

**ENVIRONMENTAL IMPACT ASSESSMENT
REPORT
OF**



**FOR
MANUFACTURING
OF
SYNTHETIC ORGANIC CHEMICALS
(Pigments)**

EXPANSION PROJECT

**Plot No. A-1/ 4701 & 4702, GIDC Estate, Ankleshwar,
Dist:-Bharuch, Gujarat**

PREPARED BY



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TERMS OF REFERENCE AND ITS COMPLIANCE**ADDITIONAL TOR**

Sr. No.	TOR Points	Compliance (Reference in EIA report)
A. Specific TOR		
1.	Unit will maintain existing discharge 254.5 KL/Day	Unit will maintain existing discharge.
2.	Unit shall developed 20% greenbelt	➤ Unit is provided 24% green belt area of total plot area within premises. Unit has got permission for additional plantation in GIDC. Letter is attached as Annexure-27.

GENERIC TOR IN RESPECT OF INDUSTRY SECTOR

Sr. No.	TOR Points	Compliance (Reference in EIA report)
1.	Executive summary (maximum 2-3 sheets in A4 Size paper) of the project covering project description, description of the environment, anticipated environmental impacts & its mitigation measures, environmental management plan, environmental monitoring programme, public consultation, project benefits, Social impacts including R&R.	➤ Brief executive summery is given in chapter 11.
2.	SITE DETAILS	
i	Location of the project site covering village, Taluka/Tehsil, district and state on Indian map of 1:1000, 000 scale.	➤ Location of project site covering village, Taluka/Tehsil, district and state on Indian map of 1:1000, 000 scales is attached as annexure-IV.
ii	A Toposheet of the study area of radius of 10km	➤ A Toposheet of the study area of radius

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	and site location on 1:50000/1:25000 scale on an A3/A2 sheet.	of 10km and site location on 1:50000/1:25000 scales on an A3/A2 sheets attached as annexure-XX.
iii	Co-ordinates (lat-long) of all four corners of the site.	➤ A co-ordinates show (lati-long) of all four corners of the site is cover in topic 1.3.1, table no.1.5, and figure 1.2 of chapter-1 from page no.3 to 6.
iv	Google map-earth downloaded of the project site.	➤ Google map on Google earth show the project site is figure 1.1 & 1.2 of chapter-1 from page no.5 to 6.
v	A map showing environmental sensitivity [land use/land cover ,water bodies ,reserved forests wildlife sanctuaries, National parks, tiger reserve etc.] and from critically/severely polluted area(s) and Eco-sensitive Area within 10km radius of the project site vis-a-vis shortest (aerial) distance from the project. If the project is located within 10km of CPA/severely polluted area, confirm whether moratorium has been imposed on the area.	➤ Map is given in Figure No. 3.8 of Chapter-3 at Page No. 97.
vi	Layout maps indicating existing unit as well proposed unit indicating storage area, plant area, green belt area, utilities etc. In addition, if located within the industrial area/estate/complex, layout of industrial area and location of unit within the industrial area/Estate/complex, layout of industrial.	➤ Existing & Proposed Layout map indicating all the things is attached as annexure- V-A & V-B.
vii	Photographs of the proposed and existing (if applicable) plant site. If existing, In addition to	➤ Photographs are attached as annexure-VI.

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	Side map, provide photographs of plantation /greenbelt in Existing project. If fresh EC application, photographs.	
3.	Land use break-up of total land of the project site (identified and acquired), government/private - agricultural, forest, wasteland, water bodies, settlements, etc shall be included.	➤ Project land is totally industrial land. ➤ Land use breakup is given under topic 2.5.1 of chapter-2 from page no. 32 to 33.
4.	A copy of the mutual agreement for land of the acquisition signed with land included.	➤ Land possession document is attached as annexure-III.
5.	Proposed shall be submitted to the ministry for environmental clearance only after acquisition of land shall be included.	➤ Existing unit. Full land acquired. ➤ Land possession document is attached as annexure-III.
6.	Forest and wildlife related issues (if applicable):	➤ Not Applicable.
i.	Permission and approval for the use of forest land (forestry clearance), if any, and recommendations of the State Forest Department.	➤ Not Applicable.
ii.	Land use map based on High resolution satellite imagery (GPS) of the proposed site delineating the forestland (in case of projects involving forest land more than 40 ha)	➤ Not Applicable.
iii.	Status of Application submitted for obtaining the stage I forestry clearance along with latest status shall be submitted.	➤ Not Applicable.
iv.	The projects to be located within 10 km of the National Parks, Sanctuaries, Biosphere Reserves, Migratory Corridors of Wild Animals, the project	➤ Not Applicable.

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	proponent shall submit the map duly authenticated by Chief Wildlife Warden showing these features vis-à-vis the project location and the recommendations or comments of the Chief Wildlife Warden-thereon	
v.	Wildlife Conservation Plan duly authenticated by the Chief Wildlife Warden of the State Government for conservation of Schedule I fauna, if any exists in the study area	➤ Not Applicable.
vi.	Copy of application submitted for clearance under the Wildlife (Protection) Act, 1972, to the Standing Committee of the National Board for Wildlife	➤ Not Applicable.
7.	Expansion/modernization proposal	
i	Copy of all the Environmental clearance (s) including Amendments thereto obtained for the project from MOEF/SEIAA shall be attached as an annexure .A certified copy of the latest Monitoring report of the regional office of the Ministry of environmental and forests as per circular dated 30 th may, 2012 on the status of compliance of condition stipulated in all the existing environmental clearance including amendments should be provided. In addition, status of compliance of consent to operate for the on-going /existing operation of the project from SPCB shall be attached with the EIA-EMP reports.	➤ Copies of all CCA are attached as Annexure –XXI-A. ➤ Compliance report of last CCA is attached as annexure – XXI-B. ➤ This is 1 st environment clearance of the unit. The regional office report condition is not applicable.
ii	In case the existing project has not obtained	➤ Unit was established before 2006

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	environmental clearance, reasons for not talking EC under the provisions of the EIA notification 2006 shall be provided copies of consent to establish /No objection certificate and consent to operate (in case of units operating prior to EIA Notification 2006, CTE and CTO of FY 2005-2006) obtained from the SPCB Shall be submitted.	notification. As per earlier notification of 1996, EC was not applicable to dye intermediates products. Unit obtain CCA. ➤ CCA are attached as annexure – XXI-A.
	Details of industrial operations	
8.	A list of major industries with name and type within study area (10km radius) shall be incorporated.	➤ Details are covered in table no.3.1 of chapter - 3 from page no.69 to 70.
9.	Details of proposed raw material and products along with production capacity. If expansion project, details for existing unit, separately for existing and new (proposed) unit.	➤ Details are covered under topic 2.3 in table no.2.1 chapter-2 from page no. 21 to 22.
10.	Details of manufacturing process, major equipment and machinery. If expansion project details of existing unit, separately for existing and new (proposed) unit.	➤ Manufacturing processes are covered under topic 2.4 of chapter - 2 from page no. 25 to 32. ➤ Details of Equipment and machinery are covered under topic 2.5.4 in table no.2.12 of chapter - 2 on page no. 38 to 39.
11.	List of raw material required and its sources long with mode of transportation shall be included. All the trucks for raw material and finished product transportation must be “ environmentally compliant”	➤ Details are covered under topic 2.3.3 in table no.2.3 & 2.4 of chapter - 2 from page no. 23 to 24.
12.	Quantity of fuel required, its sources and	➤ Details are covered under topic 2.5.3 in

Sr. No.	TOR Points	Compliance (Reference in EIA report)
	characteristic and documentary evidence to substantiate confirmed fuel linkage shall be furnished.	table no. 2.9 of chapter - 2 on page no. 37.
13.	Project site layout plan to scale using Auto CAD showing raw material ,fly ash and other storage plans bore well or water storage ,acquires dumping ,waste disposal ,green areas water bodies ,rivers/drainage passing through the project site shall be include.	➤ Existing & Proposed Plant layout is attached as annexure-V-A & V-B.
14.	Manufacturing process details of all the plants including captive power plant if any along process flow chart shall be include.	➤ Details are covered under topic 2.4 of chapter - 2 from page no 25 to 32.
15.	Mass balance for the material and products shall be included.	➤ Details are covered under topic 2.4 of chapter-2 from page no. 25 to 32.
16.	Energy balance data for all compensates of the plant shall be incorporated.	➤ Electricity connected load given in table no.2.10 of chapter -2, on page no.37.
	Environmental Status	
17.	Geological features and geo-hydrological status of the study shall be included.	➤ Geological features given under topic 1.3 of chapter - 1 from page no.3 to 7. ➤ Geo-hydrological is not applicable.
18.	Details of drainage of the project up to 5 km radius of study area. If the site within 1 km radius of any major river ,peak and lean river discharge as well as flood occurrence frequency based on peak rainfall data of the past 30 years. Details of RL of the project site and mRL of the river should also be provided.	➤ Not Applicable.
19.	One season site-specific micro-metrological data	➤ Details are covered under topic 3.2 &

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Sr. No.	TOR Points	Compliance (Reference in EIA report)
	using temperature relatively humanity, hour, wind speed and direction and rainfall and AAQ data (except monsoon)at 8 location for PM ₁₀ ,PM _{2.5} ,SO ₂ ,NO _x ,CO and HC (methane & non-methane) should be collected. The monitoring stations should take into account the pre-dominant wind direction, population zone and sensitive receptors including reserved forests.	3.4 in table no. 3.2, 3.3 & 3.4 of chapter - 3 from page no. 71 to 77.
20..	Surface water supply quality of nearly river (60m upstream and downstream) and other surface drains at eight locations to be provided.	➤ Details are covered under topic 3.5 in table no. 3.7 & 3.8 of chapter-3 from page no. 83 & 87.
21.	Ground water monitoring minimum at 8 locations shall be included.	➤ Details are covered under topic 3.5 in table no. 3.5 & 3.6 of chapter-3 from page no. 77 & 82.
22.	Noise level monitoring at 8 locations shall be included.	➤ Details are covered under topic 3.5 in table no.3.10 of chapter-3 on page no.89 & 91.
23.	Traffic study of the area for the proposed project the respect of the exist traffic ,type of vehicles, frequency of vehicles for transportation of material additional traffic due to proposed project ,parking arrangement etc.	➤ Details are covered under topic 3.11 in chapter - 3 on page no.114.
24.	Detailed description of flora and fauna (terrestrial and aquatic) existing in the study area shall be given with special reference to rare, endemic and endangered species. If Schedule-I fauna are found within the study area, a Wildlife Conservation Plan shall be prepared and furnished.	➤ Details are covered in table no.3.15 & 3.16 of chapter - 3 from page no.98 to 103.

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25.	Emission (g/sec) with and without the air pollution control measures.	➤ Details are covered in Table no.2.21-B of chapter-2 from page no.47.
26.	Cumulative impact of all sources of emission (including transportation) on the AAQ of the area shall be well assessed. Details of the model used and input model used and input data used for modeling shall also be provided. The air quality contours should be plotted on allocation map showing the location of project site, habitation nearby, sensitive receptors, if any.	➤ Details are covered under topic 4.1 & 4.2 of chapter - 4 from page no. 117 & 134. ➤ Location map is shown in figure no. 4.7 to 4.10 of chapter - 4 on page no. 131 to 134.
27.	Impact of the transport of the raw materials and end products on the surrounding environment shall be assessed and provided. On this regard, options for transport of raw materials and finished products and wastes (large quantities) by rail or rail – cum road transport or conveyor – cum – rail transport shall be examined.	➤ Details are covered under topic 4.2.4 of chapter - 4 from page no.135 to 137.
28.	Details of water requirement, water balance chart for new unit or for existing unit as well as proposed expansion (in case of expansion)	➤ Details are covered under topic 2.5.2 of chapter - 2 from page no.33 to 36. Source of water is GIDC water.
29.	Source of water supply and quantity and permission of withdrawal of water (surface/ground) from Competent Authority.	➤ Source of water is GIDC water
30.	Details regarding quantity of effluents generated, recycled and reused and discharged to be provided. Methods adopted/to be adopted for the water conservation shall be included. Zero discharge effluent concepts to be adopted.	➤ Details are covered under topic 2.6 in table 2.14 of chapter - 2 from page no. 40 & 41. ➤ Detail of water conservation covered in topic no. 10.5.2 of chapter 10 on page no. 226 & 227.

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Sr. No.	TOR Points	Compliance (Reference in EIA report)
31.	A note on treatment of wastewater from different plant operations, extent recycled and reused for different purposes shall be included. Complete scheme of effluent treatment. Characteristics of untreated and treated effluent to meet the prescribed standards of discharge under E (P) Rules.	➤ Details are covered under topic 2.10 of chapter - 2 from page no. 60 & 63.
32.	Action plan for control of ambient air quality parameters as per NAAQES Standards for PM10, PM2.5, SO2 and NOx, etc as per GSR 826(E) dated 16 th November, 2009.	➤ Details are covered under topic 6.4.4 in table 6.2 of chapter - 8 on page no.150 to 151.
33.	An action plane to control and monitor secondary fugitive emissions from all the sources as per the latest permissible limits issued by the ministry vide G.S.R. 414 (E) dated 30 th May, 2008.	➤ Details are covered under topic 6.4.4 in table 6.2 of chapter - 8 on page no.150 to 151
34.	Action plan for solid/hazardous waste generation, storage, utilization and disposal. Copies of MOU regarding utilization of solid waste shall also be included. EMP shall include the concept of waste - minimization, recycle / reuse / recover techniques, Energy conservation and natural resource conservation.	➤ Details are covered under topic 2.6.4 of chapter - 2 from page no.48 to 52. ➤ Membership certificate from BEIL are attached as annexure -XXII.
35.	Proper utilization of fly ash shall be ensured as per Fly Ash Notification, 1999 and subsequent amendment in 2003 and 2009. A detailed plan of action should be provided.	➤ Details are covered under topic 2.6.4, table no. 2.22 of chapter - 2 on page no.48. ➤ MOU with supplier is attached as annexure - VIII.
36.	Action plan for the green belt development plan in	➤ Details are covered under topic 10.4.7 of

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	33% area i.e. land with not less than 1500 trees per ha. Giving details of species, with of plantation, planning schedule etc. Shall be included. The green belt shall be around the project boundary and a scheme for greening of the roads used for the project shall also be incorporated. All rooftops/terraces shall have some green cover.	chapter - 10 on page no. 222 to 223.
37.	Action plan for rainwater harvesting measures at plant site shall be submitted to harvest rainwater from the roof tops and storm water drains to recharge the groundwater recharge structures may also be constructed outside the plant premises in consultation with local gram Panchayat and village hand to augment the ground water level, incorporation of water harvesting plan for the project is necessary, if source of water is bore well.	➤ Details are covered under topic 10.4.10 of chapter - 10 on page no. 224 to 225.
38.	Environment Management Plan (EMP) to mitigate the adverse impacts due to the project along with item wise cost of its implementation. Total capital cost and recurring cost/annum for environmental pollution control measures shall be included.	➤ Details are covered under topic 10.4 of chapter - 10 from page no. 217 to 225.
39.	Details of Rehabilitation & Resettlement (R & R) involving the project. R & R shall be as per policy of the state govt. And a detailed action plan shall be included.	➤ Not Applicable.
40.	Action plan for post – project environmental monitoring shall be submitted.	➤ Environment monitoring plan covered in chapter - 6.

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41.	Disaster Preparedness and Emergency Management Plan including Risk Assessment and damage control needs to be addressed and included.	➤ Details are covered under topic 7.6 of chapter - 7 from page no. 192 to 203.
42.	Occupational Health:	
i	Details of existing occupational & safety hazardous. What are the levels of above mentioned they are within permissible Exposure level (PEL).If these are not with in PEL so that health of the workers can be preserved.	➤ Details are covered under topic 7.7.5 & 7.7.6 of chapter - 7 from page no. 205 & 206.
ii	Details of exposure specific health status evaluation of worker. If the workers' health is being evaluated by pre designed format, chest x-rays, Audiometry, Spirometry, Vision testing (Far & Near vision, colour vision and any other ocular defect) ECG, during pre-placement and periodical examinations give the details of the same. Details regarding last month analysed data of above mentioned parameters as per age, sex, duration of exposure and department wise.	➤ Details are covered under topic 7.7.8 of chapter - 7 on page no. 207. ➤ Reports of medical and fitness medical certificate are attached as annexure - XII.
iii	Annual report of health status of workers with special reference to occupational health and safety.	➤ Reports of medical and fitness medical certificate (F.N-33) are attached as annexure - XII.
iv	Action plan for the implementation of OHS standard as per OSHAS/USEPA.	➤ Details are covered under topic 7.7.2 to 7.7.6 of chapter - 7 on page no. 204 to 206.
v	Plan and fund allocation to ensure the occupational health & safety of all contract and casual workers.	➤ Details are covered under topic 7.7.11 of chapter - 7 on page no.209 & 210.

Sr. No.	TOR Points	Compliance (Reference in EIA report)
43.	Corporate Environmental Policy	
i	Does the company have a well laid down Environment Policy approved by its Board of Directors? If so, it may be detailed in the EIA report.	➤ Environment policy approved by its Board of Directors is attached as annexure - XVI.
ii	Does the Environment Policy prescribe for standard operating process / procedures to bring into focus any infringement / deviation / violation of the environmental or forest norms / conditions? If so, it may be detailed in the EIA.	➤ Details are covered under topic 6.7 of chapter - 6 on page no. 152.
iii	What is the hierarchical system or Administrative order of the company to deal with the environmental issues and for ensuring compliance with the environmental clearance conditions? Details of this system may be given.	➤ Details are covered under topic 6.7, figure 6.1 of chapter - 6 on page no. 152 & 153.
iv	Does the company have system of reporting of non-compliances / violations of environmental norms to the Board of Directors of the company and / or Shareholders or stakeholders at large? This reporting mechanism shall be detailed in the EIA report.	➤ Details are covered under topic 6.7, figure 6.2 of chapter - 6 on page no 153.
44.	Details regarding infrastructure facilities such as sanitation, fuel, restroom etc. to be provided to the labour force during construction as well as to the casual workers including truck drivers during operation phase.	➤ This is existing unit so all infrastructure facilities are provided. ➤ Unit is in Industrial estate so there is no residential facility provided.
45.	At least 5% of the total cost of the project shall be earmarked towards the enterprise social commitment based on public hearing issue and	➤ Details are covered under topic 8.1 in table 8.1 of chapter - 8 from page no. 212.

Sr. No.	TOR Points	Compliance (Reference in EIA report)
	item wise details along with time bound action plan shall be included. Social-economic development activities need to be elaborated upon.	
46.	Any litigation pending against the project and/or any direction/order passed by any Court of Law against the project, if so, details thereof shall also be included. Has the unit received any notice under the Section 5 of Environment (Protection) Act, 1986 or relevant Sections of Air and Water Acts? If so, details thereof and compliance/ATR to the notice(s) and present status of the case.	➤ Attached as Annexure –XVII.
47.	The questionnaire for industry sector (available on MoEF Website) shall be submitted as an annexure to the EIA-EMP reports.	➤ The questionnaire for industry sector is attached as annexure - XXIII.
48.	‘TORs’ prescribed by the expert appraisal Committee (industry) shall be considered for preparation of EIA-EMP reports for the project in addition to all the relevant information as per the ‘genetic structure of EIA’ is given in appendix IIIA in the EIA notification ,2006.where the documents provided are in language other than English ,an English translation shall be provided. The draft EIA –EMP, report shall be submitted to the state pollution control board of the concerned state for the conduct public hearing. The SPCB shall conduct public hearing/public consultation, district wise, as per the provisions of EIA Notification, 2006.the issues raised in the public hearing and during the consultation process and	➤ Instruction followed.

Sr. No.	TOR Points	Compliance (Reference in EIA report)
	the committee made by the project proponent the same shall include separately in EIA-EMP reports in the form tabular chart with financial budget (capital and revenue) along with time-schedule of implementation for complying with the commitments made. The final EIA reports shall submitted to the ministry for obtaining environmental clearance.	
49.	A tabular chart with index for point wise compliance of above TORs.	➤ Cover in TOR Compliance.
50.	The TORs prescribed shall be valid for a period of three years for submission of the EIA-EMP Reports. Along with public hearing proceedings(whatever stipulated)	➤ Noted.
ADDITIONAL TOR FOR SYNTHETIC ORGANIC CHEMICAL INDUSTRY		
1.	Manufacturing process details along with the chemical reaction and process flow chart.	➤ Manufacturing process & material balance are covered in topic 2.4 of chapter-2 from page no. 25 to 32.
2.	Name of all solvent to be used in the process and details of the solvent recovery system.	➤ Details are covered under topic 2.9 of chapter - 2 from page no. 55 to 59.
3.	Design details of ETP, incinerator, if any along with boiler, scrubber/bag filters etc.	➤ Design details of ETP are covered under topic 2.10 in chapter – 2 from page no. 60 to 63. ➤ Incinerator not required.
4.	The details of solid and hazardous waste generation, storage, utilisation and disposal particularly related to the hazardous calorific value of hazardous waste and detailed characteristic of the hazardous waste. Action plan	➤ Details of solid and hazardous waste generation, storage are covered under topic 2.10 in table no.2.22 & 2.23 of chapter-2 on page no.48 to 50. ➤ Membership certificate from BEIL are

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	of the disposal of fly ash generated from boiler shall include.	attached as annexure-XXII. ➤ MOU with supplier is attached as annexure - IX.
5.	Precaution to be taken during the storage and transportation of hazardous chemical shall be clearly mentioned and incorporated.	➤ Details are covered under topic 7.5 in table no. 7.18 of chapter - 7 on page no. 187 to 191.
6.	Material safety data sheet for all the chemicals are being used/will be used. AS No./RTECS No./DOT/UN ETC to be mentioned against each chemicals.	➤ Noted. ➤ Material Safety Data Sheet is provided in soft copy. Hard copy of few MSDS is attached as annexure-XXIV.
7.	Details of VOC monitoring in the working zone environment, and other hazardous emission such as chlorine, HCl, etc if any.	➤ Details are covered under topic 6.7.7 & 6.7.8 of chapter - 6 on page no. 6.52 & 6.53.
8.	Authorization/membership for disposal of the solid/hazardous waste in TSDF.	➤ Membership certificate from BEIL are attached as annexure-XXII.
9.	Risk assessment for the storage for chemicals /solvents. Action plan for the handing & safety system.	➤ Details are covered in topic 7.2 and 7.3 table no.7.1 to 7.9 of chapter-7 from page no.156 to 185. ➤ Action plan is covered in topic 7.7.9 of chapter - 7 on page no. 208.
10.	Details of occupation health programme.	➤ Details are covered under topic 7.7 of chapter - 7 from page no 204 to 211.
i	To which chemical, workers are exposed directly or indirectly.	➤ Details are covered under topic 7.3.1 in table no. 7.5, 7.6 of chapter - 7 from page no. 161 to 166.
ii	Whether these chemical, are chemical within threshold limit values (TLV) / permissible exposure levels as per ACGIH recommendation.	➤ Details are covered in table no. 7.2 of chapter - 7 on page no. 160.

Sr. No.	TOR Points	Compliance (Reference in EIA report)
iii	What measure company has taken to keep these chemicals within PEL/TLV?	➤ Details are covered under topic 7.7.6 of chapter - 7 from page no. 206.
iv	How the workers evaluated concerning their exposure to chemical during pre-placement and periodical medical monitoring.	➤ Details are covered under topic 7.7.4 to 7.7.12 of chapter-7 on page no. 205-211.
v	Liver function test (LFT) during pre-placement and periodical examination.	➤ Details are covered under topic 7.7.4 to 7.7.9 of chapter-7 on page no. 205 to 209. ➤ Copies of medical checkup are attached as Annexure XII.
11.	A toxic management plan shall be prepared.	➤ Details are covered under topic 7.7.9 of chapter - 7 in page no. 208 & 209.
12.	A write up on “safe practice” followed for handing, storage, transportation and unloading of chemical to be submitted.	➤ Details are covered under topic 7.5 of chapter – 7 on page no.187 to 191.
13.	What are onsite and offsite emergency plan during chemical disaster.	➤ Details are covered under topic 7.6 of chapter - 7 on page no. 192 to 202.
14.	A write up on “treatment of workers affected by accidental spillage chemical”.	➤ Details are covered under topic 7.7 of chapter - 7 on page no. 204 to 211.

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ABBREVIATIONS

AAQM	Ambient Air Quality Monitoring
APCM	Air Pollution Control Measures
API	Active Pharmaceutical Ingredient
AMSL	Above Mean Sea Level
BEIL	Bharuch Environ Technology Limited
BGL	Below Ground Level
BOD	Biological Oxygen Demand
CETP	Common Effluent Treatment Plant
CGWA	Central Ground Water Authority
CGWB	Central Ground Water Board
CH BASE	Chlorhexidine Base

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CH & S	Community Health & Safety
CO	Carbon Monoxide
COD	Chemical Oxygen Demand
CPCB	Central Pollution Control Board
CSR	Corporate Social Responsibility
CTE	Consent to Establish
CTO	Consent to Operate
Db	Decibels
DCM/MDC	Dichloro Methane/Methylene Dichloride
DCP	Dry Carbon Powder
DEM	Dimethyl ether
DFO	Deputy Forest Officer
DG	Diesel Generator
DGVCL	Dakshin Gujarat Vij Company Limited
DMP	Disaster Management Plan
DMS	Dimethyl Sulfide
DO	Dissolve Oxygen
EHS	Environmental Health and Safety
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EOT	Electric Overhead Travel
EPA	Environmental protection Act
ESP	Exchangeable Sodium Percentage
ETP	Effluent Treatment Plant
ETL	Enviro Technology limited
FAE	Functional Area Expert
FETP	Final Effluent Treatment Plant
GIDC	Gujarat Industrial Development Corporation
GLC	Ground Level Concentration
GPS	Global Positioning System
Ha	Hectare
HAZOP	Hazard and Operability Study
HBr	Hydrobromic Acid
HC	Hydrocarbon
HCl	Hydrochloric acid
HDPE	High Density Polyethylene
HP	Horse Power
HSD	High Speed Diesel
H₂S	Hydrogen sulfide
H₂SO₄	Sulphuric Acid
IMD	Indian Meteorological Department
IPA	Isopropyl alcohol
IPE	Isopropyl Ether
INR	Indian Rupees
ISCST-3	Industrial Source Complex Short Term-3
KG	Kilo Gram
KLD	Kilo Liter per Day
KVA	Kilo Volt Ampere
kW	Kilowatt

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MCLS	Maximum Credible Loss Scenarios
MEE	Multiple Effect Evaporator
MIBK	Methyl Isobutyl Ketone
MoEF	Ministry of Environment and Forest& Climate Change
MoU	Memorandum of Undertaking
MS	Mild Steel
MSI HC	Manufacture, Storage and Import of Hazardous Chemical
MSDS	Material Safety Data Sheet
MSW	Municipal Solid Waste
MT	Metric Tone
NA	Not Applicable
NABET	National Accreditation Board of Education and Training
NAAQS	National Ambient Air Quality Standards
NaOH	Sodium Hydroxide
NCTL	Narmada Clean Tech Limited
NH	National Highway
NH₃	Ammonia
NOC	No Objection Certificate
NO_x	Nitrogen Oxides
ODPA	4,4"-Oxydiphthalic acid
OHS	Occupational Health& Safety
OSHAS	Occupation Health and Safety Assessment Series
PCU	Passenger Car Unit
PEL	Permissible Exposure Level
PESO	Petroleum and Explosives Safety Organization
PHC	Public Health Center
PM	Particulate Matter
PP	Project Proponent
PPE	Personal Protective Equipments
PPMV	Parts per Million by Volume
PUCC	Pollution Under Control Certificate
QCI	Quality Council of India
R&R	Resettlement & Rehabilitation
RCC	Reinforced Cement Concrete
RO	Reverse Osmosis
SEAC	State Expert Appraisal Committee
SEIAA	State Environment Impact Assessment Authority
SS	Stainless Steel
STP	Sewage Treatment Plant
SH	State Highway
SO₂	Sulfur Dioxide
TBA	Tertiary Butanol
TDS	Total Dissolved Solids
TEBA	Benzyltriethylammonium chloride
THF	Tetra Hydro furan
TOC	Total Organic Compound
ToR	Terms of Reference
TPD	Tone Per Day
TSDF	Transportation Storage and Disposal Facility

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TSS	Total Suspended Solid
USEPA	United States Environment Protection Agency
VECs	Valued Environmental Components
VOC	Volatile Organic Compound
ZLD	Zero Liquid Discharge

CHAPTER - 1

INTRODUCTION

1.1 PURPOSE OF THE REPORT

As per the EIA Notification dated 14th Sept., 2006, as amended from time to time; it is mandatory to have Environmental Clearance for any new industry or the expansion/modernization of the existing industry from Ministry of Environment, Forests & Climate Change, Government of India, New Delhi / SEIAA, Gandhinagar, Gujarat. For this, Environment Impact Assessment (EIA) is to be conducted as per guidelines given by MoEF&CC, New Delhi.

The purpose of the EIA report is to provide a coherent statement of the potential impacts of the proposed project and the measures that should be taken to eliminate, reduce and remedy them. It contains essential information for:

- The proponent to implement the proposal in an environmentally and socially responsible way;
- The responsible authority to make an informed decision on the proposal, including the terms and conditions that must be attached to an approval or authorization; and
- The public to understand the proposal and its likely impacts on people and the environment.

1.1.1 INTRODUCTION OF THE PROJECT & PROJECT PROPONENT

1.1.1.1 IDENTIFICATION OF PROJECT

(A) PROJECT PROPOSAL

M/s. A- One Chemicals is located at Plot No. A-1/ 4701 & 4702, GIDC Estate, Ankleshwar, Dist:- Bharuch, Gujarat. Unit was established in 1987. Unit had got NOC vide ref No. GPCB/BRCH/NOC-3070 CCA (122)/16440, dated 7th June 2005 for manufacturing of CPC Blue, Alpha Blue and Beta Blue 350 MT/Month. Same quantity consent is continuing. The unit has valid CCA order AWH-90951, issue on dated 03/02/2018 for manufacturing of CPC Blue, Alpha Blue and Beta Blue. Total existing production capacity is 350 MT/Month. After expansion, total proposed production capacity will be 825 MT/Month. The unit has proposed expansion of existing products. The details of product are given in table no.1.1. The product proposed by the unit fall in the Schedule attached to the EIA Notification, i.e. Project No. 5(f).

The purpose of this report is to:

- Establish a pre-project baseline with respect to environmental indicators.
- Identify environment related impacts.
- Evaluate safety related risk factors associated with project.
- Propose appropriate mitigation measures for minimizing the adverse impactsto the extent possible.
- Suggest Environment Management Plan.

- Recommend Risk Management Plan.

This report is also made in the overall frame work of the Environmental Impact Assessment (EIA) Notification dated 14th September 2006 (and subsequent amendments to the same) issued by the Ministry of Environment and Forests (MoEF), by providing required information with regards to the project as mentioned in the Terms of Reference issued by the State Level Environment Impact Assessment Committee.

TABLE: 1.1

LIST OF PRODUCTS

Sr. No.	Product	CAS No.	Quantity as per CCA-50195 in MT/Month	Additional Quantity as per Proposed for EC MT/Month	Quantity After Expansion in MT/Month	End Use
1.	CPC Blue	74160	300	350	650	Paint, Ink & Plastic
2.	Beta Blue	74160	25	125	150	
3.	Alpha Blue	74160	25	0	25	
	Total		350	475	825	
Byproduct						
1.	Ammonia Liquor (10 to 15 %)		300	-300	0	
2.	Ammonium Carbonate	506-87-6	1500	1500	3000	In Ammonium Sulphate
3.	Ammonium Sulphate	7783-20-2	120	380	500	For textiles purpose.
	Total		1920	1580	3500	

(B) SCREENING CATEGORY

As per EIA Notification dated 14th September, 2006, as amended from time to time; this project falls under Category “B”, Project or Activity-5 (f) and requires Environmental Clearance from SEAC, Gandhinagar. As per Office Memorandum- Compliance of Hon’ble NGT order dated 19.08.2019 (published on 23.08.2019) in O.A. No. 1038 2018 - reg. Date:31/10/2019, we are applying as Category A-Project.

1.2 IDENTIFICATION OF THE PROJECT AND PROJECT PROPONENT

M/s. A-One Chemicals is an expansion unit which will be manufacture organic dyes after having valid environment clearance in category 5(f).

1.2.1 PROJECT PROPONENT

M/s. A-One Chemicals will involve in the manufacturing of organic dyes. The partners of the company have good experience in handling the production management, financial management and

all the allied areas. One of the partner of the company is Mr. Ganshyambhai B. Patel, is a having more than 30 years, experience in Production, Operations, Process Improvement & optimization and new product Scale up, etc. He is associated with A-One Chemicals since inception and under his guidance and work; company has reached to this level. Details regarding partner is given in Table 1.2.

TABLE: 1.2**LIST OF PARTNERSS**

Sr. No.	Name	Address Telephone No./Fax No./ E- Mail Address
1.	Mr. Ganshyambhai B. Patel	1 HansvillaResidency, Nr. SuvernavillaBunglows, Hebatur Cross road, Thaltej, Bopal, Ahmedabad-380054 Ph:- (M) 9824558113
2.	Mr. Ashwinbhai G. Patel	E-Mail:- Plant@aonechemicals.com ashvin@aonechemicals.com
3.	Mr. Vipulbhai N. Patel	19-22, HansvillaResidency, Nr. SuvernavillaBunglows Hebatur cross road, Thaltej, Bopal, Ahmedabad-380054 (R):- 29096009

1.3 BRIEF DESCRIPTION OF NATURE, SIZE AND LOCATION OF THE PROJECT**1.3.1 BRIEF DESCRIPTION OF NATURE, SIZE AND LOCATION OF PROJECT**

Brief description of project in terms of nature, size, location of the project and its importance to the country, region is given in the Table 1.3. And list of nearby Industries is given below in table no. 1.4.

TABLE: 1.3**BRIEF DESCRIPTION OF NATURE, SIZE AND LOCATION OF PROJECT**

Sr. No.	Particulars	Details
A.	Nature & Size of the Project	Organic Dyes (825 MT/Month)
B.	Location Details	
1.	Plot No.	A-1/ 4701 & 4702
2.	Village	Ankleshwar
3.	Tehsil	Ankleshwar
4.	District	Bharuch
5.	State	Gujarat
6.	Co-ordinate Extends	Latitude: 20° 21' 12.24" N Longitude: 72° 56' 2.70" E
Location map of the project site has been shown in Figure – 1.1.		

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Sr. No.	Particulars	Details
C. Area Details		
1.	Total Project Area	5460 sq. m.
2.	Greenbelt/ Plantation area	1350.45 sq. m. (24.73% of total plot area)
D. Environmental Setting Details (with approximate aerial distance and direction from proposed project site)		
1.	Nearest Village	Ankleshwar about 2.00 KM
2.	Nearest Town / City and District Headquarter	Ankleshwar about 1 KM
3.	Nearest Railway station	Ankleshwar Railway Station about 1.5 KM
4.	National Highway	• SH-8 (1 km)
5.	Nearest Airport	Surat Airport (55 km in N direction)
6.	Water bodies within 10 km radius	Amaravati river is about Narmada KM 10.5 in WWS direction
7.	National Park, Wild Life Sanctuaries, Biosphere Reserves, Reserve / Protected Forests, Tiger Reserves, Wildlife Corridors, etc.) Within 10 Km. radius (boundary to boundary distance)	No National Park/Wild Life Sanctuary/Biosphere Reserve/Reserve Forest/Protected Forest/Tiger Reserve/Wildlife Corridor etc. Falls within 10 Km. radius of the project site.
Environmental Settings of the 10-km radius study area has been shown in Figure - 1.3		
E. Cost details		
1.	Capital cost of the Project	Rs. 5 Crores
2.	Cost for Environmental Protection Measures	Capital Cost: Rs. 0.75 Crores

TABLE: 1.4**NEARBY INDUSTRY DETAILS**

Name of Industry	Direction w.r.t project site	Address
16 Mt GIDC Road	East side of company	---
20 Mt GIDC Road	North side of company	Plot No. 37/7, GIDC Estate, Jhagadia.
Anita Synthetics	South side of company	Plot No. 3302/B, GIDC Estate, Ankleshwar.
Holy land Corporation	West side of company	Plot No. 3302/D, GIDC Estate, Ankleshwar, District: Bharuch-393002, Gujarat

TABLE 1.5**DETAILS OF FOUR CORNERS CO-ORDINATE OF SITE**

Direction	Corners	Latitude	Longitude
North	1 st	21°37'5.86"N	73° 2'2.51"E
West	2 nd	21°37'3.86"N	73° 2'2.36"E
South	3 rd	21°37'3.98"N	73° 1'59.42"E
East	4 th	21°37'6.05"N	73° 1'59.52"E

1.3.2 LOCATIONMAP

FIGURE: 1.1

PROJECTLOCATION MAP

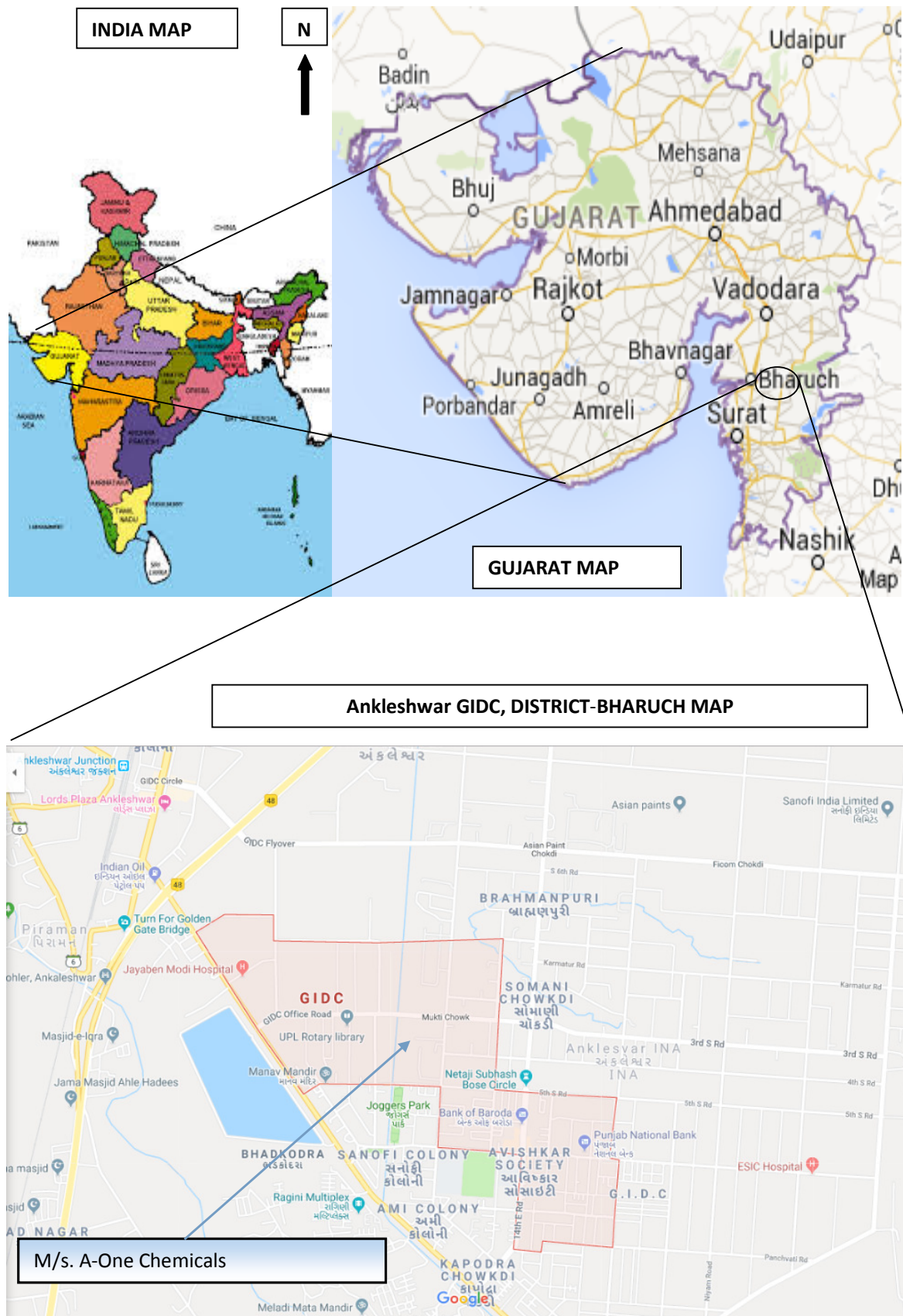


FIGURE: 1.2

AERIAL VIEW OF THE PROJECT SITE



1.3.3 LOCATION OF THE PROJECT

The project site is located at Plot No. A-1/ 4701 & 4702, GIDC Estate, Ankleshwar, Dist:-Bharuch, Gujarat in the state of Gujarat which is one of the fastest growing industrial estate and having all the essential facilities & infrastructure for the management & disposal of effluent discharge. It is approximately 16 km distance from Dist.: Bharuch. The approximate geographical positioning of the project site is at Latitude: 20° 21' 12.24" N and Longitude: 72° 56' 2.70" E. The location of the project site can be identified from the location map shown in Figure-1.1.

1.3.4 SITESELECTION

Ankleshwar GIDC Location

- Ankleshwar GIDC is in Ankleshwar Taluka of Central part of Bharuch District, Gujarat, India. It is well connected with National Highway (NH-8). Road and Railway both are having the connectivity to New Delhi, the National Capital and Mumbai, the commercial Capital of India.

Connectivity

- Road: Ankleshwar GIDC is on 6 lane State Highway connecting of Bharuch (13Kms) with National Highway No. 8
- Rail: 3kms from Ankleshwar, Main Rail Head connecting Mumbai - Delhi..
- Airport: Baroda-75kms and Surat-72kms (Daily flights to Mumbai & Delhi).

Area of GIDC Ankleshwar

GIDC Ankleshwar covers the total land area of 1600 Hect. and more than 1500 industries, consisting of chemicals, pesticides, pharmaceuticals, bulk drugs, petroleum products, engineering, textiles, plastics, rubber and packaging etc. are located in this industrial estate

Infrastructure and Services in Ankleshwar GIDC

- The Estate is connected with internal road network consist of single lane in GIDC, Double lanes 3 KMs & 4 lanes 26.6 KMs to meet the transport requirements of member industries. GIDC had developed this network and is maintained by them.
- Street lights.
- Storm Water Disposal (SWD) facility alongside road.

Water

- GIDC is co-developer for water supply.
- Water distribution network for 150 MLD water supply.

Drainage / Effluent Disposal

- Enviro Technology Limited – a CETP was established in 1986 having 1.8 MLD capacity and EC is obtained to increase the capacity to 3.5 MLD.
- Common incinerator of 2.5 MT/Hr capacity was erected in 2004 near TSDF site.
- Closed pipeline conveyance from FETP (Narmada Clean Tech) to deep sea was completed in 2006. The capacity of FETP is of 60 MLD.
- Ankleshwar Cleaner Process Technology Centre Private Limited (ACPTCL)- Zero-Liquid discharge facility was commissioned in March 2016 and This facility has a humongous 3 MLD handling capacity and it is well-equipped with the world's most trusted and best technologies like Forced evaporation systems, Multi-effect evaporators, Mechanical vapour recompression, Reverse osmosis, Biological treatment etc.

1.4 REGULATORY FRAMEWORK

To keep the environment congenial for better standard of living, the provisions have been made in the constitution of India and many Enactments have taken place, so that, Industrialization may not have adverse impact on the environment. There are many Acts/ Rules/ Notifications issued by MoEF & CC in this regard, few of them are mentioned below:

- Environment (Protection) Act, 1986;
- Environment (Protection) Rules, 1986;
- Water (Prevention & Control of Pollution) Act, 1974;
- Air (Prevention & Control of Pollution) Act, 1981;
- Environmental Impact Assessment (EIA) Notification, dated 14th September 2006 as amended from time to time.

1.5 SCOPE OF THE STUDY

The Disciplines covered under the study are pre-requisite in formation of the proposed site, process technology, effluent generation, treatment and its proper disposal, hazardous waste management, impacts and management plans. This report contains data of ambient air quality monitoring as well as the ecological studies noise environment, socio-economic study carried out during Winter Season (December-2016 to Feb-2017).

Application (Appendix-I/Form-I/ToR and Pre-Feasibility Report) for obtaining Environmental Clearance for this proposed project was submitted online proposal no. IA/GJ/IND2/61019/2016 dated 10th December 2006 to EAC, New Delhi.

1.5.1 SIZE AND COST OF THE PROJECT

The expected cost of proposed project is Rs.500 lacs. New Plant and machinery installations will also have to be acquired and installed. Environment Protection and safety systems have also been considered in planning the Cost Projection. The below given table no-5 shows the break-up of the proposed project cost.

TABLE: 1.6

CAPITAL COST PROJECTION

Sr. No.	Purpose	Total (Rs. In Lacs)
1.	Land	Existing land
2.	Building	100
3.	MEE Spray Drier	165 205
4.	Environment Protection & Safety	
a)	Effluent treatment Plant	--
b)	Safety Equipment (PPE, fire extinguishers, Ventilation, etc.)	10
c)	Green belt development	20
	Total	500

1.6 REGULATORY FRAMEWORK

As per the EIA Notification, September 2006, the proposed project falls under category 5(f) of the schedule. The unit manufactures organic chemicals which require prior Environmental Clearance (EC). They are categorized as Category 'B', requiring EC from STATE LEVEL EXPERT APPRAISAL COMMITTEE. The EIA report is based on the TORs received vide as J-11011/383/2016-IA.II(I) dated: - 07th July, 2017 and TOR Amendment received vide **letter No. J-11011/383/2016-IA.II(I)** dated: - 21 May 2018. Letter containing TOR & TOR Amendment given by the MoEF&CC New Delhi is attached as Annexure-I.

1.7 SCOPE & OBJECTIVES OF THE EIA STUDY

This EIA Report is prepared to comply with the requirements of the SEAC as per the guideline for the Clearance. The objectives of this EIA are:

- To describe the Project and associated works together with the requirements for carrying out the Project.
- To identify and describe the elements of the community and environment likely to be affected by the Project, and / or likely to cause impacts upon the Project, including both the natural and man-made environment.
- To identify and quantify emission sources and determine the severity of impacts on sensitive receivers and potential affected uses.
- To recognize and quantify any environmental impacts associated with the Project and recommend appropriate mitigation measures.
- To study existing landscape and visual quality in the study area so as to evaluate the landscape and visual impacts of the project.
- To propose mitigation measures to minimise pollution, environmental disturbance and nuisance during construction and operation of the project;
- To identify, predict and evaluate the residual (that is, after practicable mitigation) environmental impacts and cumulative effects expected to arise during the construction and operation phases of the project in relation to the sensitive receivers and potential affected uses.
- To identify, assess and specify methods, measures and standards, to be included in the detailed design, construction and operation of the project which are necessary to mitigate these impacts and reduce them to allowable levels within established standards / guidelines.
- To investigate the extent of side-effects of proposed mitigation measures that may lead to other forms of impacts.
- To identify constraints associated with the mitigation measures recommended in this EIA.
- To identify any additional studies necessary to fulfil the objectives to the requirements of this EIA Study.

1.8 STRUCTURE OF EIA REPORT

The generic structure of the EIA report, as per the guideline provided by MoEF&CC is illustrated in the following tabulated format.

TABLE: 1.7**STRUCTURE OF EIA REPORT**

Sr. No.	EIA Structure	Contents
1.	Introduction	• Purpose of the report and regulatory frame work • Identification of the project and project proponent • Key Information of project • Regulatory Frame work • Scope & Objective of EIA study • Structure of EIA report • Terms of reference & Its Compliance
2.	Project Description	• Condensed description of those aspects of the project (based on project feasibility study), likely to cause environmental effects. Description contains the details of the following: • Type of project • Need for the project • Location details showing general location, specific location, project boundary & project site layout) • Technology and process description • Project description. Including drawings showing project layout, components of project etc. Schematic representations of the feasibility drawings which give information important for EIA purpose • Description of mitigation measures incorporated into the project to meet environmental standards,
3.	Description of the Environment	• Study area, period, components & methodology • Establishment of baseline for valued environmental components, as identified in the scope • Base maps of all environmental components
4.	Anticipated Environmental Impacts & Mitigation Measures	• Details of Investigated Environmental impacts due to project location, possible accidents, project design, project construction, regular operations, final decommissioning or rehabilitation of a completed project • Measures for minimizing and / or offsetting adverse impacts identified • Irreversible and Irretrievable commitments of environmental components • Assessment of significance of impacts (Criteria for determining significance, Assigning significance) • Mitigation measures
5.	Analysis of alternatives (technology & site)	• Need for alternatives with respect to technology and site selection, give details of each alternative, summary of adverse impact of each alternative and propose mitigation measures for each alternative.
6.	Environmental Monitoring Program	• Technical aspects of environmental monitoring for the effectiveness of mitigation measures (incl. Measurement methodologies, frequency, location, data analysis, reporting

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Sr. No.	EIA Structure	Contents
		schedules, emergency procedures, budget & procurement schedules)
7.	Additional Study: Risk Assessment & Disaster Management Plan	- Hazard Identification - Risk Assessment & control/prevention Measures - Disaster Management
8.	Project Benefits	Detail of the Socioeconomic & other tangible benefits of the project
9.	Environmental Cost Benefit Analysis	Environmental cost benefit analysis to be carried out if required.
10.	Environment Management Plan	- Description of the administrative aspects of ensuring that mitigation measures are implemented and their effectiveness monitored, after approval of the EIA. The Chapter consist of: - Mitigation measures for impacts - Pollution Prevention Plan - Greenbelt Development Plan - Mangrove Management Plan - Dredging management Plan
		- Waste management plan - Environment Management Cell - Budgetary Provisions for EMS
11.	Summary & Conclusion	Description of brief of EIA report
12.	Disclosure of Consultant Engaged	Detail of the EIA Consultant

1.9 TERMS OF REFERENCE**TABLE: 1.8****ADDITIONAL TOR**

Sr. No.	TOR Points
1.	Unit will maintain existing discharge 254.5 KL/Day
2.	Unit shall develop 20% greenbelt

TABLE: 1.9**STANDARD TOR**

Sr. No.	TOR Points
1.	Executive summary (maximum 2-3 sheets in A4 Size paper) of the project covering project description, description of the environment, anticipated environmental impacts & its mitigation measures, environmental management plan, environmental monitoring

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Sr. No.	TOR Points
	program, public consultation, project benefits, Social impacts including R&R.
2.	SITE DETAILS
i	Location of the project site covering village, Taluka/Tehsil, district and state on Indian map of 1:1000, 000 scale.
ii	A Toposheet of the study area of radius of 10km and site location on 1:50000/1:25000 scale on an A3/A2 sheet.
iii	Co-ordinates (lat-long) of all four corners of the site.
iv	Google map-earth downloaded of the project site.
v	A map showing environmental sensitivity [land use/land cover ,water bodies ,reserved forests wildlife sanctuaries, National parks, tiger reserve etc.] and from critically/severely polluted area(s) and Eco-sensitive Area within 10km radius of the project site vis-a-vis shortest (aerial) distance from the project. If the project is located within 10km of CPA/severely polluted area, confirm whether moratorium has been imposed on the area.
vi	Layout maps indicating existing unit as well proposed unit indicating storage area, plant area, green belt area, utilities etc. In addition, if located within the industrial area/estate/complex, layout of industrial area and location of unit within the industrial area/Estate/complex, layout of industrial.
vii	Photographs of the proposed and existing (if applicable) plant site. If existing, In addition to Side map, provide photographs of plantation /greenbelt in Existing project. If fresh EC application, photographs.
3.	Land use break-up of total land of the project site (identified and acquired), government/private - agricultural, forest, wasteland, water bodies, settlements, etc shall be included.
4.	A copy of the mutual agreement for land of the acquisition signed with land included.
5.	Proposed shall be submitted to the ministry for environmental clearance only after acquisition of land shall be included.
6.	Forest and wildlife related issues (if applicable):
i.	Permission and approval for the use of forest land (forestry clearance), if any, and

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Sr. No.	TOR Points
	recommendations of the State Forest Department.
ii.	Land use map based on High resolution satellite imagery (GPS) of the proposed site delineating the forestland (in case of projects involving forest land more than 40 ha)
iii.	Status of Application submitted for obtaining the stage I forestry clearance along with latest status shall be submitted.
iv.	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-à-vis the project location and the recommendations or comments of the Chief Wildlife Warden-thereon
v.	Wildlife Conservation Plan duly authenticated by the Chief Wildlife Warden of the State Government for conservation of Schedule I fauna, if any exists in the study area
vi.	Copy of application submitted for clearance under the Wildlife (Protection) Act, 1972, to the Standing Committee of the National Board for Wildlife
7.	Expansion/modernization proposal
i	Copy of all the Environmental clearance (s) including Amendments thereto obtained for the project from MOEF/SEIAA shall be attached as an annexure .A certified copy of the latest Monitoring report of the regional office of the Ministry of environmental and forests as per circular dated 30 th may, 2012 on the status of compliance of condition stipulated in all the existing environmental clearance including amendments should be provided. In addition, status of compliance of consent to operate for the on-going /existing operation of the project from SPCB shall be attached with the EIA-EMP reports.
ii	In case the existing project has not obtained environmental clearance, reasons for not talking EC under the provisions of the EIA notification 2006 shall be provided copies of consent to establish /No objection certificate and consent to operate (in case of units operating prior to EIA Notification 2006, CTE and CTO of FY 2005-2006) obtained from the SPCB Shall be submitted.
	Details of industrial operations
8.	A list of major industries with name and type within study area (10km radius) shall be incorporated.
9.	Details of proposed raw material and products along with production capacity. If expansion project, details for existing unit, separately for existing and new (proposed) unit.

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Sr. No.	TOR Points
10.	Details of manufacturing process, major equipment and machinery. If expansion project details of existing unit, separately for existing and new (proposed) unit.
11.	List of raw material required and its sources long with mode of transportation shall be included. All the trucks for raw material and finished product transportation must be “environmentally compliant”
12.	Quantity of fuel required, its sources and characteristic and documentary evidence to substantiate confirmed fuel linkage shall be furnished.
13.	Project site layout plan to sale using Auto CAD showing raw material ,fly ash and other storage plans bore well or water storage ,acquires dumping ,waste disposal ,green areas water bodies ,rivers/drainage passing through the project site shall be include.
14.	Manufacturing process details of all the plants including captive power plant if any along process flow chart shall be include.
15.	Mass balance for the material and products shall be included.
16.	Energy balance data for all compensates of the plant shall be incorporated.
	Environmental Status
17.	Geological features and geo-hydrological status of the study shall be included.
18.	Details of drainage of the project up to 5 km radius of study area. If the site within 1 km radius of any major river ,peak and lean river discharge as well as flood occurrence frequency based on peak rainfall data of the past 30 years. Details of RL of the project site and mRL of the river should also be provided.
19.	One season site-specific micro-metrological data using temperature relatively humanity, hour, wind speed and direction and rainfall and AAQ data (except monsoon)at 8 location for PM ₁₀ ,PM _{2.5} ,SO ₂ ,NO _x ,CO and HC (methane & non-methane) should be collected. The monitoring stations should take into account the pre-dominant wind direction, population zone and sensitive receptors including reserved forests.
20..	Surface water supply quality of nearly river (60m upstream and downstream) and other surface drains at eight locations to be provided.
21.	Ground water monitoring minimum at 8 locations shall be included.
22.	Noise level monitoring at 8 locations shall be included.
23.	Traffic study of the area for the proposed project the respect of the exist traffic ,type of vehicles, frequency of vehicles for transportation of material additional traffic due to proposed project ,parking arrangement etc.
24.	Detailed description of flora and fauna (terrestrial and aquatic) existing in the study area

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Sr. No.	TOR Points
	shall be given with special reference to rare, endemic and endangered species. If Schedule-I fauna are found within the study area, a Wildlife Conservation Plan shall be prepared and furnished.
25.	Emission (g/sec) with and without the air pollution control measures.
26.	Cumulative impact of all sources of emission (including transportation) on the AAQ of the area shall be well assessed. Details of the model used and input model used and input data used for modeling shall also be provided. The air quality contours should be plotted on allocation map showing the location of project site, habitation nearby, sensitive receptors, if any.
27.	Impact of the transport of the raw materials and end products on the surrounding environment shall be assessed and provided. On this regard, options for transport of raw materials and finished products and wastes (large quantities) by rail or rail – cum road transport or conveyor – cum – rail transport shall be examined.
28.	Details of water requirement, water balance chart for new unit or for existing unit as well as proposed expansion (in case of expansion)
29.	Source of water supply and quantity and permission of withdrawal of water (surface/ground) from Competent Authority.
30.	Details regarding quantity of effluents generated, recycled and reused and discharged to be provided. Methods adopted/to be adopted for the water conservation shall be included. Zero discharge effluent concepts to be adopted.
31.	A note on treatment of wastewater from different plant operations, extent recycled and reused for different purposes shall be included. Complete scheme of effluent treatment. Characteristics of untreated and treated effluent to meet the prescribed standards of discharge under E (P) Rules.
32.	Action plan for control of ambient air quality parameters as per NAAQES Standards for PM10, PM2.5, SO2 and NOx, etc as per GSR 826(E) dated 16 th November, 2009.
33.	An action plane to control and monitor secondary fugitive emissions from all the sources as per the latest permissible limits issued by the ministry vide G.S.R. 414 (E) dated 30 th May, 2008.
34.	Action plan for solid/hazardous waste generation, storage, utilization and disposal. Copies of MOU regarding utilization of solid waste shall also be included. EMP shall include the concept of waste - minimization, recycle / reuse / recover techniques, Energy conservation and natural resource conservation.
35.	Proper utilization of fly ash shall be ensured as per Fly Ash Notification, 1999 and

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Sr. No.	TOR Points
	subsequent amendment in 2003 and 2009. A detailed plan of action should be provided.
36.	Action plan for the green belt development plan in 33% area i.e. land with not less than 1500 trees per ha. Giving details of species, with of plantation, planning schedule etc. Shall be included. The green belt shall be around the project boundary and a scheme for greening of the roads used for the project shall also be incorporated. All rooftops/terraces shall have some green cover.
37.	Action plan for rainwater harvesting measures at plant site shall be submitted to harvest rainwater from the roof tops and storm water drains to recharge the groundwater recharge structures may also be constructed outside the plant premises in consultation with local gram Panchayat and village hand to augment the ground water level, incorporation of water harvesting plan for the project is necessary, if source of water is bore well.
38.	Environment Management Plan (EMP) to mitigate the adverse impacts due to the project along with item wise cost of its implementation. Total capital cost and recurring cost/annum for environmental pollution control measures shall be included.
39.	Details of Rehabilitation & Resettlement (R & R) involving the project. R & R shall be as per policy of the state govt. And a detailed action plan shall be included.
40.	Action plan for post – project environmental monitoring shall be submitted.
41.	Disaster Preparedness and Emergency Management Plan including Risk Assessment and damage control needs to be addressed and included.
42.	Occupational Health:
i	Details of existing occupational & safety hazardous. What are the levels of above mentioned they are within permissible Exposure level (PEL).If these are not with in PEL so that health of the workers can be preserved.
ii	Details of exposure specific health status evaluation of worker. If the workers' health is being evaluated by pre designed format, chest x-rays, Audiometry, Spirometry, Vision testing (Far & Near vision, colour vision and any other ocular defect) ECG, during pre-placement and periodical examinations give the details of the same. Details regarding last month analysed data of above mentioned parameters as per age, sex, duration of exposure and department wise.
iii	Annual report of health status of workers with special reference to occupational health and safety.
iv	Action plan for the implementation of OHS standard as per OSHAS/USEPA.
v	Plan and fund allocation to ensure the occupational health & safety of all contract and causal workers.

EIA REPORT FOR EXPANSION OF M/S. A-ONE CHEMICALS, GIDC, ANKLESHWAR.

Sr. No.	TOR Points
43.	Corporate Environmental Policy
i	Does the company have a well laid down Environment Policy approved by its Board of Directors? If so, it may be detailed in the EIA report.
ii	Does the Environment Policy prescribe for standard operating process / procedures to bring into focus any infringement / deviation / violation of the environmental or forest norms / conditions? If so, it may be detailed in the EIA.
iii	What is the hierarchical system or Administrative order of the company to deal with the environmental issues and for ensuring compliance with the environmental clearance conditions? Details of this system may be given.
iv	Does the company have system of reporting of non-compliances / violations of environmental norms to the Board of Directors of the company and / or Shareholders or stakeholders at large? This reporting mechanism shall be detailed in the EIA report.
44.	Details regarding infrastructure facilities such as sanitation, fuel, restroom etc. to be provided to the labour force during construction as well as to the casual workers including truck drivers during operation phase.
45.	At least 5% of the total cost of the project shall be earmarked towards the enterprise social commitment based on public hearing issue and item wise details along with time bound action plan shall be included. Social-economic development activities need to be elaborated upon.
46.	Any litigation pending against the project and/or any direction/order passed by any Court of Law against the project, if so, details thereof shall also be included. Has the unit received any notice under the Section 5 of Environment (Protection) Act, 1986 or relevant Sections of Air and Water Acts? If so, details thereof and compliance/ATR to the notice(s) and present status of the case.
47.	The questionnaire for industry sector (available on MoEF Website) shall be submitted as an annexure to the EIA-EMP reports.
48.	‘TORs’ prescribed by the expert appraisal Committee (industry) shall be considered for preparation of EIA-EMP reports for the project in addition to all the relevant information as per the ‘genetic structure of EIA’ is given in appendix IIIA in the EIA notification, 2006. where the documents provided are in language other than English, an English translation shall be provided. The draft EIA –EMP, report shall be submitted to the state pollution control board of the concerned state for the conduct public hearing. The SPCB shall conduct public hearing/public consultation, district wise, as per the provisions of EIA Notification, 2006. the issues raised in the public hearing and during the consultation

EIA REPORT FOR EXPANSION OF M/S. A-ONE CHEMICALS, GIDC, ANKLESHWAR.

Sr. No.	TOR Points
	process and the committee made by the project proponent the same shall include separately in EIA-EMP reports in the form tabular chart with financial budget (capital and revenue) along with time-schedule of implementation for complying with the commitments made. The final EIA reports shall be submitted to the ministry for obtaining environmental clearance.
49.	A tabular chart with index for point wise compliance of above TORs.
50.	The TORs prescribed shall be valid for a period of three years for submission of the EIA-EMP Reports. Along with public hearing proceedings (whatever stipulated)
ADDITIONAL TOR FOR SYNTHETIC ORGANIC CHEMICAL INDUSTRY	
1.	Manufacturing process details along with the chemical reaction and process flow chart.
2.	Name of all solvent to be used in the process and details of the solvent recovery system.
3.	Design details of ETP, incinerator, if any along with boiler, scrubber/bag filters etc.
4.	The details of solid and hazardous waste generation, storage, utilisation and disposal particularly related to the hazardous calorific value of hazardous waste and detailed characteristic of the hazardous waste. Action plan of the disposal of fly ash generated from boiler shall include.
5.	Precaution to be taken during the storage and transportation of hazardous chemical shall be clearly mentioned and incorporated.
6.	Material safety data sheet for all the chemicals are being used/will be used. AS No./RTECS No./DOT/UN ETC to be mentioned against each chemical.
7.	Details of VOC monitoring in the working zone environment, and other hazardous emission such as chlorine, HCl, etc if any.
8.	Authorization/membership for disposal of the solid/hazardous waste in TSDF.
9.	Risk assessment for the storage for chemicals /solvents. Action plan for the handling & safety system.
10.	Details of occupation health programme.
i	To which chemical, workers are exposed directly or indirectly.
ii	Whether these chemical, are chemical within threshold limit values (TLV) / permissible exposure levels as per ACGIH recommendation.
iii	What measure company has taken to keep these chemicals within PEL/TLV?
iv	How the workers evaluated concerning their exposure to chemical during pre-placement and periodical medical monitoring.
v	Liver function test (LFT) during pre-placement and periodical examination.

EIA REPORT FOR EXPANSION OF M/S. A-ONE CHEMICALS, GIDC, ANKLESHWAR.

Sr. No.	TOR Points
11.	A toxic management plan shall be prepared.
12.	A write up on “safe practice” followed for handing, storage, transportation and unloading of chemical to be submitted.
13.	What are onsite and offsite emergency plan during chemical disaster.
14.	A write up on “treatment of workers affected by accidental spillage chemical”.

CHAPTER-2

PROJECT DISCRIPTION

2.1 TYPE OF PROJECT

M/s. A- One Chemicals is located at Plot No. 4701 & 4702, GIDC Estate, Ankleshwar, Dist:- Bharuch, Gujarat. Unit is manufacturing of Organic pigments falling under category of Dyes and Dye-Intermediates. The proponent has proposed expansion of existing organic manufacturing activity. The expansion project falls under category 5(f) of the schedule, as per the EIA Notification, September 2006.

The unit has valid CCA order AWH-90951, issue on dated 03/02/2018 for manufacturing of CPC Blue, Alpha Blue and Beta Blue. Total existing production capacity is 350 MT/Month. After expansion, total proposed production capacity will be 825 MT/Month. The unit has proposed expansion of existing products. There will be no new products. The production capacity of all products and by products is given in Chapter 1, Table 1.2. The list of raw materials required for each product is provided in Table 2.1.

2.2 JUSTIFICATION FOR THE PROJECT

World demand for organic pigments is expected to grow 5.0 percent peryear to \$6.5 billion in 2019. Rising consumer spending will drive increaseddemand for organic colorants in textiles and plastics, while strong growthin global construction activity will boost demand in paints and coatings. Increase in value demand will reflect the growing importance ofexpensive, higher value pigments that meet increasingly stringentperformance standards and preferences for more environmentally friendlyproducts.

Expansion of the middle class, particularly in the Asia-Pacific, Africa andMiddle-East regions, will help drive an acceleration in global consumerspending that will benefit important organic pigment markets such as12textiles and plastic products. Rising textile production - the textile marketaccounted for over half of world organic pigment demand in 2014 - will be the primary contributor to increased demand going forward, while growingPlastic output will expand demand for organic pigments. According toanalysts, “Dye and organic pigment consumption will remain concentratedin the Asia-Pacific region, where the majority of world textile andconsumer plastic product production occurs”.

The main end user of pigments in India are printing inks, plastics, rubber, paints and coatings. The worldwide pigments industry produces hundredsof colorant, extender and functional pigments for a wide spectrum of industrial and consumer markets.

2.3 PRODUCTS AND RAW MATERIAL DETAILS

2.3.1 DETAILS OF PRODUCT

Total production capacities of the unit will be 825 MT/Month. The unit has proposed manufacturing of synthetic organic chemical (Organic pigments) as a product. The list of the products and their production capacity with their chemical name are given in table no.1.1 of chapter-1.

2.3.2 DETAILS OF RAW MATERIAL

The list of name of raw materials for each product is provided in table no. 2.1, details of solvent used is given in table no. 2.2.

TABLE: 2.1

LIST OF RAW MATERIALS CONSUMPTION

Name of Product	Sr.No	Name of Raw Material	CAS No.	Existing Raw Material qty. (MT/M)	Additional Proposed Raw Material qty. (MT/M)	Quantity After Expansion in MT/Month
CPC Blue	1	Phthalic Anhydride	147-14-8	333	388.5	721.5
	2	Cuprous Chloride	7758-89-6	59.7	69.7	129.4
	3	Ammonium Molybdate	13106-76-8	0.93	1.09	2.02
	4	T G Urea	57-13-6.	442.5	516.25	958.75
	5	Ortho Nitro Toluene	88-72-2	24	28	52
	6	Sulphuric Acid (98%)	7664-93-9	33.3	38.85	72.15
	7	Spent Acid (10-15%)	7664-93-9	189	220.5	409.5
	8	Caustic Soda	1310-73-2	22.5	26.19	48.69
		Total		1104.93	1289.08	2394.01
ALPHA BLUE	1	CPC Blue crude	147-14-8	26.25	0	26.25
	2	Sulphuric Acid (70%)	7664-93-9	120.25	0	120.25

EIA REPORT FOR EXPANSION OF M/S. A-ONE CHEMICALS, GIDC, ANKLESHWAR.

Name of Product	Sr.No	Name of Raw Material	CAS No.	Existing Raw Material qty. (MT/M)	Additional Proposed Raw Material qty. (MT/M)	Quantity After Expansion in MT/Month
	3	Emulsifier	--	0.125	0	0.125
				146.625	0	146.625
BETA BLUE	1	CPC Blue crude	147-14-8	25.75	128.75	154.50
	2	Dilute Hydrochloric Acid		0.325	1.625	1.95
	3	Caustic Flakes	1310-73-2	0.375	1.875	2.25
	4	IBA / Xylene (solvent)	1330-20-7	12.5	62.5	75
		Total		38.95	194.75	233.7
Ammonium Sulphate	1	Ammonium Carbonate	506-87-6	1500	1500	3000
	2	Sulphuric Acid (20%)	7664-93-9	300	300	600
	3	Sulphuric Acid (98%)	7664-93-9	30	30	60
		Total		1830	1830	3960

TABLE: 2.2

DETAILS OF SOLVENTS STORAGE

Sr. No.	Name of solvents	Quantity stored (in KL)
1.	IBA / Xylene	20
2.	Ortho Nitro Toluene	20

2.3.2.1 RAW MATERIAL STORAGE AND HANDLING

The monthly raw material consumption of raw materials is given in Table 2.3. Raw materials are stored in M.S. Tanks, S.S. Tanks, HDPE Tanks, HDPE Carboys, HDPE bags, fiber drums. The quality of raw material is check properly and stored in the Close shad storage area as per characteristic of raw material.

The storage area are designed in such a way that the floor level is 150 mm above the maximum flood level with 2.5 mm thickness of HDPE geo membrane and two layers of RCC in storage is proposed.

2.3.3 TRANSPORTATION OF RAW MATERIALS AND FINISHED PRODUCTS

The raw materials and finished goods will be transported through tankers and trucks. There is well developed road structure in Jhagadia GIDC. The raw material source will be standard manufacturer or supplier. Indicative list along with mode of transportation is included in table no. 2.4.

TABLE: 2.3**DETAILS OF RAW MATERIAL AND FINISHED PRODUCTS**

Name of Raw Material	State	Storage Location	Storage mode	Max. storage capacity at site (Existing)	Max. storage capacity at site (Proposed)	MOC
Phthalic Anhydride	Powder	R.M. Storage	Bags	100 MT	120 MT	PP Woven Bags
Cuprous Chloride	Powder	R.M. Storage	Bags	20 MT	45 MT	HDPE
Ammonium Molybdate	Powder	R.M. Storage	Drums	1 MT	2 MT	Drums
T G Urea	Granvel	R.M. Storage	Bags	150 MT	320 MT	HDPE
ONT	Liquid	R.M. Storage	Tanks	10 MT	10 MT	MS Tanks
H ₂ SO ₄ (98%)	Liquid	Tank Farm	Tanks	10 MT	20 MT	MS tanks
Spent Acid (10-15%)	Liquid	R.M. Storage	Tanks	50 MT	100 MT	MS
Caustic Soda	Flake	R.M. Storage	bags	0.5 MT	1 MT	HDPE
CPC Blue crude	Powder	R.M. Storage	Bag	10 MT	20 MT	HDPE
Sulphuric Acid (70%)	Liquid	Tank Farm	Tank	30 MT	30 MT	MS with rubber line
Emulsifier	Liquid	R.M. Storage	tank	1MT	3 MT	Tank
IBA / Xylene	Liquid	Tank Farm	Tank	10 MT	20 MT	MS
Ammonium Carbonate	Liquid	R.M. Storage	tanks	20 MT	20 MT	MS

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Details Of Proposed Product						
Name of product	State	Storage Mode	Capacity	Max. storage capacity at site (MT/M)	MOC	End use
CPC Blue	Powder	Bag	25kg	30.0 MT	HDPE	Paint, Ink & Plastic
Beta Blue	Powder	Bag	25kg	15.0 MT	HDPE	
Alpha Blue	Powder	Bag	25kg	5.0 MT	HDPE	
Ammonium Carbonate	Liquid	Tank	10KL	20 KL	MS	In Ammonium Sulphate
Ammonium Sulphate	Powder	Bag	25kg	25 MT	HDPE	For Resin

TABLE: 2.4

DETAILS OF RAW MATERIAL SOURCE AND METHOD OF TRANSPORTATION

Sr. No.	Name of Raw Material	State	Source	Mode of transportation
1.	Phthalic Anhydride	Liquid	Trimulia/ IG Petrochem	By truck
2.	Cuprous Chloride	Liquid	Aman chem./ sanginita	By truck
3.	Ammonium Molybdate	Liquid	Inwac metal	By truck
4.	T G Urea	Solid	GNFC	By truck
5.	ONT	Liquid	Dipak Nitrate ltd	By tanker
6.	H ₂ SO ₄ (98%)	Liquid	Kesvi Marketing	By Tanker
7.	Caustic Soda	Solid	GGCL/ maghamani	By truck
8.	IBA / Xylene	Liquid	Triveni Chemicals, Vapi.	By truck

TABLE: 2.5

LIST OF ETP CHEMICALS

Name of Raw Material	State	Storage Mode	Capacity Max. storage at site	CAS NO	MOC
Lime	Solid	800 Bags	40	1305-62-0	HDPE Bags of 50 Kgs.
Alum	Liquid	1 Tank	20	10043-67-1	HDPE Tank
Poly Electrolyte	Liquid	4 carboys	0.2 MT	7758-29-4	50 kg carboys

2.4 PROCESS DESCRIPTION

2.4.1 BEST AVAILABLE TECHNOLOGY& REASON FOR SELECTING THEM

The company will use the Best Available Process Technology (BAT) for the production. This section includes the manufacturing process of the product, chemical reactions and mass balance of each product.

The products will be manufactured by unit will be established since last long and increase the reaction efficiency up to optimum level in our R&D lab. Above all the products are tailor made products based on literature review and set in our R&D. Hence no proposal of alternate process or technology and currently it is best technology available with the proponent.

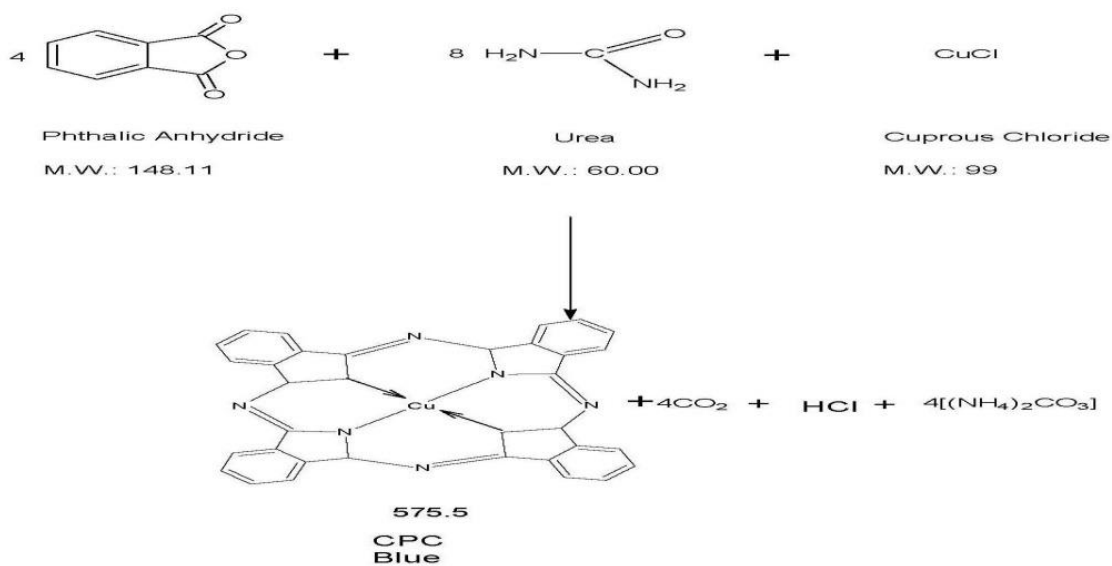
2.4.2 MANUFACTURING PROCESS

Manufacturing Process for CPC Blue

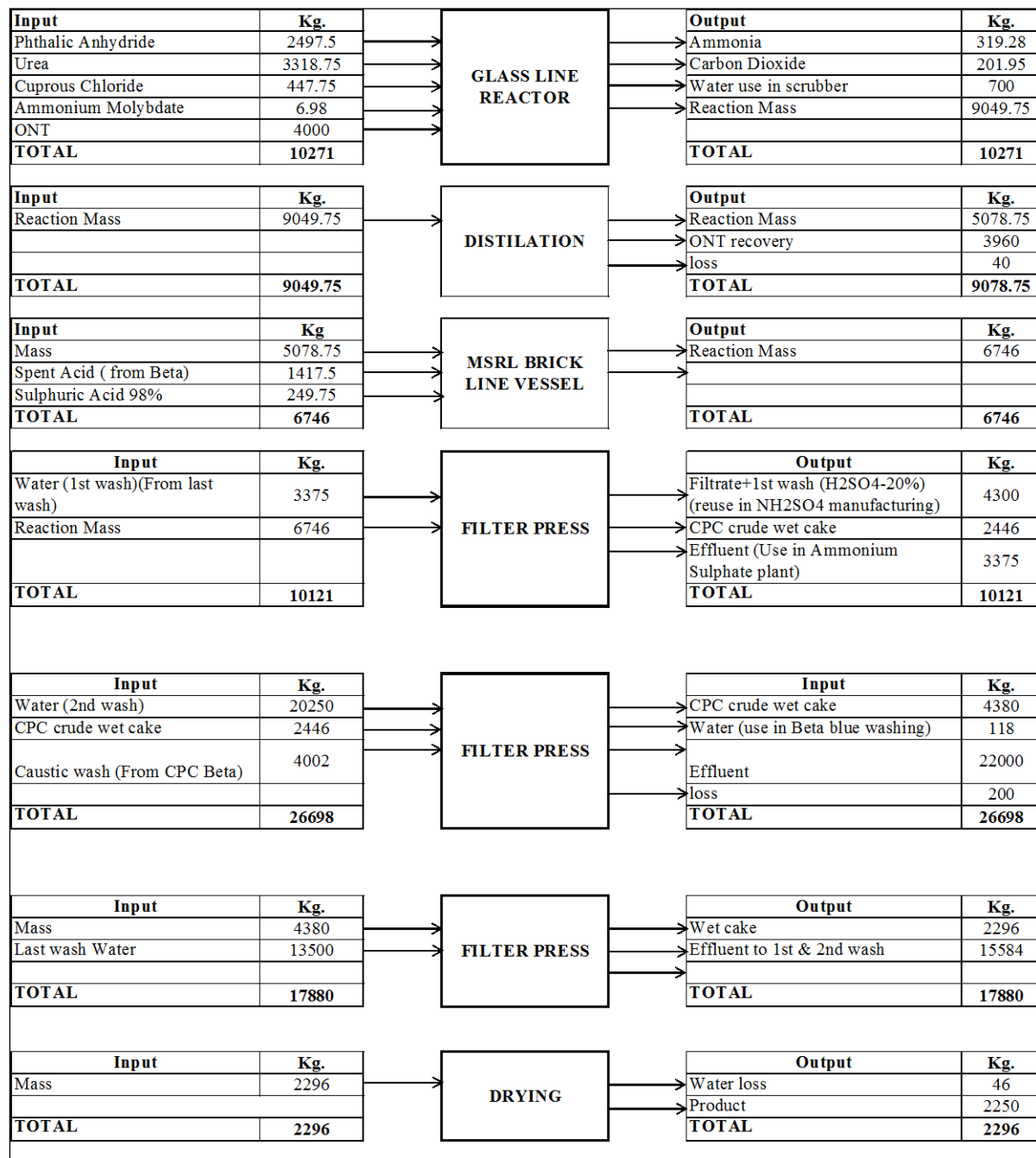
- Charge ONT in G.L. Vessel. Then add urea, Cuprous Chloride, Phthalic Anhydride & Ammonium molybdate into the vessels.
- Gradually raise temperature up to 170°C to 175°C, which is maintained for 2-3 hours.
- On completion of reaction, charge the reaction mass into Rotary vacuum dryer, where ONT recovery takes place. Recycled the recovered ONT in the next batch.
- Scrub Ammonia and Carbon dioxide gases evolved during process to water scrubber to get solution of ammonium carbonate.
- Take Crude CPC from Rotary Vacuum Dryer to MS rubber lining tank for purification. Where acid is added & stem is charged directly to remove impurities.

- Filter this purified CPC in filter press.
- Give wet cake alkali wash and water wash.
- Carryout the drying of the purification wet cake of CPC in S.F. Dryer.
- Packing of dried powder from S.F.D for dispatch.

Chemical reaction



Material Balance for CPC Blue



MASS BALANCE ACROSS SCRUBBER



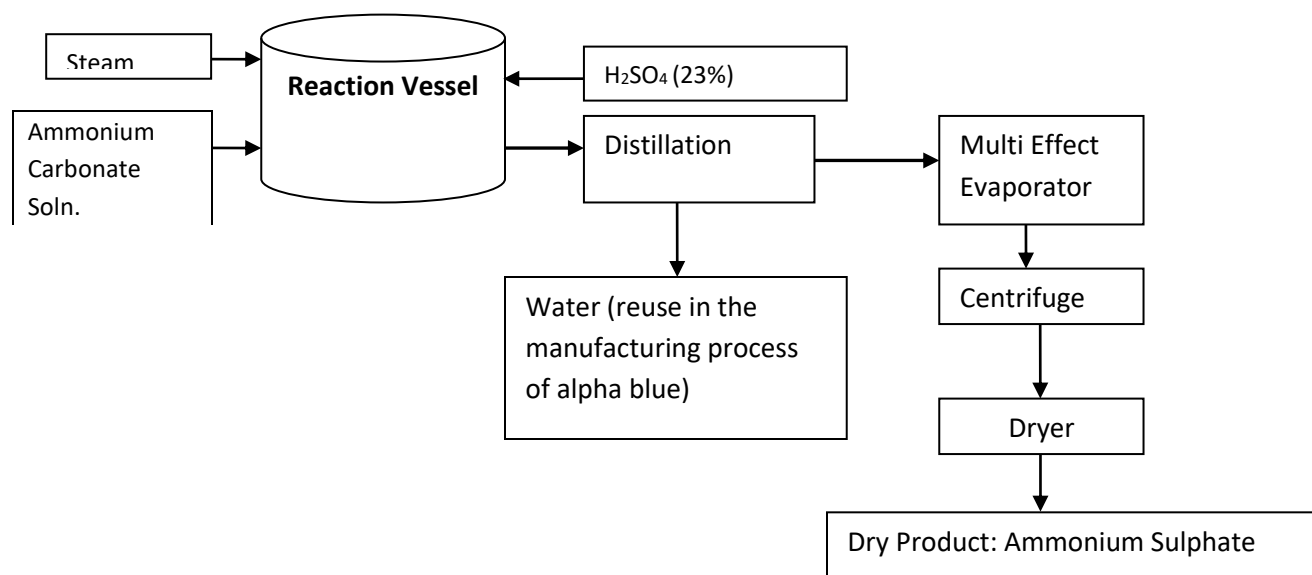
Ammonium Sulphate

Take ammonium carbonate solution (15%) in reactor. Add sulphuric acid (23%). Provide steam to reactor for 4-5 hrs. This process is carried out under vacuum system.

After completion of reaction, entire mass will be sent to distillation where the water and slurry will be separated from each other. Separated water will be sent for the re-use purpose in the manufacturing process of alpha blue. Ammonium sulfate solution will be sent in to crystallizer.

Then transfer mass to centrifuge. Liquid will come out from centrifuge and will be reused for preparation of next batch of ammonium sulfate and the Solid mass coming out of will be sent in to dryer, where we will get our Final product-Ammonium Sulfate.

Flow diagram of Manufacturing Process of Ammonium Sulphate



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Material Balance:

Input	Kg
Ammonium carbonate soln (13-15%)	8.33
H ₂ SO ₄ (20-%)	2.5
H ₂ SO ₄ (98-%)	0.25
Total	11.08

Neutralizer

Output	Kg
Neutralised mass	11.08
Total	11.08

Input	Kg
Neutralised mass	11.08
Total	11.08

Filtration

Output	Kg
Wet cake	2.115
Filtrate	8.965
Total	11.08

Input	Kg
Filtrate	8.965
Na ₂ S	0.001
Total	8.966

Free Copper removal

Output	Kg
Reaction mass	8.966
Total	8.966

Input	Kg
Reaction mass	8.966
Total	8.966

Filtration

Output	Kg
Copper Salt	0.06
Ammonium Sulfate soln	6.797
Total	6.857

Input	Kg
Ammonium Sulfate soln.	6.797
Total	6.797

MEE Plant

Output	Kg
Condensate water	5.742
Semi Solid Ammonium Sulphate	1.055
Total	6.797

Input	Kg
1.055	1.055
Total	1.055

Spray Drier

Output	Kg
Loss	0.055
Ammonium Sulphate	1
Total	1.055

Manufacturing Process for Beta Blue

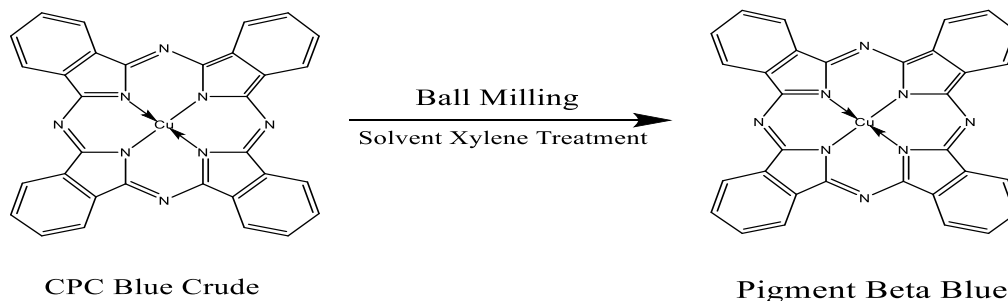
Crude CPC Blue is taken into Ball mill for grinding. Here the particle size of the material gets reduced. Then the grinded material is taken into the reactor with Caustic Flakes. Caustic flakes are used to get alkaline pH. The alkaline pH results in better dispersion of particles for pigmentation. The mass is refluxed for pigmentation. Here the color of the material gets enhanced due to fine tuning with Xylene / IBA.

This is only a physical process and does not involve any chemical reaction. After completion of reflux, the mass is distilled for recovery of Xylene / IBA. After recovery of Xylene / IBA, the mass

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is neutralized with hydrochloric acid to increase the particle size of beta blue. The whole mass is washed and filtered in filter press. Filtrate and washing are use for manufacturing of CPC Blue Crude. Wet cake from filter press is dried in dryer / SFD.

Chemical Reaction:

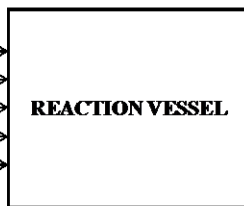


Material Balance:

Input	Kg		Output	Kg
copper phthalocyanine Blue	1030.00	→	Reaction mass	1030.00
Total	1030.00		Total	1030.00



Input	Kg		Output	Kg
Mass	1030.00	→	Mass	3358.00
Dilute HCL	13.00			
Caustic soda flakes	15.00			
Water	1800.00			
IBA/Xylene	500.00			
Total	3358.00		Total	3358.00



Input	Kg		Output	Kg
Mass	3358.00	→	Mass	2858.00
			Recovered IBA/Xylene	490.00
			Atmosphere solvent loss	10.00
Total	3358.00		Total	3358.00



Input	Kg		Output	Kg
Mass	2858.00	→	Mass	2307.00
Water for washing (From CPC Blue 2nd wash)	3451.00		Effluent (reuse in Caustic wash of CPC Blue)	4002.00
Total	6309.00		Total	6309.00



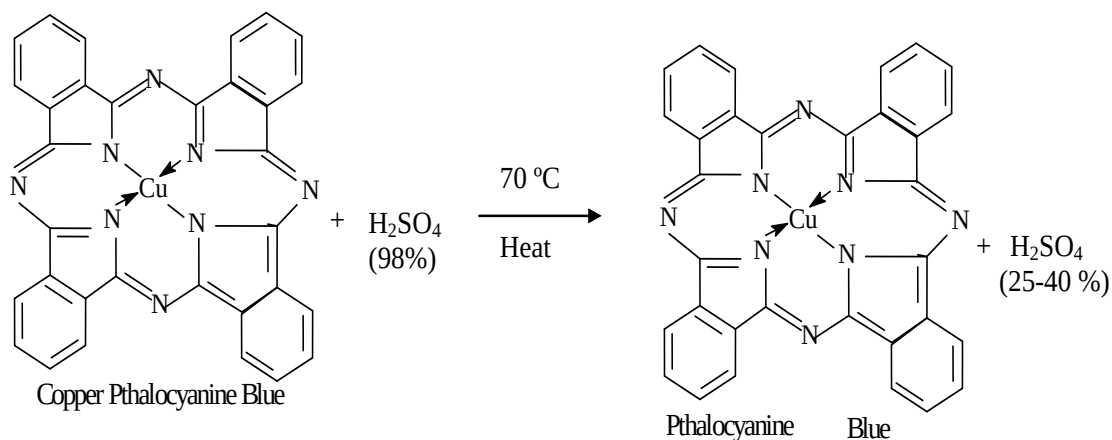
Input	Kg		Output	Kg
Mass	2307.00	→	Beta Blue	1000.00
			Evaporation loss	1307.00
Total	2307.00		Total	2307.00



Manufacturing Process for Alpha Blue

1. Charge 98% Sulphuric acid in SS jacketed vessel and add required quantity of CPC blue in 4 hours maintaining the temperature of 50°C.
2. Continue stirring till CPC gets dissolve in acid.
3. Transfer the batch by air pressure in another vessel containing sufficient water to make final concentration of 15% to 20% acid.
4. Filter the mass through filter press and wash with water to bring pH 5.5.
5. Charge wet cake in wooden vat containing water and add dispersing agent.
6. Heat with live steam and bring pH to neutral with the help of caustic lye.
7. Filter the slurry and wash with water.
8. Wet cake is dried through spin flash dryer and packed.

Chemical Reaction:



Material Balance:

Input	Kg		Output	Kg
CPC Crude	617.4	→	Reaction mass	5895.7
Sulfuric acid(98%)	2828.3			
Water	2450			
Total	5895.7		Total	5895.7



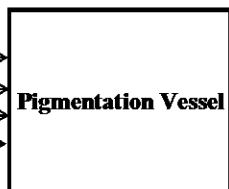
Input	Kg		Output	Kg
Reaction Mass	5895.7	→	Reaction mass	30895.7
water (5000 fresh+20000 from filtration)	25000			
Total	30895.7		Total	30895.7



Input	Kg		Output	Kg
Reaction mass	30895.7	→	Wet cake	1500
Process Water	5000		Spent dilute sulphuric acid	25000
			washing effluent	9395.7
Total	35895.7		Total	35895.7



Input	Kg		Output	Kg
Reaction Mass	1500	→	Reaction mass	11547.94
NaOH	45			
Oliec Acid	2.94			
Water	10000			
TOTAL	11547.94		Total	11547.94



Input	Kg		Output	Kg
Reaction mass	11547.94	→	Wet cake	1547.94
Process water	10000		Effluent (Use in drowning)	20000
Total	21547.94		Total	21547.94



Input	Kg		Output	Kg
Wet cake	1547.94	→	Product	588
			Water loss	959.94
TOTAL	1547.94		TOTAL	1547.94



2.5 RESOURCE REQUIREMENT

2.5.1 LAND

The proposed production will be established next to the existing unit. A letter of land allotment from GIDC of industrial plot no. A-1/ 4701 & 202/B is attached as Annexure - III. The total plot area of the unit is 5460 sq. m. The green belt area is 1350 sq.m. The plant layout has earmarked space for development of green belt and separate entry & exit and adequate margin all-round the periphery for unobstructed easy movement of the emergency vehicle / fire tenders without

reversing back is also taken care. Plant layout is attached as Annexure-III. The Details of breakup of plot area are covered under following table no.2.6.

TABLE: 2.6

LAND USE BREAK UP OF TOTAL PLOT AREA			
Sr. No.	Particular	Land Area (sq.m.)	Land Area in %
1.	Plant Area	692.16	12.68
2.	Office building	131.84	2.41
3.	MSRL Area Purification Stage-1	188.27	3.45
4.	MSRL Area Purification Stage-2	76.02	1.39
5.	Godown	720.3	13.19
6.	G.F. Utility 1 st Floor Electric Room	74.80	1.37
7.	Boiler House	416.00	7.62
8.	ETP Area	339.98	6.23
9.	Lime Storage	27	0.49
10.	Storage	37.26	0.68
11.	Electric Room	25.92	0.47
12.	Bathroom	39.69	0.73
13.	Tank Farm	130.07	2.38
14.	Sludge storage	117.71	2.16
15.	Ammonium Sulfate Plant	119.34	2.19
16.	Outlet flow meter	3.1	0.06
17.	Security office-1	5.29	0.10
18.	Security office-2	1.69	0.03
19.	Green Belt Area	1350.45	24.73
20.	Road Area & open space	963.11	17.64
	Total	5460	100.00

2.5.2 WATER

Water consumption is primarily for processing, washing, boiler, cooling, gardening and domestic purpose. The existing fresh water requirement for domestic and industrial purpose is met through GIDC water supply. GIDC has its own water reservoir and distribution network throughout the GIDC Estate.

As per CCA - AWH-57006 Average daily fresh water consumption of the unit is about 300 KL/day. Now, after proposed expansion, total water consumption will be 713 KL/day (343 fresh + 370 Recycle) after proposed expansion.

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The category wise bifurcation of the water requirement is given in below table no. 2.7. And product wise water consumption, waste water generation along with hazardous waste generation is given in table no: 2.8.

TABLE: 2.7

CATEGORY-WISE WATER REQUIREMENT

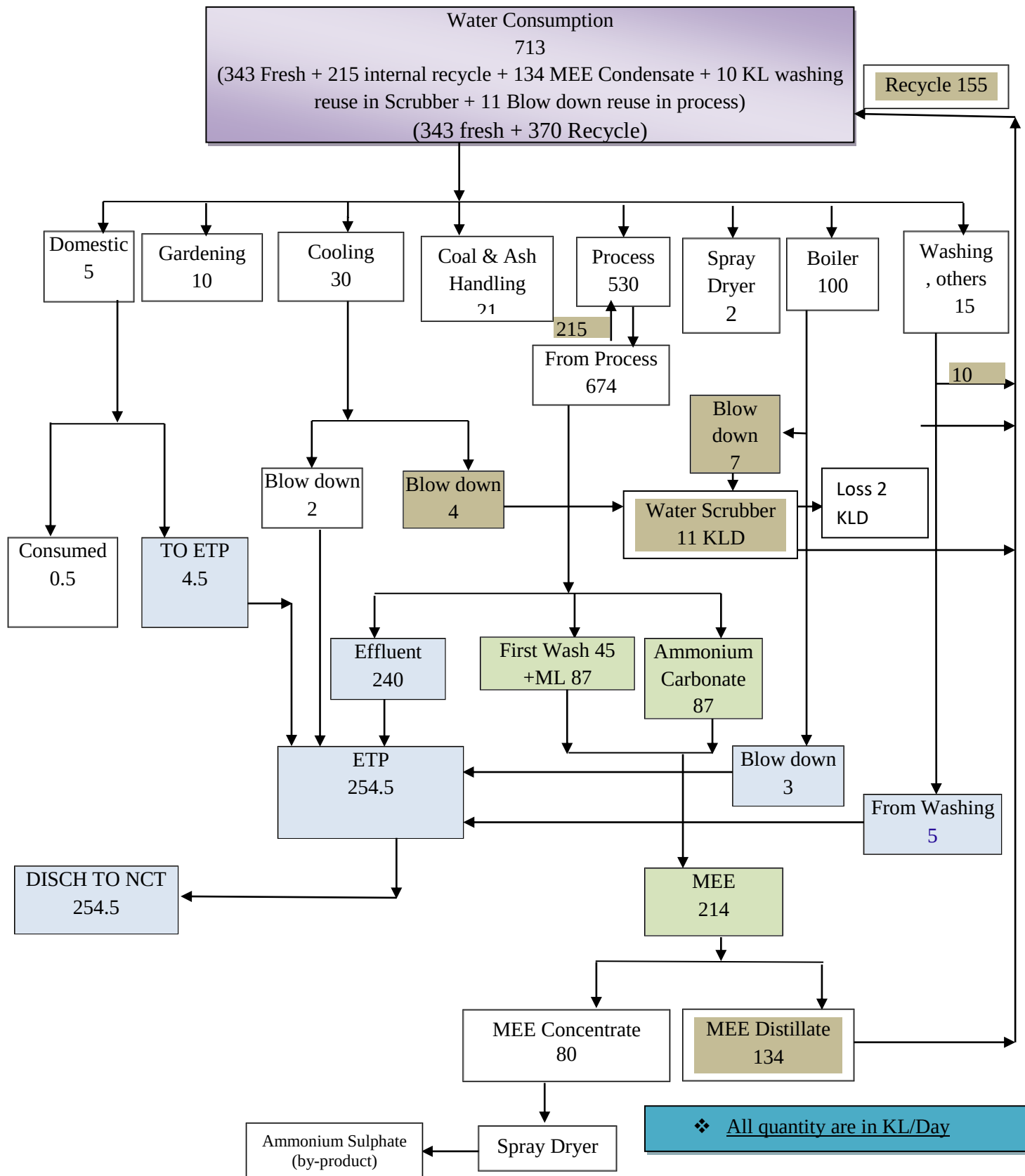
Sr.	Particular	Water Consumption in KL/Day			Remark
		Existing Quantity KLD	Quantity as per Proposed for EC in KLD	Quantity After Expansion in KLD	
1.	Domestic	5	0	5	
2.	Gardening	10	0	10	
3.	Industrial				
	a) Process	245(Fresh 175, Recycle 70)	285	530	160 Fresh + 215 internal recycle + 134 MEE Condensate +10 washing water
	b) Washing	15	0	15	
	c) Boiler	65	35	100	
	d) Cooling	20	10	30	
	e) Coal Handling	09	12	21	11 KLD blowdown reuse in water scrubber followed in coal handling
	f) Spray Dryer - Scrubber	01	01	02	
	Total (Industrial)	355 (Fresh 285, Recycle 70)	343	698	328 Fresh +215internal recycle + 134 MEE Condensate + 11 Blow down reuse water scrubber +10 washing water
	Total (Domestic + Industrial)	370 (Fresh 300, Recycle 70)	343	713	343 Fresh + 215 internal recycle + 134 MEE Condensate + 11 Blow down reusein water scrubber +10 washing water

Internal Reuse

Sr. No.	Wastewater generated (KLD)	From process of	Reuse in
1	151	CPC Manufacturing	1 KLD in CPC beta Manufacturing + 150 KLD in first & second wash of CPC Blue
2	28	Alfa Blue	Use in drowning of Alfa Blue
3	20	Beta Blue	Caustic wash stage of CPC Blue
4	16 (spent Sulphuric Acid-10-15%)	Alfa Blue	CPC Blue
	215	Total	

FIGURE: 2.1

WATER BALANCE DIAGRAM IN KLD



2.5.3 DETAILS OF FUEL AND ELECTRICITY CONSUMPTION

The energy requirement in terms of power and fuel for proposed unit is shown in following table no.2.9.

TABLE: 2.9

FUEL CONSUMPTION REQUIREMENT

Sr. No.	Particulars	Existing as per Consent Quantity	Proposed Quantity	Total Quantity	Source
1.	Natural Gas	4000Nm ³ /Day	2000 Nm ³ /Day	6000 Nm ³ /Day	Gujarat Gas
2.	Coal	14 MT/Day	18 MT/Day	32 MT/Day	Local
3.	Diesel	180 Lit/Hr	0	180 Lit/Hr	Local
4.	Energy-Electricity	750KVA	950 KVA	1700 KVA	DGVCL

2.5.3.1 DETAILS OF ENERGY DISTRIBUTION/UTILIZATION

Details of energy distribution are covered in below table no. 2.10.

TABLE: 2.10

ENERGY DISTRIBUTION

Sr. No.	Name of Equipment	Existing Connected Energy in KVA	Proposed Connected Energy in KVA	Total Connected Energy in KVA
1	GLV	200	0.0	200
2	RVD	100	0.0	100
3	MSRL & Filter press all	50	0.0	50
4	Dryer	100	0.0	100
5	ETP	150	0.0	150
6	Amm. Sulphate	100	0.0	100
7	Spray Dryer	-	450	450
8	Alpha Plant	25	-	25
9	CPC &Beta plant	25	500	525
Total		750	950	1700

2.5.4 UTILITIES

The details of proposed utilities for M/s. A-One Chemicals are given below in table no. 2.11.

TABLE: 2.11**DETAILS OF UTILITIES**

EXISTING UTILITIES				
Sr. No.	Name of The Utilities	Capacity	MOC	Nos.
1.	Cooling Tower	300 TR	PPFRP	3
2.	Cooling Tower	120 TR	PPFRP	1
3.	Compressor	30 CFM	MS	4
PROPOSED UTILITIES				
1.	Cooling Tower	400 TR	FRP	2
2.	Compressor	15 CFM	MS	1
3.	Compressor	30 CFM	MS	1

2.5.4.1EQUIPMENTS/ MACHINERIES

The details of proposed equipments, machineries & utilities for M/s. A-One Chemicals are given below in table no. 2.12.

TABLE: 2.12.**DETAILS OF EQUIPMENTS/MACHINERIES**

Sr. No.	Name of the Equipment	Capacity in KL/m²	MOC	Existing Quantity in Nos.	Additional Quantity in Nos.	TOTAL Quantity in Nos.
1	Reactor	10KL	MS GLR	07		7
2	Distillation Reactor	20KL	SS 316	-	02	02
3	Ammonia Recovery Tank	90 KL	MS	40		01
4	Ammonia Recovery Tank	30 KL	MS	30		03
5	Storage Tank	10 KL	MS	02	01	03
6	Storage Tank	20KL	MS	01		01
7	Storage Tank	50KL	MS	01		01
8	Storage Tank	20KL	MS	01		01

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Sr. No.	Name of the Equipment	Capacity in KL/m ²	MOC	Existing Quantity in Nos.	Additional Quantity in Nos.	TOTAL Quantity in Nos.
9	Storage Tank	20KL	HDPE	02		02
10	Storage Tank	20KL	MS	02		02
11	Blender	12KL	SS	-	1	1
12	RVD	12KL	MS	04		
13	Condensor	20M3	SS	04		
14	SFD-1	1000kg/hr	SS	01		01
	SFD-2	300 Kg/hr	SS		01	01
15	Verticle Receiver	6KL	MS	04		
16	Underground Storage Tank	125KL	RCC	125 KL	-	01
17	Ammonia Scrubber	1.5kl	PP	07		07
18	Filter Press	60X60	MSPP	03		03
19	Filter Press	48X48	MSPP	02		02
20	Filter Press	60X60	MSPP		01	01
21	ETP Underground Tank	36 KL	RCC brick line	36KL		02
22	ETP Underground Tank		RCC brick line	50KL		01
23	ETP Underground Tank	60 KL	RCC brick line	60KL		02
24	Aeration Tank		RCC	216		01
25	Carbon Column	1.5KL	MSRL	1.5 KL		01
26	Sand Filter	1.5KL	MSRL	1.5KL		01
27	MEE	250	SS	1	0	1
28	Spray Dryer	150	SS	1	0	1
29	Ball Mill	20 KL	MS	1	2	3
30	Treatment Tank	Existing 20	MS	3	2	5

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Sr. No.	Name of the Equipment	Capacity in KL/m ²	MOC	Existing Quantity in Nos.	Additional Quantity in Nos.	TOTAL Quantity in Nos.
		KL, Proposed 40KL	Brick line, HDPE			

2.5.5 MANPOWER

The manpower required for the project as well as during the construction/ commissioning activities will be employed from the local area. The preference will be given to local people. The man-power requirement is given in below table no. 2.13.

TABLE: 2.13

MAN POWER REQUIREMENT

Phase of project	Type of worker	No. of workers (Existing)	No. of workers (Proposed Scenario)	No. of workers (Total)
During construction	Contractual	-	45	-
During commissioning	Contractual	-	40	-
During operations	Managerial	2	1	3
	Skilled	15	10	25
	Un-skilled	30	20	50
Total		47	31	78

2.6 POLLUTION POTENTIAL SCENARIO

The details of pollution generation in terms of effluent generation, sewage generation, flue gas emission, process emission and hazardous waste generation are covered in this section.

2.6.1 EFFLUENT AND SEWAGE GENERATION

As per CCA, the wastewater generation is 254.5 KL/Day. After proposed expansion, total industrial effluent generation will be 709.5 KL/Day (Existing: 254.5 KL/Day E + Proposed: 438 KL/Day). Out of 709.5 KL (Process Effluent), 254.5 send in NCT after ETP treatment + 225 internal reuse + 219 will be send to MEE+ 11 Blow down reuse +10 washing water reuse in Process. The category-wise bifurcation of the wastewater generation details is given in below

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table no 2.14.Details of waste water generation with qualitative and quantitative analysis of each waste stream are given below in table no. 2.15.

TABLE: 2.14

CATEGORY-WISE WASTEWATER GENERATION

Sr. No.	Particulate	Waste Water Generation in KL/Day			Remark
		Existing Quantity KLD	Quantity as per Proposed for EC in KLD	Quantity After Expansion in KLD	
1.	Domestic	4.5	0	4.5*	
2.	Industrial				
	a) Process	240	434	674	215will be internally recycle + 219 will be send to MEE and remaining will be send in ETP.
	b) Washing	15 (5 send in ETP and 10 reuse in Scrubber)	0	15	(5 send in ETP and 10 reuse in Process)
	c) Boiler	8 (3 send in ETP and 5 reuse in process)	2	10	(3 send in ETP and 7 reuse in water scrubber followed in Coal Handling)
	d) Cooling	4 (2 send in ETP and 2 reuse in process)	2	6	(2 send in ETP and 4 reuse in followed in Coal Handling)
	e) Other	0	0	0	
	Total Industrial	267 (250 send in ETP and 17 reuse in process)	438	705	(250 send in NCT after ETP treatment + 215 internal reuse + 219 will be send to MEE+ 11 Blow down reuse +10 washing water reuse in Process)
	Total (Domestic + Industries)	271.5 (254.5 send in ETP and 17 reuse)	438	709.5	(254.5 send in NCT after ETP treatment + 215 internal reuse + 219 will be send to MEE+ 11 Blow down reuse +10 washing water reuse in Process)

TABLE: 2.15**DETAILS OF WASTE WATER GENERATION WITH QUALITATIVE AND QUANTITATIVE ANALYSIS OF EACH WASTESTREAM**

Sr. No.	Source of Waste Water Generation	Quantity in KL/Day	Quality	Effluent load in Kg/day*
1.	Cooling Tower blow down, Boiler blow down, and Washing	12	pH:6.5-8.5	--
			TSS:200-250 mg/L	3
			COD:250-300mg/L	3.6
			TDS: 3000-5000 mg/L	60
2.	Sewage	4.5	pH:6.5-8.5	--
			TSS:50-100 mg/L	0.45
			COD:100-150mg/L	0.67
			TDS: 1000-1500 mg/L	6.75
3.	Process	238	pH: 3-4	--
			TSS: 1000-1500 mg/L	59.5
			COD:4000-6000 mg/L	1428
			TDS: 6000-8500 mg/L	2142
4.	Composite	254.5	pH:4-8	--
			TSS: 1000-1200 mg/L	55.99
			COD:4000-6000 mg/L	1527
			TDS: 5000-8000 mg/L	2036

2.6.2 GASEOUS EMISSIONS & CONTROL**2.6.2.1 FLUE GAS EMISSIONS**

The flue gas emissions from the utility are given in following Table.

Details of stacks number, stack height, pollutants emitted are covered in following table no.2.16.

2.6.2.2 PROCESS EMISSIONS

The process emissions from the manufacturing activities are given in following Table. The details of air pollution control system are also mentioned in table no.2.17.

TABLE: 2.16**FLUE GAS EMISSIONS**

Stack No.	Source of emission	Type of emission	Permissible limit	Stack height (m)	Stack dia meter (mm)	Pollution control equipment
Existing Flue Gas Emission: (As per CCA No: AWH-96963)						
1.	Boiler- 1	PM SO ₂ NO _x	150 mg/Nm ³ 100 ppm 50 ppm	30	600	Multi cyclone Separator + Bag filter+ water scrubber
2.	Boiler-2 (Stand By)	PM SO ₂ NO _x	150 mg/Nm ³ 100 ppm 50 ppm	30	600	
3.	Thermopack 1 & 2 (4 Lac Kcal/Hrs.)	PM SO ₂ NO _x	150 mg/Nm ³ 100 pp 50 ppm	20	300	Adequate stack height
4.	Thermopek 3,4,5 & 6 (4 Lac Kcal/Hrs.)	PM SO ₂ NO _x	150 mg/Nm ³ 100 ppm 50 ppm	20	300	Adequate stack height
5.	Thermopack7&8 (4 Lac Kcal/Hrs.)	PM SO ₂ NO _x	150 mg/Nm ³ 100 pp 50 ppm	20	300	Adequate stack height
6.	Pre-heating tank	PM SO ₂ NO _x	150 mg/Nm ³ 100 ppm 50 ppm	20	300	Adequate stack height
7.	Hot Air Generator for Spray Dryer	PM SO ₂ NO _x	150 mg/Nm ³ 100 ppm 50 ppm	35	600	3 stage water Scrubber and Multi Cyclone Separator
8.	Boiler-3	PM SO ₂ NO _x	150 mg/Nm ³ 100 ppm 50 ppm	30	600	Multi cyclone Separator + Bag filter+ water scrubber
9.	Thermopack9&10 (4 Lac Kcal/Hrs.)	PM SO ₂ NO _x	150 mg/Nm ³ 100 pp 50 ppm	20	300	Adequate stack height
10.	D.G. Set-1 (750 KVA)	PM SO ₂ NO _x	150 mg/Nm ³ 100 pp 50 ppm	12		Adequate stack height
11.	D.G. Set-2 (380	PM	150 mg/Nm ³	12		Adequate

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	KVA)	SO ₂ NO _x	100 pp 50 ppm			stack height
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Note: There shall be no change in proposed expansion.

TABLE: 2.17

PROCESS EMISSIONS AND CONTROL MEASURES

Stack No.	Source of Emission	Type of Emission	Permissible Limit	Stack Height (meter)	Stack diameter (mm)	Air pollution control system
EXISTING PROCESS EMISSION						
1.	Reactor I, II, III & IV	NH ₃	175 mg/Nm ³	25	300	2 stage water scrub with each reactor followed by acid media ventury scrubber.
2.	Spin Flash Dryer	PM	150 mg/Nm ³	12	600	Bag Filter
PROPOSED PROCESS EMISSION						
3.	Reactor V, VI & VII	NH ₃	175 mg/Nm ³	25	300	2 stage water scrub with each reactor followed by acid media ventury scrubber.

TABLE: 2.18

DETAILS OF ALL EMISSIONS CONTROL MEASURES

Sr. No.	Source	Probable Pollutant Emission	Control Measures/ APCM
FUGITIVE EMISSION			
1.	Solvent storage tank	Air pollutant (VOC)	i) Carry out work place area monitoring to find out concentration level in ambient air. ii) Provision of breather valve cum flame arrester.
2.	Solvent recovery system	Air pollutant (VOC)	i) Solvent recovery system with steam condensation system. ii) Pumps & motors are mechanical seal type.

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Sr. No.	Source	Probable Pollutant Emission	Control Measures/ APCM
3	Handling of raw material bags in storage area	Air pollutant (PM)	i) Provision of exhaust ventilation ii) Provision of PPE. iii) Provision of Job rotation to reduce exposure.
4	Flange joints of pipeline, pump & motors	Air pollutant (VOC)	i) Routine & periodic inspection to check leakage. ii) Preventive maintenance, Follow SOP for maintenance. iii) Pumps & motors will be mechanical seal type. iv) LDAR program will be followed. Provision of Flange guard.
5	Solid raw material transferring to reactor	Air pollutant (PM)	Hopper will be provided with powder transfer system.
6	Liquid raw material transferring to reactor	Air pollutant (VOC)	Feeding of liquid raw material will be carried out by closed pipeline and mechanical seal pump.
7	Loading /unloading at storage area	Air pollutant (VOC)	Unloading through pipeline to tank in a close system.

Regular ambient air quality monitoring will be carried out within premises and nearby area for PM₁₀, PM_{2.5}, SO_x, NO_x, HCl, NH₃ and VOC in the downwind directions as well as where maximum ground level concentration is anticipated and record of the same shall be maintained.

Other control fugitive emissions following measures are recommended:

- A. Controlled emissions and provision of PPE for the workers.
- B. Provision of mechanical seal in pumps.
- C. Regular inspection of tank roof seals.
- D. Adequate measures for the minimization/prevention of the fugitive emission.
- E. Regular maintenance of valves, pumps and other equipment to prevent leakage.
- F. Entire process to be carried out in the closed reactors with proper maintenance of temperature.
- G. Regular periodic monitoring of work area to check the fugitive emission.
- H. Adequate stack heights as per the CPCB estimation will be provided at all locations to reduce GLCs of pollutants.
- I. Air Pollution Control System will be installed in the plant.

2.6.3 DETAILS OF SCRUBBER

1. 1. 2 STAGE WATER SCRUBBER WITH EACH REACTOR FOLLOWED BY VENTURI SCRUBBER

Working Process:

The ammonia and carbon dioxide gas will be coming from the reactors goes in receivers. After receivers, the gases go in the two stage water scrubber. By reaction, the gases will be converted into ammonium carbonate solution and unreacted gases will go in acid media venturi scrubber and it will be scrubbed there. Pure air is vent out from stack and ammonium carbonate solution will be sold to actual users (letter from MoEF & CC is attached as Annexure-II) or converted to Ammonium Sulfate.

FIGURE 2.2

DIAGRAM OF SCRUBBER

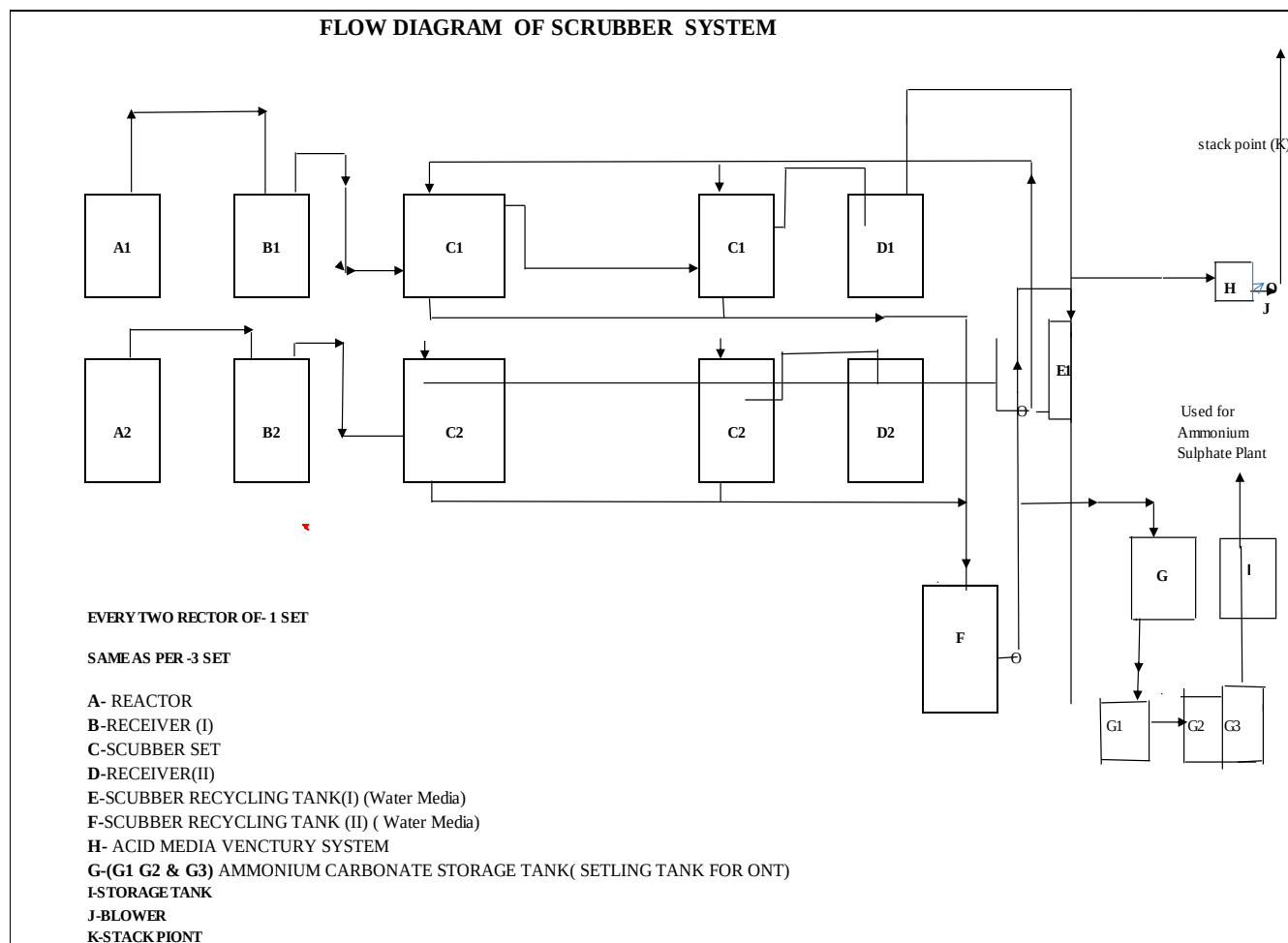


TABLE 2.20**SPECIFICATIONS OF CAUSTIC SCRUBBER& ACID SCRUBBER**

Description	Details of Scrubber System
Velocity of gas	10 Kg/Hr
Gas flow	10 Kg/Hr
Blower Capacity	1500 CFM
Pump Capacity	40M3/hrs
Scrubbing media	Water
Column diameter	700 mm
Column packed height	4000mm
Total column height	4600mm

TABLE: 2.21**DETAILS OF PROCESS GASES SENT TO SCRUBBER**

Sr. No.	Name of Air Pollutant	Quantity of Air Pollutant Ton / Ton of finished product	Name of Scrubbing Agent	Quantity Of Scrubbing Agent In KL	Name of Scrubbed Product	Quantity of Scrubbed Product Ton / Ton of finished product
1.	Ammonia (NH ₃ Gas)	0.14	Water	2	Ammonium Carbonate solution	2.32
2.	Carbon Diaoxide (CO ₂ Gas)	0.09				

TABLE: 2.21-B**DETAILS OF PROCESS GASES SENT TO SCRUBBER**

Sr. No.	Gases Come out from process	Before Quantity without APCM in Ton/ton finished product	APCM	After Quantity with APCM in Ton/ton finished product
1.	NH ₃ (CPC Blue Plant)	0.1419	Scrubber	$1 * 10^{-5}$

2.6.4SOLID &HAZARDOUS WASTE GENERATION

The following type of hazardous waste will be generated from the operational activities. All the waste will be stored separately in a designated storage area. The details of hazardous waste are given in table no.2.23. The details of solid waste such as glass, paper, cotton, wood and bio-medical waste are given in table no.2.22.

TABLE-2.22

DETAILS OF SOLID WASTE

Sr. No.	Type of Waste	Total Quantity (MT/Year)	Method of disposal
1.	Fly ash	400	Collection, storage, transportation, disposal to brick manufacturer.
2.	E – Waste	1	Collection, storage, transportation, sale to approved recyclers
3.	Biomedical waste	0.3	Collection, storage, transportation, disposal to registered BMW disposal site.

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TABLE: 2.23

DETAILS OF HAZARDOUS WASTE

Sr. No.	Hazardous waste	Source	Category	Quantity as per CCA in MT/Month	Quantity as per Proposed EC in MT/Month	Quantity After Expansion in MT/Month	Disposal
1.	ETP waste	ETP	26.1	2400 MT/Year	0	2400 MT/Year	Finally disposed at approved TSDF.
2.	Spent Oil	Lubrication	5.1	0.060 MT/Year	0.060	0.120 MT/Year	Disposed by selling to register Re-refiners.
3.	Discarded Container	Packeging	33.1	1,20,000 Nos. / Year (3000 MT/Year)	1,25,000 (3125 MT/Year)	2,45,000 Nos. / Year (6125 MT/Year)	Disposed by selling to registered recyclers or reused in waste filling or disposed to approved TSDF after decontamination.
4.	Spent Sulphuric Acid (10-15%)	Alpha Blue	B-15	5760 MT/Year	0 MT/Year	5760 MT/Year	Collection, Storage and reuse in CPC Blue manufacturing under rule-9 permission.
5	Spent Sulphuric Acid (20-25%)	CPC blue	B-15	6877 MT/Year	8023 MT/Year	14900 MT/Year	Collection, Storage and reuse in Ammonium Sulphate manufacturing under rule-9 permission.
6	Recovered solvent	CPC blue & Beta Blue	26.4	0	0	1481.76	Collection, Storage and reuse in CPC Blue and Beta blue manufacturing under rule-9 permission.
7	Copper	Neutraliza	8.2	0	360 MT/Year	360 MT/Year	Collection,treatment,

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	Sludge	tion of Spent Sulphuric Acid in manufactu re of Ammoniu m Sulphate					storage, transportation and Finallyselling to actual userhaving valid permissionunder Rule 9 of HWMR 2016.
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2.6.4.1 HAZARDOUS WASTE AND SOLID WASTE MANAGEMENT

Waste is an unavoidable byproduct of human activity. Economic development, rapid urbanization & improved living standards have led to the increase in quantity & complexity of the waste generated. Proper disposal of waste is essential for preservation and improvement of public health.

Solid waste management is one of the most essential services for maintaining the quality of life in the plant and for ensuring better standards of health and sanitation. Solid waste generated in the plant area can be handled under two main categories, namely domestic wastes and industrial wastes. Effective measures shall be taken to effectively implement the solid waste management systems in the plant. Solid waste will be handed over to authorized vendor for disposal.

The Hazardous wastes shall be handled and disposed as per Hazardous Waste (Management and Handling) Rules, 2016.

The Waste Management plan includes:

- Waste Inventory
- Classification of waste
- Packaging, Storing and Transporting Wastes to Disposal site
- Data Management and Reporting -Personnel Training
- Waste Minimization

General Guidelines for Waste Management:

1. Solid waste

- The solid waste shall be segregated as bio-degradable and non-biodegradable.
- The organic waste shall be segregated and handed over to outside authorized agency for disposal.
- The non-biodegradable (inorganic) waste shall be handed over to authorized recycler for further handling and disposal.
- Reuse of paper and plastic waste.
- Planned system for waste collection, segregation and disposal.
- E-waste will be disposed as per E-Waste (Management) Rule, 2016.

2. Hazardous waste

- Hazardous waste will be stored as per the guidelines in proper storage room and handed over to authorized vendor for final disposal.
- The collection, treatment and disposal of hazardous waste will be as per Hazardous waste (Management and Handling) Rules 2016, and hence no adverse impact on land environment is envisaged.

- It is proper management it will be stored separately in dry & covered place with RCC plat form. There will be provision of separately storage area.
- Forklift truck will be used in shifting, loading and unloading operation for hazardous waste to minimize manual handling of hazardous waste.
- Necessary PPE's shall be provided to workers while handling of hazardous waste.
- The details of quantity of hazardous waste generated and disposal facility is given in Chapter 2 in section 2.10.

2.6.4.2 METHODOLOGY FOR DECONTAMINATION

For disposal of discarded bags and containers, the guideline provided by the Gujarat Pollution Control Board will be followed. It will be ensured that containers are empty before taken for disposal. As per the guidelines all the containers will be washed properly, the washings will be checked for pH and COD. The pH should be neutral and COD should be NIL. This will ensure that the containers are cleaned before taken for disposal. Removal or defacing of all labeling and content of all product and waste material will be regular practice. The sticker will be put on individual container as "cleaned". The container will be deposited in the area marked for disposal. Then the containers will be inspected by the certifying agency approved by the GPCB. In confirmation of the quality of the cleaning they will issue the stickers for identification. After receiving stickers, that should be pasted on to the containers. Then the containers are disposed of to actual raw material supplier.

FIGURE: 2.3

METHODOLOGY OF DECONTAMINATION

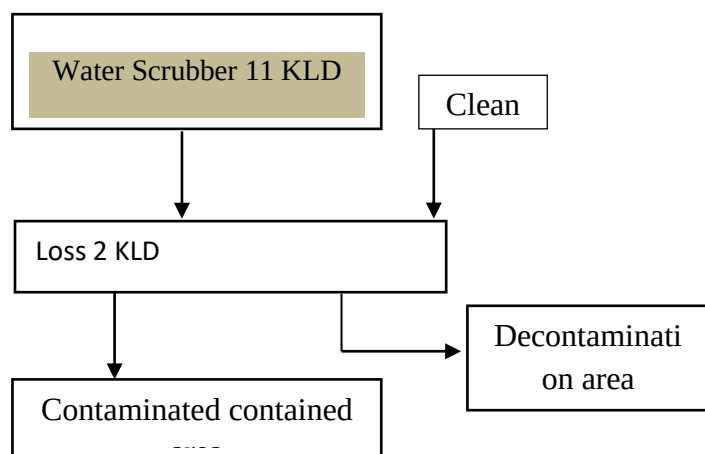


FIGURE 2.4

PHOTOGRAPHS OF PROPOSED SITE



2.7 PROJECT IMPLEMENTATION SCHEDULE

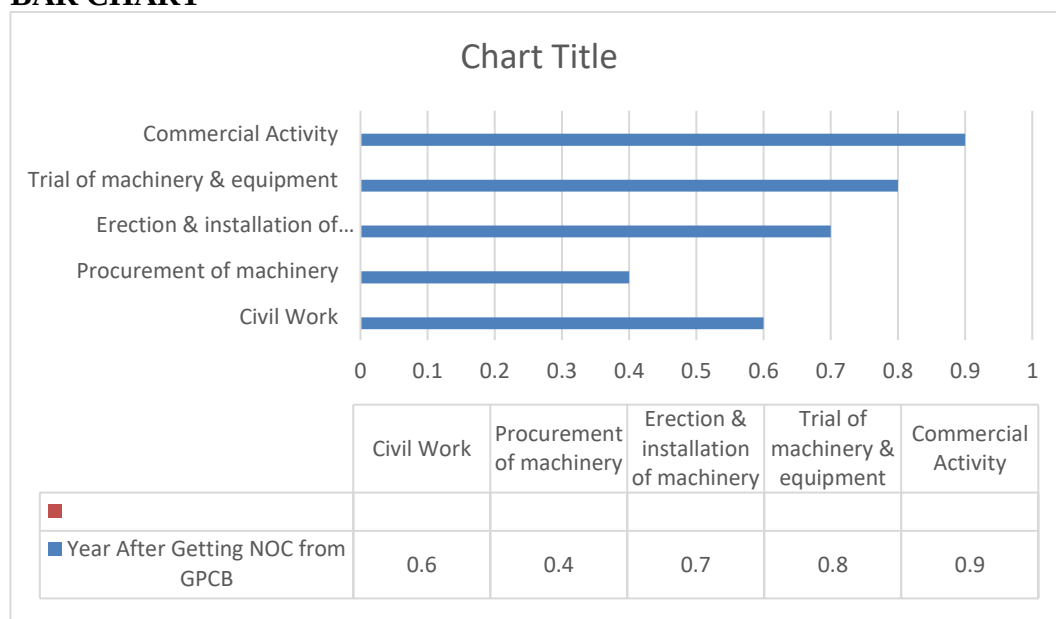
Implementation of Project within a pre-determined time frame is an important factor for the success of a project. Timely implementation saves on various costs like interest, administrative overheads and helps to realize the goals as per pre-determined objectives. Implementation of Project involves co-ordination of different activities at various levels of the firm and amongst different outside agencies. The project implementation schedule is given in table no.2.24.

This will start immediately after getting Environment Clearance. From the date of start, the implementation schedule envisages completion of project in 8 months. It is considered that preliminary activities such as obtaining necessary statutory clearance for proposed project and financial arrangements for the implementation of the project will be made at proper dates.

The major activities to be carried out at site during project work are as follows:

TABLE: 2.24**PROJECT IMPLEMENTATION SCHEDULE**

Project implementation schedule after getting NOC from GPCB		
Sr. No.	Activity	Required Period
1.	Civil work	Immediately after getting NOC-6 Months
2.	Procurement of machinery	4 month after getting NOC
3.	Erection& installation of machinery	Immediately after competition of activity no.2 - 3 month
4.	Trial of machinery & equipment	Within 1 months after competition of activity no.3
5.	Commercial activity	1 months after competition of activity no.4

FIGURE 2.5**BAR CHART**

2.8 PROJECT COST ESTIMATES

A Budget allocation for project and effective Environmental Monitoring Plan (EMP) is proposed in Table 2.25

TABLE 2.25**BUDGET ALLOCATION FOR ENVIRONMENTAL MANAGEMENT**

CONSTRUCTION PHASE			
Sr. No.	Pollution Control Measures	Operating cost (Rs. In Lakhs)	
1.	Dust suppression during construction	1 Lakhs	
TOTAL		1Lakhs	
OPERATION PHASE			
Sr. No.	Pollution Control Measures	Approximate Capital Cost (Rs. In Lakhs)	Approximate Recurring Cost Per Annum (Rs. In Lakhs)
1.	Air Pollution Control	10	3
2.	Water Pollution Control	50	57
3.	Environment Monitoring and Management	5	2
4.	Green Belt (Premises and outside premises.)	20	2
5.	Solid Waste Management	5	7
6.	Fire Safety & Equipment	10	4
TOTAL		100 Lakhs	75Lakhs

2.9 SOLVENT RECOVERY SYSTEM WITH SCRUBBER TO CONTROL VOC

Solvents like Ortho Nitro Toluene and IBA/Xylene are used in the process.

2.6.1 Ortho Nitro Toluene (ONT) from CPC Plant

Ortho Nitro Toluene (ONT) is the solvent to be used in the CPC manufacturing process. Solvent is recovered completely under condenser from vacuum Distillation Column.

Solvent recovery plant is designed to recover the solvent from the CPC Blue manufacturing process. The unit will be using solvent ortho nitro toluene. It will be steam distilled during the process. Diagram for ONT recovery system is shown in Figure 2.1.

FIGURE 2.1

MATERIAL BALANCE OF ONT RECOVERY SYSTEM

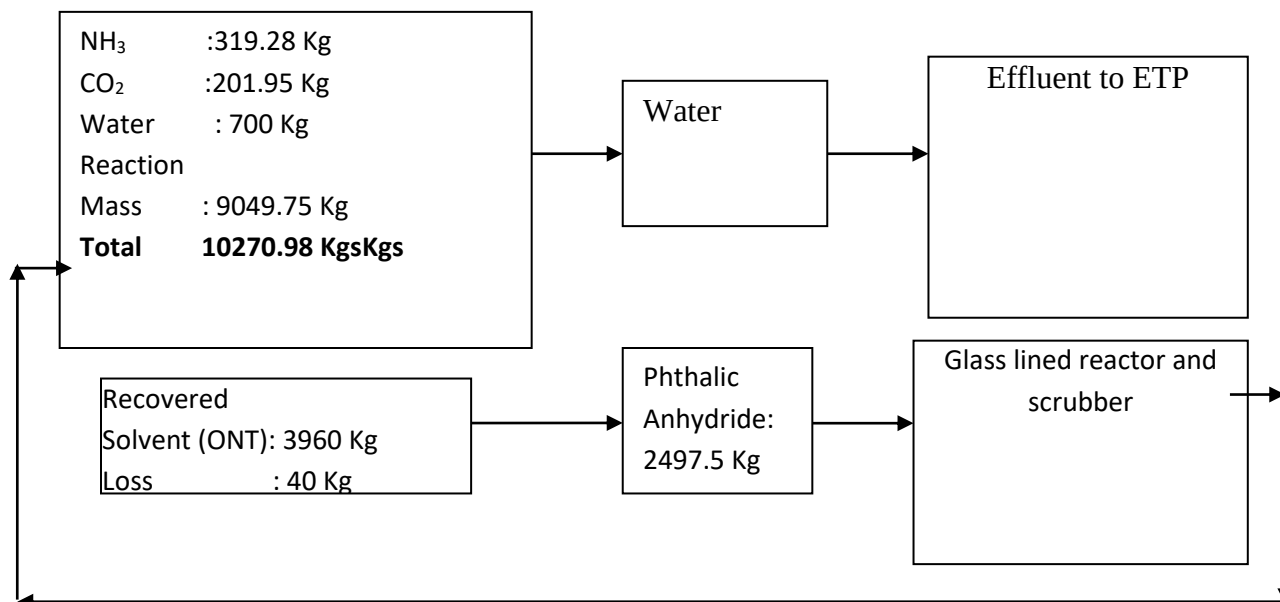
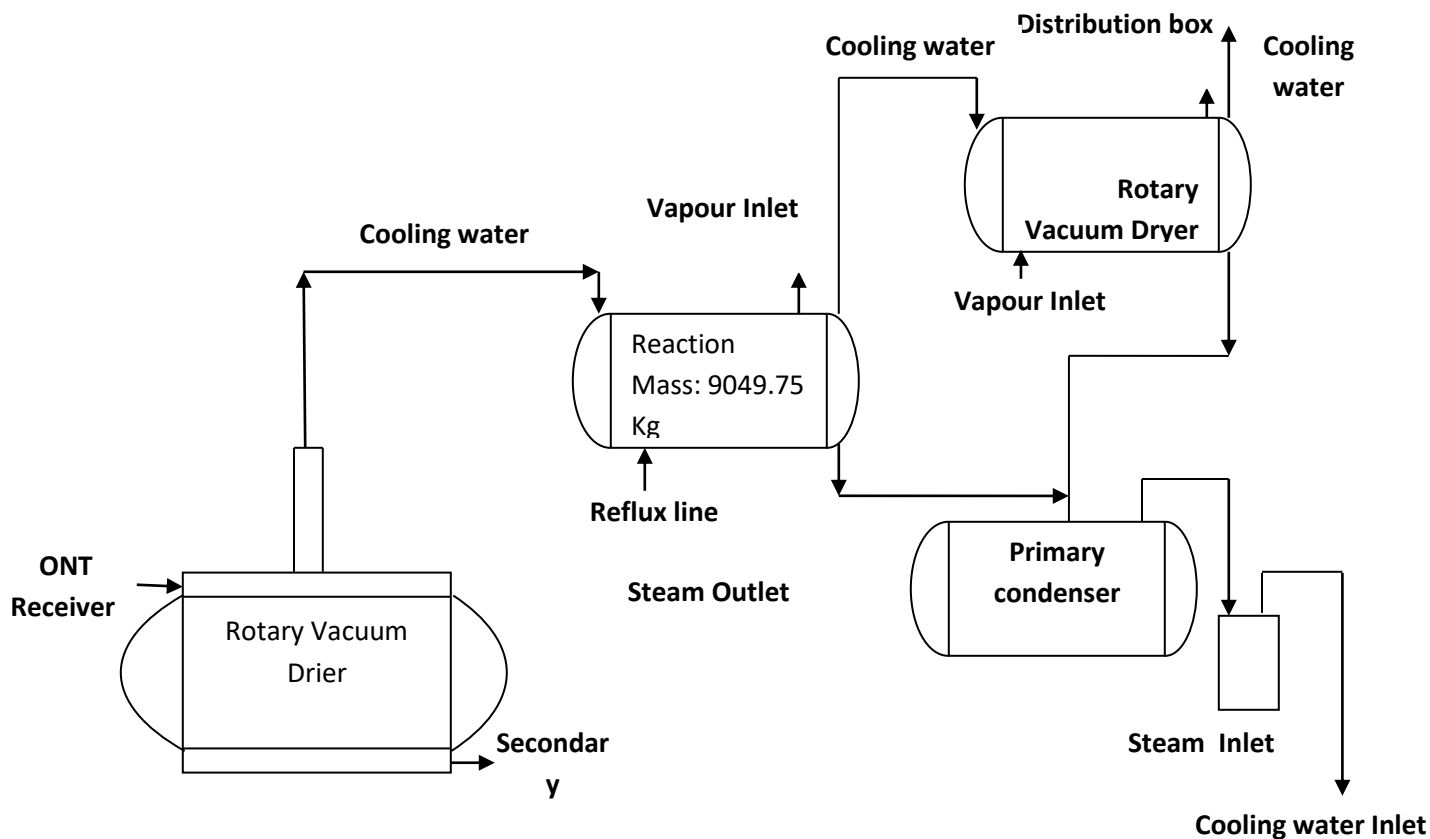


FIGURE 2.2

FLOW DIAGRAM OF ONT RECOVERY SYSTEM



2.6.2 SOLVENT ISO BUTYL ALCOHOL/XYLENE RECOVERY FROM BETA BLUE PLANT

Isobutyl alcohol/xylene is the solvent to be used in beta blue manufacturing process. Methanol is recovered completely under simple distillation column.

Solvent recovery plant is designed to recover the IBA/Xylene from the mother liquor. Plant will work efficiently with approx 98 to 99 % recovery.

Recovered IBA/Xylene will be reused in next batch. There will no loss in the atmosphere.

The 1 to 2 % solvent remains with waste water and finds its way in the effluent.

Diagram for IBA/Xylene recovery system is shown in Figure 2.2.

FIGURE 23

MATERIAL BALANCE OF IBA/XYLENE RECOVERY SYSTEM

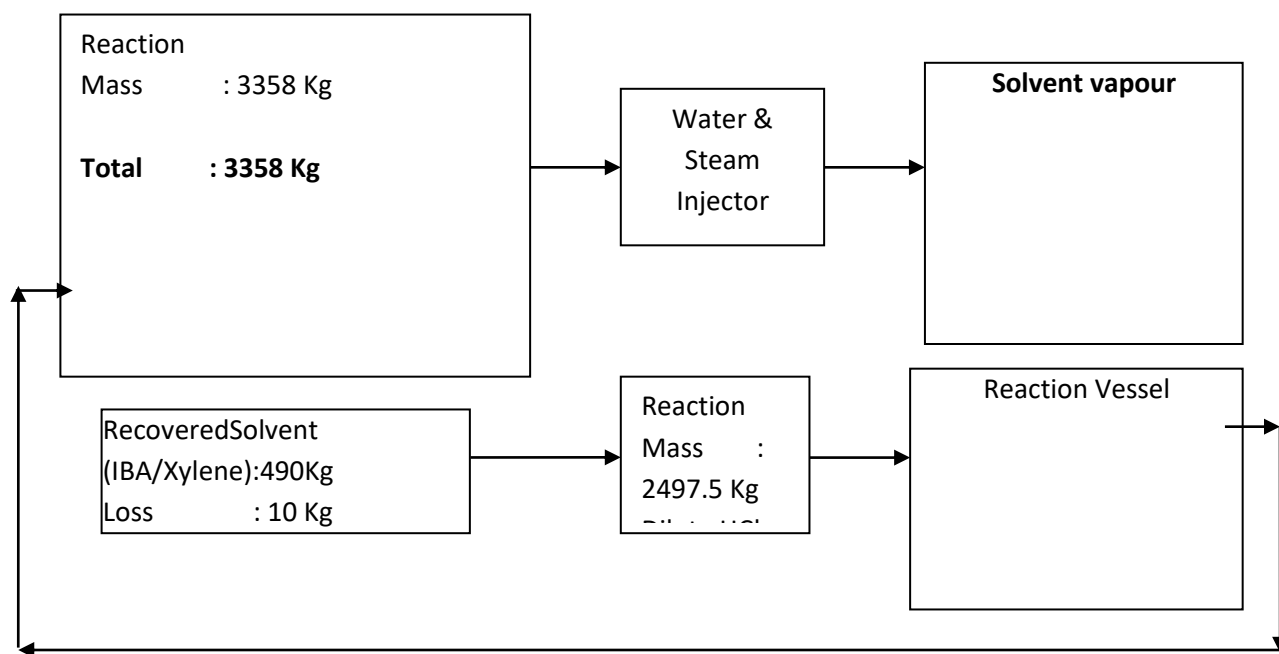


FIGURE 2.4

FLOW DIAGRAM OF ONT RECOVERY SYSTEM

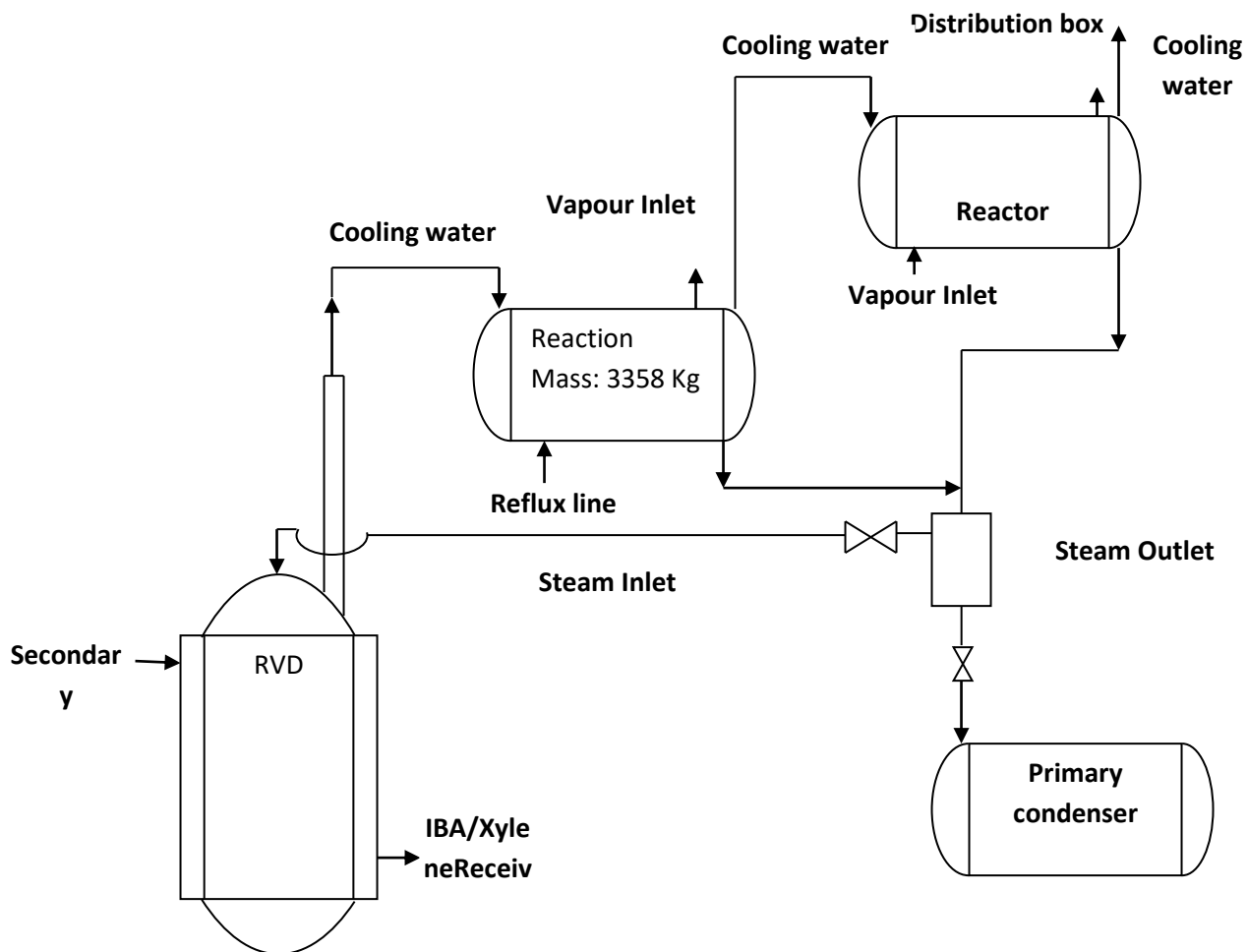


TABLE 2.25

DETAILS OF SOLVENT RECOVERY

Sr. No.	Name of Representative Product	Name of Solvent used	Product Quantity in MT/Month	Solvent Quantity used in ton per ton of product	Solvent recover Quantity in Ton per ton of product	Solvent Recovered Quantity in MT/Month	Percentage Recovery
1.	CPC Blue	Ortho Nitrotoluene	650	0.80	0.077	49.98	96
2.	Beta Blue	Xylene/IBA	150	0.50	0.49	73.5	98

2.10 DETAILS OF EFFLUENT TREATMENT PLANT

AMMONIUM CARBONATE SOLUTIONS (STREAM-A):

TANK NO-3A 3B ACID PROOF BRICK LINED NUTRILAZATION TANK WITH STIRER:-

In tank no. 1& 2, we take process scrubber solution (Ammonium Carbonate Solution) and add 40% acidic solution (Which is generated by Adding Sulphuric Acid (98%) into our Mother Liquor (25-30 %) and prepare 40% acidic solution). This is then maintained at 6 pH. Then we filter this solution through plate & frame type filter press. After that, we collect the filtrate in to the Acid proof Brick lined collection tank (Tank No.05). This collected solution is sent for copper recovery. After that, it is subjected to MEE for concentrate the soln. Concentrated Solution (Semi Solid Ammonium Carbonate) is subjected to spray drier to get Ammonium Sulphate powder.

PROCESS DESCRIPTION OF EFFLUENT TREATMENT PLANT (STREAM-B):

TANK NO.01& 02- ACID PROOF BRICK LINE TANK WITH STIRER:-

We take last washing, caustic washing, and neutral washing filtrate (General Stream) into collection tanks 01 & 02. We maintain pH 7.5 with hydrated lime & filter it through plate & frame type filter press. So that sulphuric acid is converted to gypsum and copper is precipitated out in to copper hydroxide. Additional caustic is added for the complete precipitation of copper hydroxide. The pH between 10.5 to 11 is maintained by consisting mixing of polyelectrolytes in to the water and it also removes turbidity from the water.

Then the water is filtered through a plate and frame type filter press and then it is routed to an air stripper. In air stripper, ammonia is stripped out from the tank. Then the stripped water is collected in to another collection tank to bring down the pH to 7 by using HCl and PAC is added to remove the turbidity. After the treatment water is filtered through plate and frame type filter press. Then it is sent to the primary clarifier. After that effluent is taken to an aeration tank where the biological treatment is being provided to reduce the BOD/COD level. After that wastewater is allowed to go to both these secondary clarifier where sludge and biological mass is removed while the clear effluent goes to the chemical oxidation tank.

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The overflow of chemical oxidation tank is collected to treated water sump. The waste water from treated water sump is pumped for the tertiary treatment followed by the sand filtration and charcoal treatment prior to final disposal in drainage system of NCTL.

Details of characteristics are given in treatability as an Annexure-VI.

MANAGEMENT PLAN FOR SPILLAGES/LEAKAGES/VESSEL WASHING.

Pumps and reactors will be having mechanical seal, so there will be no leakages. The unit will provide connection system for possibility of leakages. Leakages will be collected in a small pit which will carry the leakages to effluent plant.

Possible spillages will be from vessel washing, transfer of liquids, to avoid the spillage fixed pipeline will be provided. Vessel washing will be collected to effluent treatment plant. The unit will provide dedicated area made with HDPE lining so that the washing can be directly sent to ETP plant.

The products are run on campaign basis change over and washing is being avoided. Where ever washing is required we use the high pressure jet cleaning procedure hence to reduce by ~ 35-40%.

TABLE: 2.28

EQUIPMENT LIST OF PROPOSED EFFLUENT TRETMENT PLANT WITH DIMENSION

Sr. No.	Name of the unit	Capacity
1.	Acid proof brick lined neutralizer (I) with stirrer	36 KL
2.	Acid proof brick lined neutralizer (II) with stirrer	36 KL
3.	2 nos. plate and frame type filter press	1) 48'' x 2) 36'' x
4.	1 nos. plate and frame type filter press	48''x 48''
5.	Storage tank for filtrate of neutralized concentrated stream (with stirrer for agitation)	50 KL
6.	Ammonia stripping tower for concentrated stream	10 M ³ /hr
6A	Ammonia stripping tower for general stream	10 M ³ /hr
7.	Underground collection cum recirculation tank for forced draft ammonia stripping tower for concentrated stream	40KL
7.A	Underground collection cum recirculation tank for forced draft ammonia stripping tower	40KL
8.	Acid proof brick lined collection cum equalization tank (with aeration grid for gentle mixing)	60KL
9.	Acid proof brick lined collection cum equalization tank	65KL

	(with aeration grid for gentle mixing)	
10.	Flash Mixer	1 KL
11.	Hopper bottom settling tank	48KL
12.	Aeration tank with surface aerator	216 KL
13.	Secondary clarifier (2 in nos.) (with recirculation arrangement)	27KL each
14.	Chemical Oxidation tank	18.75 KL
15.	Treated water sump	21KL
16.	Pressure sand filter	1.2 Ø x 1.2 m
17.	Activated charcoal column	1.2 Ø x 1.2 m
18.	Final Outlet holdup tank	300 KLD
19.	MEE Plant	250 KLD
20.	Spray Dryer	150 KLD

TABLE: 2.29**WASTE WATER CHARACTERISTICS OF DIFFERENT STREAMS**

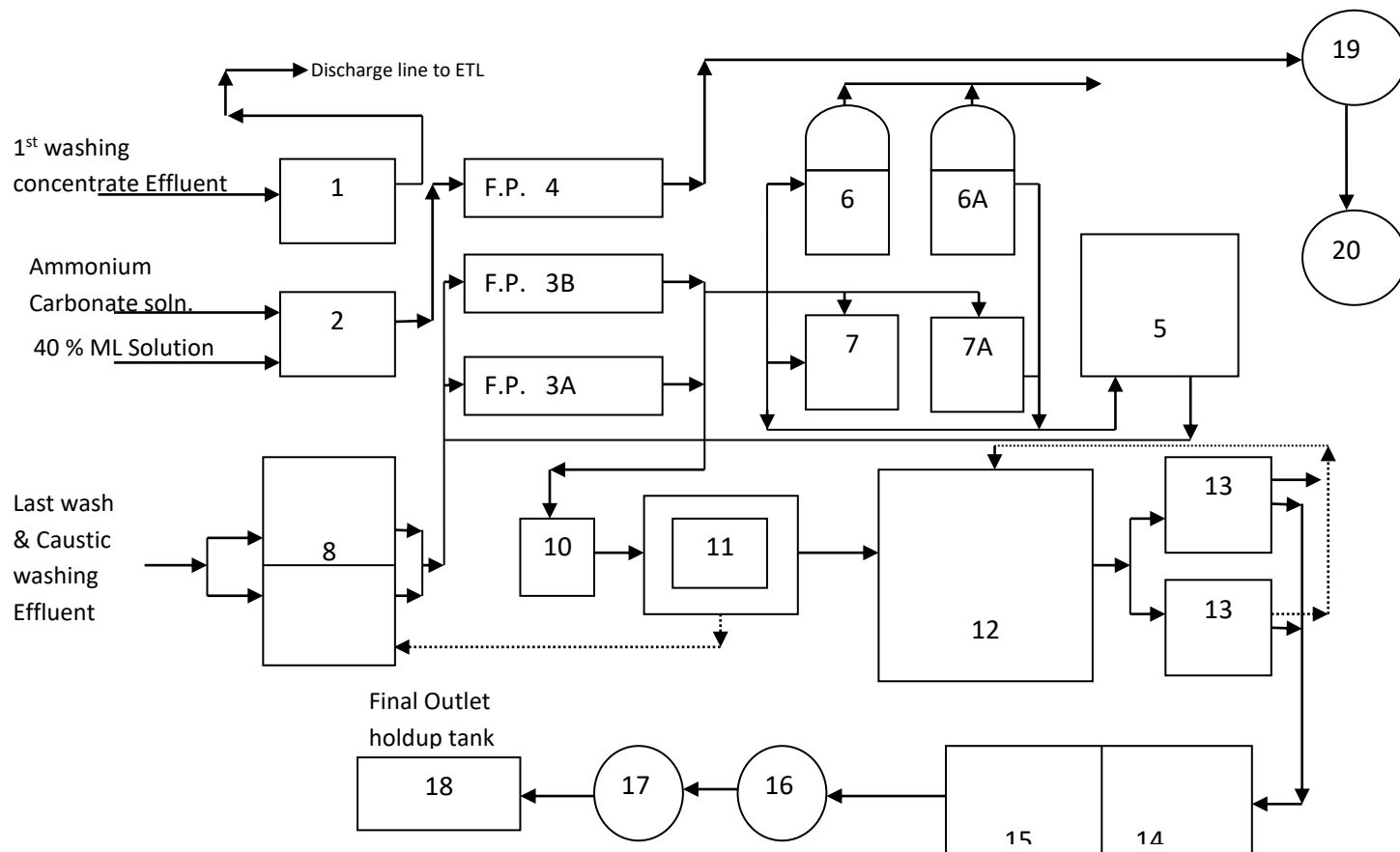
Sr. No.	Parameters	Units	Effluent generation				
			Blow down (Cooling tower and Boiler)	Washing water from floor & reactor washing	Sewage	Process	Composite Stream
	Capacity in KLD		7	5	4.5	238	254.5
1.	pH	--	6.5-8.5	6.5-8.5	6.5-8.5	4-6	4-6
2.	TSS	mg/l	200-250	150-200	50-100	1000-1500	1000-1200
3.	TDS	mg/l	3000-5000	1500-2000	1000-1500	6000-8000	5000-8000
4.	Ammonical Nitrogen	mg/l	5-10	20-30	5-10	300-400	300-400
5.	C.O.D.	mg/l	250-300	300-500	300-500	4000-6000	4000-6000

TABLE: 2.30**STAGE WISE REDUCTION IN EFFLUENT TREATMENT PLANT**

Sr. No.	Parameters	Before Treatment	Primary Outlet	Secondary Outlet	Tertiary Outlet
1	pH	4-6	6.5-8.5	6.5-7.5	6.5-7.5
2	T.S.S. in mg/L	1000-1200	87	77	77
3	T.D.S in mg/L	5000-8000	7650	7497	7497
4	AmmonicalNitrogenin mg/L	300-400	40-50	40-50	40-50
5	C.O.D. in mg/L	4000-6000	2500-4000	200-300	200-250

FIGURE: 2.7

FLOW DIAGRAM OF ETP



2.11 ECONOMICAL AND TECHNICAL VIABILITY OF THE EFFLUENT TREATMENT SYSTEM**TABLE: 2.30****CAPITAL AND RECURRING COST OF THE EFFLUENT TREATMENT SYSTEM**

Sr No	Unit	Installed Capacity (KLD)	Capital Cost (Rs in Lacs)	Operating cost (Lacs/Month)			Maintenance Cost (Lacs/Month)	Total recurring cost (Lacs/Month)
				Electricity	Man power	Chemical & consumables		
1	ETP	300	50	1.0	1.0	2.0	0.7	4.7
TOTAL			50	1.0	1.0	2.0	0.7	4.7

Unit will allocate a certain amount of money from the yearly profit towards environment health and safety department. This will enable the management to smoothly run ETP plant. Thus proper management of ETP can be carried out without having to worry about unit profit.

2.12 ODOUR MANAGEMENT PLAN**Odour Problem and Sources of Emissions**

- Causes of odour can be bad sanitation, bacterial growth in the interconnecting pipes & unattended drains etc.

Remedial Measures

- Better management to avoid staling.
- Use of sanitation biocides to minimize the growth of aerobic/anaerobic microorganisms.
- Steaming of major pipe lines.
- Proper cleaning of drains.

Following Additional methods can also be used to reduce odour nuisance:

- Green belt development in the buffer zone may help at least partially to mitigate / obfuscate the Odour.
- Ensuring that the operation is carried out under the best management practices.
- If still the Odour persists, nozzles, sprayers and atomizers that spray ultra-fine particles of water or chemicals can be used along the boundary lines of area sources to suppress odour.

TABLE: 2.32**PROPOSED ODOUR CONTROL MEASURES**

Sr. No.	Probable Source	Proposed Control Measures
1.	Pump handling odorous chemicals and pressured gases	• Use of mechanical seals of pumps and compressor. • All pipeline and pipe fitting shall be well maintain, wear and tear shall be attended promptly.
2.	At reactor during charging of liquid and solids chemicals	• Liquid raw material will be charged by pumping and closed loop.
3.	Pressure release valve emission from pipeline	• For highly pressurized lines, vent lines of PRVs to air pollution control device in case of toxic gases.
4.	Release from sampling lines	• Using a close loop sampling system.
5.	Emission from bulk storage tank during unloading	• Breather valve, PSVs, Rupture disc will be provided. • Vapor recovery system will be installed for process and storage vent tank.
6.	Leak from valves, flanges, plugs and instrument connection.	• Welded pipes will be used wherever feasible. • Suitable gasket material to be used. • Suitable gland packing will be used in valves. • Periodic inspection and maintenance of pipes and pipe fittings.
7.	Chemical vapors from wet cake in filtration and drying area	• Filtration will be done out in Agitated Neutch filter. Transfer and drying of wet-cake done in system shall be adopted, worker shall be provided PPEs, fume extraction system shall be provided, whenever require.
8.	Warehouse storing drums and bags	• Spillages shall be strictly prevented by providing dip pans, proper handling equipment, minimum manual operation, local exhaust and roof top ventilators. • Spill control procedures and equipment shall be provided.

2.13 ADEQUACY OF THE PROPOSED EMS**AIR:**

The unit will use Coalin boilers and hot air generator. Unit have installed multicyclone separator as APCM with boilers and Scrubber and Cyclone Separators APCM with Hot Air generator. The unit will use natural gas in all thermopack. Unit have stack of adequate height to control emission. Unit have installed two D. G. Sets of adequate stack height. and diesel will be used in proposed DG sets.

There will be process emission (NH₃) from reactor. Unit have proposed 2 stage water scrub with each reactor followed by venture scrubber.

WATER:

The unit will use 617.8 KLD of water. Out of which 361 KLD is fresh water and 257.8 KLD is recycled water.

The industrial effluent will be treated in effluent treatment plant. After treatment effluent will be send to NCt for further treatment and disposal.

HAZARDOUS WASTE

There will be generation of ETP sludge (2400 MT/Year), Discarded container (6125 MT/year), Used oil (0.12MT/Annum), SpentSulphuricAcid (10-15%) (3908 MT/Year), SpentSulphuricAcid (20-25%) (14900 MT/Year), Recoverable spent solvent(1481.76 MT/Year). Hazardous waste will be stored in dedicated closed areas. ETP sludgewill be sent to TSDF site for disposal. Discarded containers will be sold to authorized dealers after proper decontamination. Used oil will be disposed to registered re-processors. Spent acid and recovered solvent will be reuse interenally. Residue will be sent for Co-processing or incineration. The unit will first give preference to Co-processing over TSDF site for better environment management.

CONCLUSION

The environment management plan given by M/s. A-One Chemicals for air, water and hazardous waste is adequate as per the worst-case scenario.

CHAPTER – 3

DESCRIPTION OF THE ENVIRONMENT

3.1 INTRODUCTION

It is essential to monitor the environment quality prevailing in the surrounding area before implementation of the any project for assessing the environmental impacts. The Environment status within the study area could be used for identification of significant environmental issues to be addressed in the impact assessment study.

The impact from an existing industrial project on its surrounding environment are mainly regulated by,

- The nature of the pollutants,
- Their quantities discharged to the environment,
- Existing environment quality
- Assimilative capacity of the surrounding environment and
- Topography and terrain of the project site.

In order to identify and establish the extent of likely impacts, it is necessary to gather information on existing environmental quality relating to various components of the environment.

Primary data were collected for baseline collection. Secondary data were also gathered for remaining information like meteorological data, Socio-economic data, Ecological data and Land use data. For the purpose of collection of primary data, study area was selected within 10 km radius taking project site as a center which also included towns and villages.

The main factor of local, sub-regional and regional meteorology that influence the air quality in area of the proposed project are diurnal and seasonal wind pattern and wind direction, humidity ,temperature etc.

Ankleshwar Industrial Estate was set up by Gujarat Industrial Development Corporation in early 70s. This industrial estate is spread over an area of 1600 hectares in close proximity to National Highway No.8 and Delhi-Mumbai Railway Line. Being an ideal location for industrialization, as on date, more than 1500 industries, consisting of chemicals, pesticides, pharmaceuticals, bulk drugs, petroleum products, engineering, textiles, plastics, rubber and packaging etc. are located in this industrial estate.

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At present there are several industries located in this area. Lists of major industries in the Ankleshwar are given in Table 3.1.

TABLE: 3.1**LIST OF MAJOR INDUSTRIES IN THE ANKLESHWAR**

Sr. No.	Name Of The Company	Address	Type Of Industry
1.	Sunofi India Ltd.	3501, 3502-15, 6310B-14, GIDC Estate, Ankleshwar 393 002, Dist. Bharuch.	Pharmaceuticals
2.	Sun Pharmaceuticals Pvt. Ltd.	Plot no: 4708, GIDC, Industrial Estate Ankleshwar, Bharuch.	Pharmaceuticals
3.	Asian Paints	Plot No. 2702, GIDC Estate, Ankleshwar.	Paint
4.	Lupin Pharmaceuticals	Plot No. 09,123,123/1,124 & 125, GIDC Estate, Ankleshwar.	Pharmaceuticals
5.	Zydus Cadila	Plot No. 09,123,123/1,124 & 125, GIDC Estate, Ankleshwar.	Pharmaceuticals
6.	Glenmark Pharmaceuticals Limited	Plot No 3109, GIDC, Ankleshwar	Pharmaceuticals
7.	Heubach Colours Pvt Ltd.	Plot No. 9002-10, GIDC Estate, Ankleshwar.	Pigment
8.	Bharuch Environ Infrastructure Ltd.	Plot No. 117-118, G.I.D.C, Ankleshwar, Gujarat	TSDF Site
9.	Finornic Chemicals India Pvt Ltd	Plot No. 6234, GIDC Indl Estate, Ankleshwar.	Dye intermediates
10.	Gujarat Insecticides Ltd (GIL).	Plot # 805-806, Gidc Estate, P O Box No 90, Gidc Estate, Ankleshwar.	Insecticide
11.	Hi-Tech Electrification Engineers Pvt Ltd	Plot No. 5305, GIDC, Timber Market, GIDC, Ankleshwar.	Electrical , Electronics
12.	Hindustan Chemical Industries	Plot No. 3701, G.I.D.C. Estate, Ankleshwar.	Chemical
13.	Atul Limited	Plot No. 297, G I D C Estate, Ankleshwar..	Chemical
14.	Coromandel International Limited,	Plot No: 3204, Ficom Chowkdi, GIDC, Ankleshwar	Agro Chemical

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Sr. No.	Name Of The Company	Address	Type Of Industry
15.	J. B. Chemicals & Pharmaceuticals	Plot No 128/1, GIDC Estate, Ankleshwar	Chemical
16.	Miranda Tools Pvt Ltd	Plot No. 904-5, GIDC Estate, Ankleshwar	Engineering
17.	Sajjan India Ltd	Plot No. 6102-3, GIDC Estate, Ankleshwar.	Chemical
18.	Bectochem Consultants and Engineers	Plot 4906/15, GIDC Estate, Ankleshwar.	Equipment Manufacturing
19.	Crop Life Science	Plot No.5165, 5166 & 5151, G.I.D.C. Estate, Ankleshwar.	Agrochemical
20.	United Phosphorous Limited	Plot No.117, G.I.D.C., Ankleshwar.	Agrochemicals
21.	BASF India Ltd	Plot No. 8001, Gidc Phase 5, Ankleshwar - 393002	Dyes
22.	Cadila Pharmaceuticals Limited	294, GIDC Estate, Opp Atul Aeronautics, Ankleshwar.	Pharmaceutical
23.	Narayan Organics Pvt. Ltd.	Plot No. 1107/1&2, Industrial Estate Ankleshwar	Pigment
24.	Subhasri Pigments Pvt Ltd	Plot no 1213/1201/1202, GIDC, Ankleshwar.	Pigment
25.	Suyog Dye Chemie Pvt Ltd	2404-5, GIDC, Industrial Estate, Ankleshwar	Chemical
26.	Suyog Life Sciences Pvt Ltd	Plot No.: 145/B, G.I.D.C., Ankleshwar.	Pharmaceutical
27.	Tatva Chintan Pharma Chem Pvt Ltd	Plot No. 502/17, G.I.D.C Estate, Ankleshwar,	Pharmaceutical
28.	Lupin Pharmaceuticals	Plot No.124, GIDC Estate, Ankleshwar.	Pharmaceutical
29.	Umiya Plastic Industries Ltd	Plot No.4528/1, GIDC Estate, Ankleshwar.	Plastic
30.	Intas Pharmaceuticals Limited	2701/a, GIDC Estate, Ankleshwar.	Pharmaceutical

M/s. A- One Chemicals is located in GIDC Estate, Ankleshwar. The location aspects of the site are provided in Table 1.6 in Chapter 1.

For Baseline Study, the monthly meteorological data for study period from December 2016 to February 2017 is shown at below Table 3.2. Meteorological data like hourly wind speed, hourly wind direction, and hourly temperature are attached as Annexure-X.

3.2 WINDROSE

Based on the meteorological data, wind rose have been prepared for the winter season period between the December 2016 to February 2017. The wind rose diagram prepared from same data is shown at Figure 6.

TABLE: 3.2

METEOROLOGICAL DATA

Month	Temperature(°C)		Humidity (%)		Rain fall (mm)	
	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum
December - 16	36.5	16	47	16	00	00
January - 17	38.5	14	93	11	00	00
February - 17	43.5	16	79	7	00	00

FIGURE: 3.1

WIND ROSE DIAGRAM FOR PERIOD OF DECEMBER-2016 TO FEBRUARY 2017

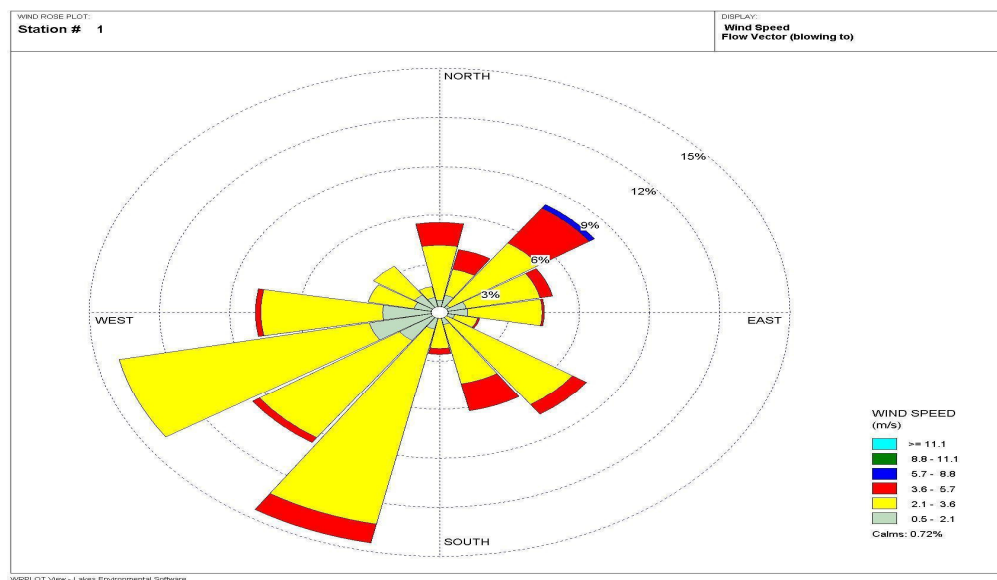
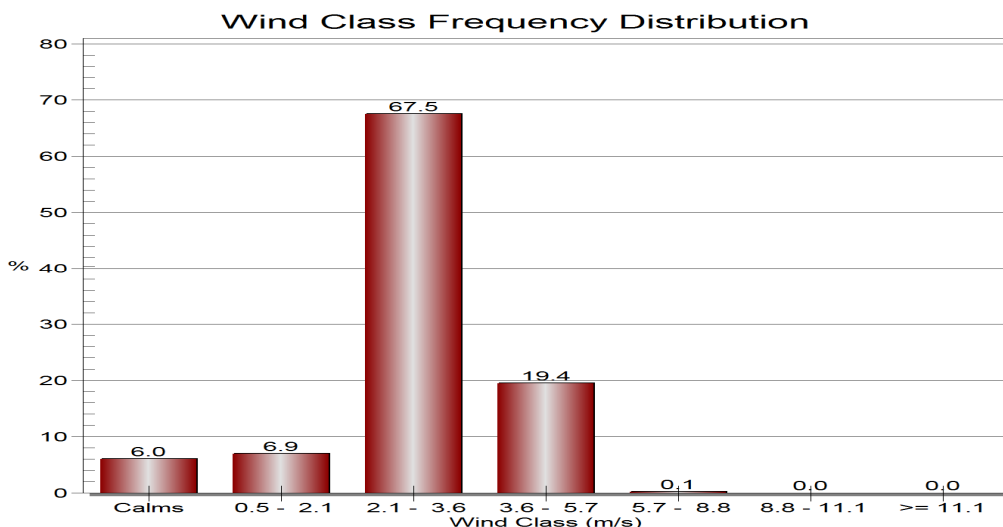


FIGURE: 3.2

WIND CLASS FREQUENCY DISRTIBUTION



It was observed that wind is blowing mainly towards the SW direction from NE. average wind speed was 2.90 m/s with calm winds recorded to be 5.97%.

3.3 TOPOGRAPHY AND DRAINAGE

Topography

The area is a plateau lying above 38.25m above MSL. The general slope is towards the north-to-north west. The topography & features of the 10 km radius study area (Figure 3.3 & 3.1)

3.3.1 Drainage

The drainage in the region is controlled to a large extent by the Narmada River (approx. 10.2 km to the north), Amla Khadi (approx. 3.5 km in South West), Amravati river (approx. 7.02 km in the East) and their tributaries, which generally are seasonal in nature. (Figure 3.4)

There are several water bodies present within the study area of the project. The distance to various seasonal streams/seasonal Rivers, water bodies are given in Table 3.1.

Name	Distance from Project Site	Direction
Water Bodies		
Narmada River	10.2 KM	N
Amaravati River	7.02 KM	E
Amla khadi	3.05 KM	SW
GIDC Pond	2.5 KM	WSW

3.4. AIR ENVIRONMENT**3.4.1 AMBIENT AIR QUALITY (AAQ)**

The basic objective of collection of base line data for air environment is to identify project specific air pollutants being released into atmosphere, which will have significant impact on air environment of immediate locality of the proposed project site. For assessment of the baseline data it is important to specify the study area in respect of the location of the proposed project. It was decided to study ambient air quality at 8 locations in the different direction in probable impact zone including the project site.

3.4.1.1 LOCATION OF AAQ MONITORING STATIONS

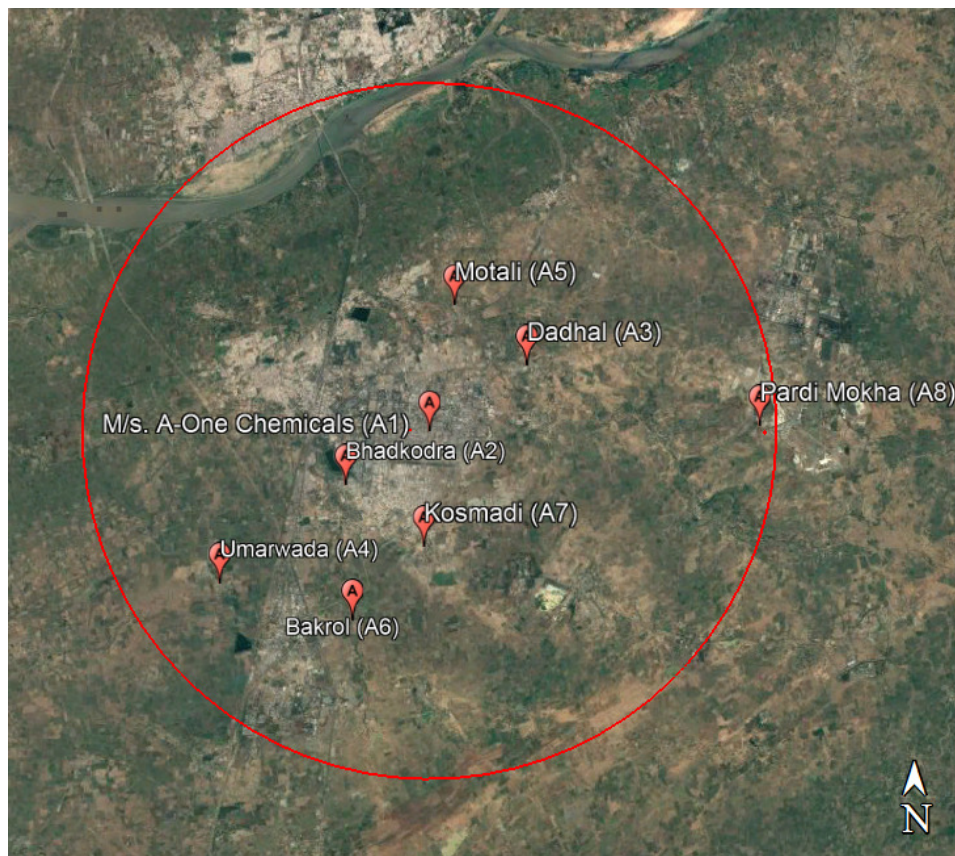
Ambient air quality stations were chosen considering the various factors like the most prevailing wind direction, pockets of habitation, available infrastructure facilities like power supply, accessibility etc. The location of AAQ monitoring stations are shown in Figure 3.3 and Table 3.4.

TABLE: 3.3**DETAILS OF SAMPLING LOCATION OF AMBIENT AIR QUALITY MONITORING**

Sr. No.	Location	Latitude	Longitude	Wind Direction	Distance in Km	District
1.	Project Site (A1)	21°37'5.10"N	73° 2'0.94"E	--	--	Bharuch
2.	Bhadkodra (A2)	21°36'15.55"N	73° 0'36.98"E	Downwind	2.79, SW	Bharuch
3.	Dadhal (A3)	21°38'6.57"N	73° 3'38.42"E	Upwind	3.40, ENE	Bharuch
4.	Umarwada (A4)	21°34'44.27"N	72°58'30.78"E	Downwind	9.36, SW	Bharuch
5.	Motali (A5)	21°39'2.44"N	73° 2'26.00"E	Upwind	2.10, NW	Bharuch
6.	Bakrol (A6)	21°34'10.22"N	73° 0'43.74"E	Downwind	7.63, SSW	Bharuch
7.	Kosmadi (A7)	21°35'18.65"N	73° 1'55.35"E	Downwind	4.92, SSW	Bharuch
8.	Pardimokha (A8)	21°37'10.55" N	73° 7'31.78"E	Upwind	7.03, SE	Bharuch

FIGURE: 3.3

LOCATION OF AMBIENT AIR QUALITY MONITORING STATIONS



3.4.1.2 BASE LINE DATA

The ambient air quality monitoring was carried out during period of December, 2016 to February, 2017. Monitoring details like location, monitoring date are attached as Annexure-XI. The frequency of monitoring was twice in a week for a period of 12 weeks to assess the existing the sub regional air quality status. All the sampling locations were monitored for PM_{2.5}, PM₁₀, SO₂, NO_x, VOC and NH₃ on 24 hr basis to enable the comparison with ambient air quality standards prescribed by the CPCB.

Based on the data obtained through ambient air quality survey statement showing maximum, minimum average concentration values of different monitoring location in the study area have been computed and presented at Table 3.4.

TABLE: 3.4**AMBIENT AIR QUALITY STATUS OF STUDY AREA**

Location	Min. Value	Max. Value	Avg. Value
PM₁₀ (Permissible Limit (CPCB standard) : 100 µg/m³)			
Project Site (A1)	76	94	81.85
Bhadkodra (A2)	73	88	79.37
Dadhal (A3)	76	90	81.29
Umarwada (A4)	70	82	76
Motali (A5)	66	78	72
Bakrol (A6)	75	89	79.29
Kosmadi (A7)	75	92	80.62
Pardimokha (A8)	32	42	35.54
PM_{2.5} (Permissible Limit (CPCB standard) : 60 µg/m³)			
Project Site (A1)	33	41	37.12
Bhadkodra (A2)	33	42	37.20
Dadhal (A3)	34	43	38.83
Umarwada (A4)	32	36	34
Motali (A5)	34	43	38.79
Bakrol (A6)	30	33	31.5
Kosmadi (A7)	32	41	36.20
Pardimokha (A8)	23	27	23.83
SO₂ µg/m³ (Permissible Limit (CPCB standard): 80 µg/m³)			
Project Site (A1)	30.3	33.9	31.92
Bhadkodra (A2)	22	32	29.45
Dadhal (A3)	20	31	28.42
Umarwada (A4)	32	40	36
Motali (A5)	28.8	35	31.54
Bakrol (A6)	28	36	32
Kosmadi (A7)	28.8	33.9	31.35
Pardimokha (A8)	15	21	18
NO_x (Permissible Limit (CPCB standard): 80 µg/m³)			
Project Site (A1)	39.4	47.7	43.33
Bhadkodra (A2)	35.0	48	40.87
Dadhal (A3)	38.5	44.2	41.03

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Location	Min. Value	Max. Value	Avg. Value
Umarwada (A4)	32	38	35
Motali (A5)	28	36	32
Bakrol (A6)	38.5	47.5	42.54
Kosmadi (A7)	38.1	42.8	40.44
Pardimokha (A8)	15	29	19.75
VOC(Permissible Limit(CPCB standard): 5 µg/m3)			
Project Site (A1)	2.2	4.4	3.3
Bhadkodra (A2)	2	3.8	2.9
Dadhal (A3)	1.6	3.2	2.4
Umarwada (A4)	2	3.9	3
Motali (A5)	2.5	3.7	3.6
Bakrol (A6)	1.2	2.4	1.8
Kosmadi (A7)	1.2	2.4	1.8
Pardimokha (A8)	0.3	0.6	0.4
NH₃ (Permissible Limit(CPCB standard): 400 µg/m3)			
Project Site (A1)	5	9	5.88
Bhadkodra (A2)	5	9	6.52
Dadhal (A3)	6	10	6.45
Umarwada (A4)	ND	ND	ND
Motali (A5)	5	9	6.08
Bakrol (A6)	ND	ND	ND
Kosmadi (A7)	5	8	6.31
Pardimokha (A8)	ND	ND	ND
CO (Permissible Limit(CPCB standard): 400 µg/m3)			
Project Site (A1)	0.3	0.5	0.41
Bhadkodra (A2)	0.2	0.5	0.34
Dadhal (A3)	0.5	0.7	0.60
Umarwada (A4)	0.3	0.5	0.41
Motali (A5)	0.6	0.8	0.69
Bakrol (A6)	0.3	0.6	0.47
Kosmadi (A7)	0.5	0.8	0.67
Pardimokha (A8)	0.5	0.8	0.68

OBSERVATION:

Based on data obtained, it could be stated that, during the study period the values of PM₁₀ at monitored locations is ranged between 32 - 94 µg/m³ while the values PM_{2.5} fluctuates in the range of 23-43 µg/m³. The values of SO₂ and NO_x were observed to be in the range of 15 - 40 µg/m³ and 29-48 µg/m³ respectively. The values of VOC and HCl were observed to be in the range of 0.3 – 4.4 µg/m³ and 1-9 µg/m³ respectively. The value of H₂S, HBr, Br₂ and Cl₂ were observed below detectible limit. The value of CO were observed to be in the range of 0.2 - 0.8 µg/m³. The average concentration the results of AAQM is within the norms prescribed in NAAQS. These concentrations at all AAQM locations were primarily caused by local phenomena including vehicular movement and natural dusting due to human activities and wind movement.

3.5 WATER ENVIRONMENT

There are two categories of water environment:

- 1) Ground water: - accumulation in deeper strata of ground and
- 2) Surface water: - river, drains, cannals, ponds etc.

Eight locations were selected for ground water sampling and six locations were selected for surface water sampling. Collected samples were analyzed for drinking water quality parameters like physic-chemical parameters and heavy metals. During study period, the sampling was done for one time. The map viewing location for sampling points is shown at Figure 3.4 and Figure 3.5. The analysis results are presented at Table 3.6 & 3.8.

FIGURE: 3.4

LOCATION OF GROUND WATER QUALITY MONITORING STATIONS



TABLE: 3.5

DETAILS OF GROUND WATER MONITORING LOCATIONS

Sr. No.	Sampling locations	Sample ID	Latitude	Longitude	Distance & Direction w.r.t project site	Type of Area
1.	GIDC water supply (Project Site)	GW1	21°37'5.10"N	73° 2'0.94"E	--	GIDC, Industrial
2.	Kosamadi	GW2	21°35'15.88"N	73° 1'56.44"E	3.46 Km, SSW	Residential Area
3.	Umarwada	GW3	21°34'41.99"N	72°58'31.40"E	7.58 Km, SW	Residential Area
4.	Pardimokha	GW4	21°37'10.78"N	73° 7'33.60"E	9.50 Km, E	Residential Area
5.	Piraman	GW5	21°37'2.55"N	72°59'51.48"E	3.81 Km,	Residential Area

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Sr. No .	Sampling locations	Sample ID	Latitude	Longitude	Distance & Direction w.r.t project site	Type of Area
					WSW	
6.	Motali	GW6	21°39'0.45"N	73° 2'27.56"E	3.70 Km, NNE	Residential Area
7.	Bakrol	GW7	21°34'10.11"N	73° 0'42.27"E	5.75 Km, SSW	Residential Area
8.	Karavel	GW8	21°38'13.92"N	73° 5'18.53"E	6.03 Km, ENE	Residential Area

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TABLE: 3.6

WATER QUALITY PARAMETERS (GROUND WATER SOURCES)

Parameters	Unit	IS 10500:1991		SAMPLING LOCATION							
		Desirable limit	Permissible Limit	Project site (GIDC Water) (GW1)	Kosamadi (GW2)	Umarwada (GW3)	Pardimokha (GW4)	Piraman (GW5)	Motali (GW6)	Bakrol (GW7)	Karavel (GW8)
Temperature	°C	--	--	27.1	25.1	24.9	32	28.6	30.9	28.4	26.2
pH	pH unit	6.5 – 8.5	6.5 – 8.5	7.58	7.02	7.5	7.2	7.80	8.15	7.09	7.18
Colour	pt.Co.scale	5	25	<5	<5	<5	<5	<5	<5	<5	<5
Odour	---	Unobjectionable -	--	Unobjectionable	Unobjectionable	Unobjectionable	Unobjectionable	Unobjectionable	Unobjectionable	Unobjectionable	Unobjectionable
TDS	mg/L	500	2000	667	622	1453	1687	1810	890	880	1430
Turbidity	mg/L	500	2000	<0.1	<0.1	0.86	0.48	1	<0.1	<0.1	<0.1
Total Hardness	mg/L	300	600	495	214	909	462	720	627	240	440
Calcium	mg/L	75	200	138	173	481	254	307	200	93	200
Total Alkalinity	mg/L	200	600	100	367	765	358	358	437	368	596
Chloride	mg/L	250	1000	79	102	104	627	530	103	116	424
Magnesium	mg/L	30	100	357	41	428	208	418	427	147	240

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Sulphate	mg/L	200	400	35	58	148	54	68	21	147	85
Phosphate	mg/L	--	--	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Sodium	mg/L	--	--	43	186.3	231.2	488.2	420.8	76.8	311.5	418
Potassium	mg/L	--	--	11	56.7	56	48.9	52.0	52.6	56.3	57.3
Fluoride	mg/L	1	1.5	0.45	0.84	0.32	0.47	0.36	0.38	0.31	0.34
Phenolic Comp.	mg/L	0.001	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Oil & Grease	mg/L	0.01	0.03	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dissolve Oxygen	mg/L	--	--	5.5	5.6	6.2	7.1	6.3	4	5.5	6.2
COD	mg/L	4	--	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
BOD(3 Days at 27°C)	mg/L	1	--	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Nitrate	mg/L	45	45	6.6	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Iron	mg/L	0.3	1	0.55	0.31	0.45	0.36	0.34	0.32	0.38	0.42
Copper	mg/L	0.05	1.5	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Boron	mg/L	1	5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chromium	mg/L	0.05	--	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Zinc	mg/L	5	15	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
MPN	No/100 ml	1	10	Absent	Absent	Absent	10	14	Absent	Absent	23
Silica	mg/L	---	---	0.69	0.52	0.78	0.7	0.79	0.82	0.78	0.72

****BDL-Below Detection Limit***

Detectable limit for

COD- 4 mg/l

BOD- 1 mg/l

Nitrate- 1 mg/l

Observation

In view of the above mentioned chemical analysis of groundwater samples reveals that the pH varies from 7.02 to 8.15, Colour<5, TDS varies from 622-1810 mg/l, Total Hardness varies from 214 to 909 mg/l, Chloride varies from 79 to 627 mg/l, Calcium varies from 93 to 481 mg/l, Magnesium varies from 41 to 428 mg/l, Iron varies from 0.31 to 0.55 mg/l, Fluoride varies from 0.31 to 0.84 mg/l, Sodium varies from 43 to 488.2 mg/l, Potassium varies from 11 to 57.3 mg/l, Sulphate varies from 21 to 148 mg/l, Nitrate varies from 0 to 6.6 mg/l, Alkalinity varies from 100 to 765 mg/l, COD, BOD and Residual free chloride are not detected. MPN coliform varies from 0-23MPN/100ml.

The heavy metal contents and TDS are found to be well within the limit. The physico-chemical and biological analysis revealed that all the parameters are well within the prescribed limits of IS: 10500-2012.

This water can be used for drinking purpose only after some preliminary treatment.

Analysis of collected samples reveals that rest of the parameters satisfy the permissible limits as per IS 10500:2012 specified for drinking water and hence are suitable for drinking, however it is suggested that the water may disinfected by boiling or by use of chlorine tablets before use.

Conclusion: Quality of Ground Water

Based on data obtained, it could be stated that the quality of ground are appropriate in the study area as norms of all parameter apart from MPN are meeting with permissible limit of Indian standard.

FIGURE: 3.5

LOCATION OF SURFACE WATER QUALITY MONITORING STATIONS

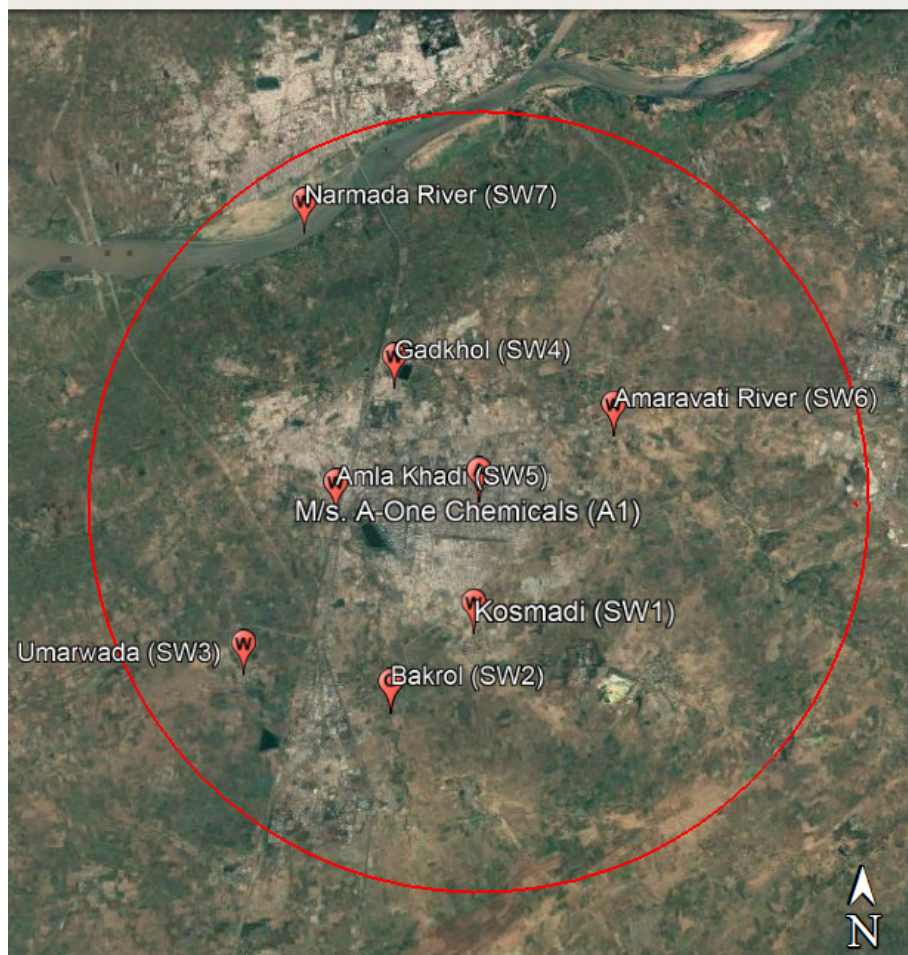


TABLE: 3.7

DETAILS OF SURFACE WATER MONITORING LOCATIONS

Sr. No.	Sampling locations	Sample ID	Latitude	Longitude	Distance & Direction w.r.t project site	Source
1.	Kosamadi	SW1	21°35'15.88"N	73° 1'56.44"E	3.82 Km. S	Lake water
2.	Bakrol	SW2	21°34'10.11"N	73° 0'42.27"E	5.88 Km. SSW	Pond water
3.	Umarwada	SW3	21°34'41.99"N	72°58'31.40"E	7.46 Km. SW	Khadi water
4.	Gadkhol	SW4	21°38'39.84"N	73° 0'45.55"E	3.63 Km. NW	Lake water
5.	Amla Khadi	SW5	21°36'55.47"N	72°59'53.36"E	3.78 Km. SWS	Khadi water
6.	Amaravati River	SW6	21°37'59.99"N	73° 4'1.05"E	3.89 Km. E	River water
7.	Narmada River	SW7	21°40'48.19"N	72°59'25.23"E	8.40 Km, NW	River water

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TABLE: 3.8

WATER QUALITY PARAMETERS (SURFACE WATER SOURCES)

Parameter	Unit	IS 10500:1991		IS 10500:1991						
		Desirable limit	Permissible limit	SW1 Kosmadi Lake Water	SW2 Bakrol Pond water	SW3 Umarwada Khadi water	SW4 Gadkhhol Lake water	SW5 Amla Khadi	SW6 Amaravati River	SW7 Narmada River
Temperature	°C	---	---	27	28	28.4	28.4	27.8	28	27.9
pH	pH unit	6.5-8.5	6.5-8.5	7.12	7.05	7.15	7.02	7.24	8.1	7.3
Colour	pt.Co.s scale	5	25	<5	<1.1	<1	<5	<5	<5	<5
Odour	---	Unobjectionable	--	Unobjectionable	Unobjectionable	Unobjectionable	Unobjectionable	Unobjectionable	Unobjectionable	Unobjectionable
TDS	mg/L	500	2000	480	611	845	605	295	520	301
TSS	NTU	--	--	5	4	5	6	4	8	4
Total Hardness	mg/L	300	600	171	169	273	120	110	142	132
Calcium	mg/L	75	200	116	78	169	67	14	25	21
Total Alkalinity	mg/L	200	600	129	134	493	70	189	167	103
Chloride	mg/L	250	1000	130	134	150	169	120	182	105

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Magnesium	mg/L	30	100	55	91	104	53	96	117	111
Sulphate	mg/L	200	400	18.3	220	220	22.1	29	48	22.1
Phosphate	mg/L	--	--	0.02	0.03	<0.001	0.03	<0.001	0.02	0.04
Sodium	mg/L	--	--	102	36.4	82.6	32.7	19	126	22
Potassium	mg/L	--	--	53.5	39.7	122.9	50.4	4	18	8
Fluoride	mg/L	1	1.5	0.34	0.04	0.02	0.11	0.27	0.44	0.11
Phenolic Comp.	mg/L	0.01	0.02	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Oil & Grease	mg/L	0.5	--	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Dissolve Oxygen	mg/L	--	--	4.6	4.2	3.8	4.2	4.3	4.8	3.6
COD	mg/L	--	--	08	16	12	BDL	16.2	BDL	5.2
BOD(3 Days at 27°C)	mg/L	--	--	BDL	BDL	BDL	BDL	<2	BDL	BDL
Nitrate	mg/L	45	45	BDL	BDL	BDL	BDL	BDL	0.4	2.3
Iron	mg/L	0.3	1	0.002	0.02	0.25	0.21	0.71	0.14	0.16
Copper	mg/L	0.05	1.5	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Boron	mg/L	0.5	1.0	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Chromium	mg/L	--	--	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Zinc	mg/L	05	15	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Silica	mg/L	--	--	0.2	0.2	0.3	0.1	0.2	0.3	0.1

**BDL- Below Detection Limit, Detectable limit for, COD- 4 mg/l, BOD- 1 mg/l, Nitrate- 1 mg/l*

Observation

In view of the above mentioned chemical analysis of surface water samples reveals that the pH varies from 7.05 to 8.1, Colour remains <5 Pt.co.sc, Turbidity varies from <2 to 3 NTU, Total Hardness varies from 37 to 180 mg/l, Residual free chloride was not detected from any source, Fluoride varies from 0.12 to 0.47 mg/l, Chloride varies from 105 to 1825 mg/l, TDS varies from 295 to 845 mg/l, TSS varies from 4 to 25 mg/l, Calcium varies from 22 to 117 mg/l, magnesium varies from 16 to 110 mg/l, Iron varies from 0.008 to 0.65 mg/l, Sodium varies from 40 to 190 mg/l, Potassium varies from 19 to 80 mg/l, Sulphate varies from 19.2 to 65 mg/l, Nitrate varies from 0.6 to 0.8mg/l, Alkalinity varies from 140 to 179 mg/l, COD varies from <10 to 18 mg/l & BOD remains <10 mg/l, MPN coliform count varies from 0 to 59MPN/ 100 ml and E coli remains absent.

The heavy metal contents and TDS are found to be well within the limit. The physico-chemical and biological analysis revealed that all the parameters are well within the prescribed limits of IS: 10500-2012.

This water can be used for drinking purpose only after some preliminary treatment.

Analysis of collected samples reveals that rest of the parameters satisfy the permissible limits as per IS 10500:2012 specified for drinking water and hence are suitable for drinking, however it is suggested that the water may disinfected by boiling or by use of chlorine tablets before use.

Conclusion: Quality of Surface Water

Based on data obtained, it could be stated that the quality of surface water are appropriate in the study area as norms of all parameter apart from MPN are meeting with permissible limit of Indian standard.

Sampling Method

The samples were collected as per Indian standard IS: 3025 (part-1) for ground water and surface water quality assessment.

Analysis Method

The analysis method followed for the measuring different parameters to evaluate water quality is given in Table 3.9.

TABLE: 3.9**METHOD OF ANALYSIS**

Sr. No.	Parameters	Applicable Standard Method of Analysis	Detection Limit
1.	Color in Pt. Co. Sc.	APH (22 nd Edition) Spectrophotometer (analogous to APHA 2120 C) (Platinum Cobalt Method)	1
2.	pH	APHA(22 nd Edition) 4500 H ⁺ B Electrometric Method	0.01
3.	Total hardness (as CaCO ₃) in mg/l	APHA(22 nd Edition) 2340 C: Page 2 – 37 EDTA Titrimetric Method	2
4.	Chloride (as Cl) in mg/l	APHA(22 nd Edition) 4500-Cl-B- Argentometric method	1
5.	TDS in mg/l	APHA (22 nd Edition) 2540 C Total Dissolved Solid Dried at 180°C	4
6.	TSS in mg/l	APHA (22 nd Edition) 2540-D-Total Suspended Solids Dried at 103-105°C	4
7.	Calcium (as Ca) in mg/l	APHA (22 nd Edition) 3500- Ca : B Page 3 – 65 EDTA Titrimetric Method	2
8.	Magnesium(as Mg) in mg/l	APHA(22 nd Edition) – 3500 - Mg : B Page 3 – 84 Calculation Method	2
9.	Sulphate (as SO ₄) in mg/l	APHA (22 nd Edition) 4500–SO ₄ ⁻² E: Page 4-188 Turbid metric Method/ IS 3025 (Part 24) 1986 (Reaffirmed 1986) Gravimetric Method	1

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10.	Alkalinity (as CaCO ₃) in mg/l	APHA (22 nd Edition) – 2320 B: Page 2 – 27 Titration Method	2
11.	COD in mg/l	APHA(22 nd Edition)– 5220 B Open Reflux Method	4
12.	BOD in mg/l	IS: 3025 (Part – 44) 1993 (Reaffirmed 1999)	1
13.	MPN Coliform Count	APHA -9221 C	--
14.	E.coli	APHA- 9221 D (Presence Absence Test)	--
15.	Nitrate in mg/l	Spectrophotometer	1
16.	Iron (as Fe) in mg/l	By NOVA 60 spectrophotometer (Triazine)	0.01
17.	Fluoride (as F) in mg/l	By NOVA 60 spectrophotometer	0.1
18.	Residual Free Chlorine in mg/l	Iodometric method	1
19.	Sodium in mg/l	Flame photo meter	--
20.	Potassium in mg/l	Flame photo meter	--
21.	Ammonical Nitrogen in mg/l	APHA-4500 N ORGBnC macro and semi-micro KJELDHAL	2.8

3.6 NOISE ENVIRONMENT

Noise can be defined as an unwanted sound. It interferes with speech and hearing. If intense enough, it can damage hearing, or is otherwise irritating. Noise can also disturb natural wildlife and ecological system.

3.6.1 RECONNAISSANCE

In order to measure the existing noise sources and to identify the background noise levels, the noise pollution survey around the proposed site was carried out.

3.6.2 METHODOLOGY FOR NOISE MONITORING

Noise standards have been designated as per the Noise Pollution (Regulation & Control) Rules, 2000 Notified by Ministry of Environment and Forests, New Delhi, February 14, 2000. The ambient noise standards are presented in Equivalent noise levels (Leq). The

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measurements were carried out at each monitoring location during day time and night time. Noise survey was conducted using Sound Level Meter.

3.6.3 NOISE MONITORING LOCATIONS

A total of nine locations were identified for ambient noise monitoring in the study area. The noise monitoring locations are shown in Figure 3.6 and listed in Table 3.10.

FIGURE: 3.6

LOCATION OF NOISE MONITORING STATIONS

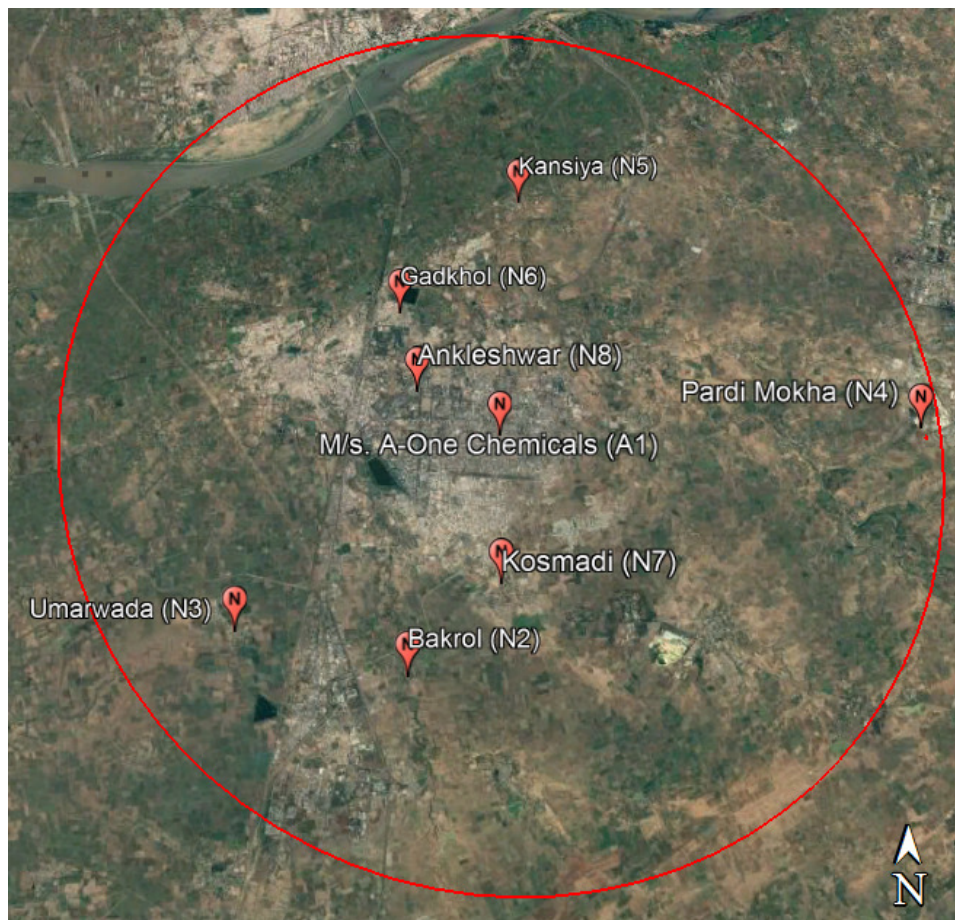


TABLE: 3.10

NOISE LEVEL DATA

Sr. No.	Location	Sample ID	Area Category	LEQ (dB (A))	
				Day Time	Night Time
1.	Project Site	N1	Industrial	53-72	45-53
2.	Bakrol	N2	Residential	50-55	42-50
3.	Umarwada	N3	Residential	53-59	45-51
4.	Pardimokha	N4	Residential	58-66	47-54

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Sr. No.	Location	Sample ID	Area Category	LEQ (dB (A))	
				Day Time	Night Time
5.	Kansiya	N5	Residential	49-57	44-49
6.	Ghadkhol	N6	Residential	53-59	45-51
7.	Kosmadi	N7	Residential	50-55	42-50
8.	Ankleshwar	N8	Residential	48-53	41-45

TABLE: 3.11**CPCB RECOMMENDATIONS FOR COMMUNITY NOISE EXPOSURE**

Area Code	Category of area	Leq. (dBA)	Leq. (dBA)
		(Daytime) (06:00 to 21:00hrs.)	(Night time) (21:00 to 06:00hrs.)
A	Industrial area	75	70
B	Commercial Area	65	55
C	Residential Area	55	45
D	Silence Zone	50	40

Note 1 Silence zone is defined as areas up to 10 meters around such premises as hospitals, education, institutions and courts. The silence zones are to be declared by the Component Authority.

Note 2 Mixed categories of areas should be declared as one of the four above-mentioned categories by the Component Authority and the corresponding standard shall apply.

(Source: The Noise Pollution (Regulation & Control) Rules, 2000)

OBSERVATION & DISCUSSION

The noise levels during daytime varied from 48-53 dB (A) Leq to 53-72 dB (A) Leq in the study area. The noise level in the study area is within the permissible Limits as per Noise rules 2000.

The night time noise level in the study area is in the range of 41-45 dB (A) Leq to 45-53 dB (A) Leq. The night time noise was also within stipulated standards of CPCB.

3.7 SOIL ENVIRONMENT

3.7.1 BASELINE DATA

The geological formations of the area show that study area of Ankleshwar is situated in the region where deep black type i.e. transported soil are prominent. The depth of these soils varies from 60 cm to few meters. The deep black soils, in general, are clayey in texture, poor in drainage and neutral to alkaline reaction. The site is located on alluvial plain. The topmost layer of soil is mainly, black cotton type, with its thickness around 2.5 m. Below this layer, there is a brownish to yellowish brown silty clay extending up to about 5m depth.

The exchange complex is dominated by calcium and followed by magnesium and sodium + potassium. These soils are comparatively more fertile than the medium and shallow black soils. The other type of soils is dark brown to very dark grayish brown in colour and they contain 40 to 70 percent clay.

The hydraulic permeability of soil at 1 meter depth is of the order of 1×10^{-4} cm/sec at the site. The clay content of soil varies from 17 to 41%. The lower permeability and higher clay and silt content of soil makes the site more favorable in order to prevent the ground water contamination from the leachate generated. As per the International Regulations the subsoil should have permeability less than 1×10^{-5} cm/sec. therefore, the site has to be provided with impermeable synthetic liners.

Description of soil environment has become vital particularly when the treated effluent is to be discharge on land for disposal or treatment. The soil environment is usually described by determining the physical and chemical characteristics of soil samples collected from site with the help of auger/spade. The composite soil sample was collected from project site and the villages Within 10 km radius. The samples were collected to determine physical and chemical characteristic of soil. The selected soil sampling locations are given in Table 3.12 and shown in Figure 3.7.

TABLE: 3.12

SOIL QUALITY MONITORING WITH RESPECT TO THE PROJECT SITE

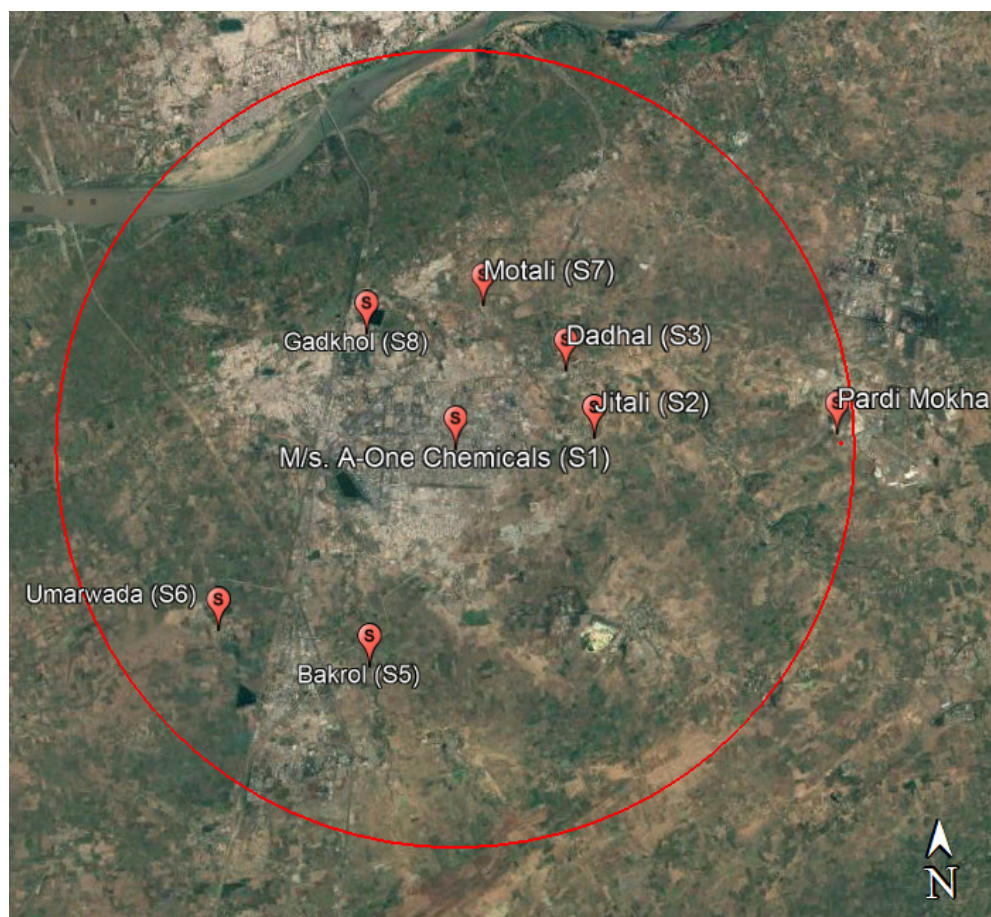
Sr. No.	Location	Sample ID			Distance in Km	District
1.	Project Site	S1	21°37'5.10"N	73° 2'0.94"E	--	Bharuch
2.	Jitali	S2	21°37'11.82"N	73° 4'2.00"E	3.50, ENE	Bharuch
3.	Dadhal	S3	21°38'6.57"N	73° 3'38.42"E	3.36 ENE	Bharuch

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Sr. No.	Location	Sample ID			Distance in Km	District
4.	Pardimokha	S4	21°37'10.78"N	73° 7'33.60"E	9.51 E	Bharuch
5.	Bakrol	S5	21°34'10.11"N	73° 0'42.27"E	5.80 SSW	Bharuch
6.	Umarwada	S6	21°34'41.99"N	72°58'31.40"E	7.48 SW	Bharuch
7.	Motali	S7	21°39'0.45"N	73° 2'27.56"E	3.68 NNE	Bharuch
8.	Gadkhol	S8	21°38'39.84"N	73° 0'45.55"E	4.00 NW	Bharuch

FIGURE: 3.7

LOCATION OF SOIL MONITORING STATIONS



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TABLE: 3.13

PARTICLE SIZE DISTRIBUTION OF SOIL SAMPLES

Sr. No	Parameter	Unit	Sampling Location							
			S1	S2	S3	S4	S5	S6	S7	S8
			Project Site	Jitali	Dadhal	Pardimokha	Bakrol	Umarwada	Motali	Gadkhol
1	pH	--	7.6	7.8	7.16	8.5	6.98	7.1	7.2	7.6
2	Moisture	%	5.8	4.8	6.1	5.6	3.41	6.81	11.49	8.41
3	Organic (Loss on ignition)	%	0.5	0.4	0.5	0.4	0.6	0.4	0.6	0.5
4	Calcium	Meq/100gm	18.2	70.2	18.5	16.2	17.4	57.9	14.7	17.2
5	Magnesium	Meq/100gm	22	32.4	23	19.2	20.4	28.7	19.1	19.7
6	Sodium	Meq/100gm	4.9	5.6	5.2	5.4	4.8	5.2	4.9	5.4
7	Potassium	Meq/100gm	1.4	1.4	1.8	1.8	1.7	1.7	1.8	1.6
8	EC	µmS/cm	1.18	1.21	1.18	1.43	1.19	1.22	1.45	1.19
9	Bulk Density	Gm/cc	1.35	1.1	1.12	1.24	1.26	1.25	1.12	1.13
10	ESP	%	8.1	8.2	8.8	9.2	9.1	8.7	8.4	8.6
11	Total phosphorus	Mg/100gm	15.1	13.4	13.2	10.2	12.2	16.1	15.3	11.1
12	Total Nitrogen	Mg/100gm	12.3	15.1	13.8	14.1	12.1	13.1	12.2	11.4
13	Nitrate	Mg/100gm	3.3	5.7	4.5	4.1	5.6	4.4	3.8	5.8
14	Zinc	Mg/100gm	1.07	0.62	BDL	1.9	0.18	0.64	11.2	1.2
15	Copper	Mg/100gm	3.2	1.9	0.9	2.6	2	3.1	2.8	0.9
16	Iron	Mg/100gm	76.83	45.8	63.55	71.38	64.88	52.44	70.11	81.11
17	Chromium	Mg/100gm	1.8	1.3	3	2.1	2.6	2.1	1.8	1.9
18	Boron	Mg/100gm	2.6	2.8	3.1	3	3.2	3.4	3.2	2.8

EIA FOR EXPANSION OF M/S. A-ONE CHEMICALS, GIDC, ANKLESHWAR.

Sr. No	Parameter	Unit	Sampling Location							
			S1	S2	S3	S4	S5	S6	S7	S8
			Project Site	Jitali	Dadhal	Pardimokha	Bakrol	Umarwada	Motali	Gadkhol
Soil Texture Analysis										
1	Texture		Clay loam	Clay loam	Clay loam	Clay loam	Clay loam	Clay loam	Clay loam	Clay loam
2	Sand%		11	81.9	17	84.7	38	16	30.2	40.6
3	Silt%		26	10	29	5.3	21	21	31	17
4	Clay%		44	8.5	39	11	22	46	40	17.9
5	Colour		Brown	Brownish Yellow	Light brown	Light brown	Yellowish Brown	Light brown	Brown	Brown

Conclusion: On data obtained, it is ensured that the soil quality at around site is appropriate and no abnormality in terms of soil contaminants is reported.

3.8 LAND USE PATTERNS

The land use pattern of the study area has been studied by satellite imaginary picture of National Remote Sensing Centre, Govt. of India. Details are covered in Table 3.14.

TABLE: 3.14

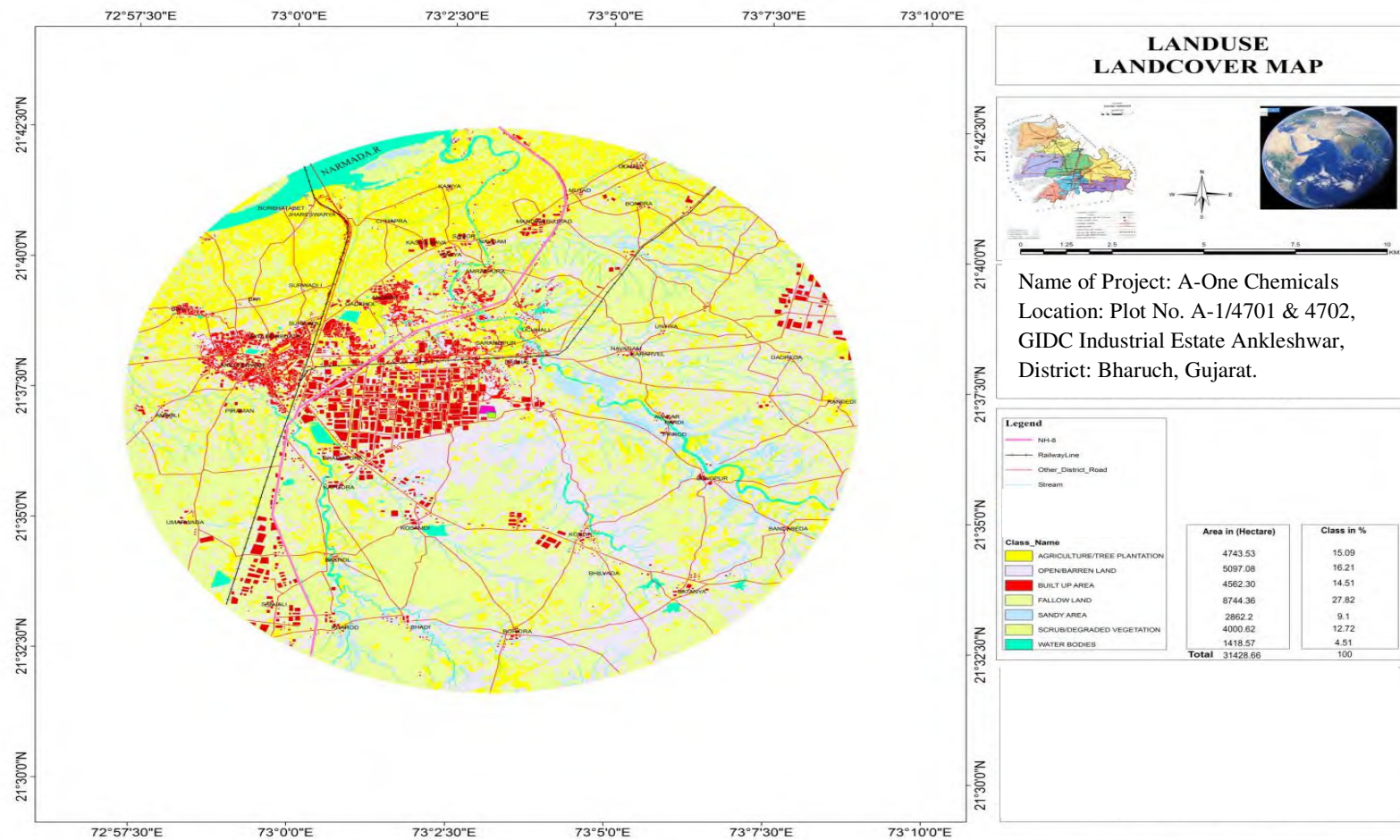
LAND USE STATISTICS OF THE STUDY AREA

Sr. No.	Class Name	Area (Hectares)	Area (%)
1.	Water Body	1418.57	4.51
2.	Open/Barren Land	5097.08	16.21
3.	Agriculture Land	4743.53	15.09
4.	Fallow Land	8744.36	27.82
5.	Buildup Area	4562.30	14.51
6.	Scrub/degraded vegetation	4000.62	12.72
7.	Sandy land	2862.2	9.1
	Total	31482.66	100

EIA FOR EXPANSION OF M/S. A-ONE CHEMICALS, GIDC, ANKLESHWAR.

FIGURE: 3.8

LAND COVER MAP WITH VILLAGE LOCATION



3.9 BIOLOGICAL ENVIRONMENT & SOCIO –ECONOMIC ENVIRONMENT

3.9.1 ECOLOGICAL INFORMATION

The study of the environmental components like flora and fauna is required to assess the biological diversity of the region. Flora and fauna can be used for biological surveillance in assessing the environmental status. The ecological interpretation of study area is based on secondary sources of information.

Water is the basic and essential resource for the survival of flora and fauna. The flora being the primary producer influences the fauna of the region. The characteristic flora existing in a region depends upon the existing conditions such as intensity of sunlight, type of soil, quality of air, including the quality and quantity of water available, etc.

The topography of Bharuch district is plain with numerous small watersheds and water logged areas resulting from agriculture wasteland, fallow land and pastures collecting rainwater or backwater and becoming marshy /saline. The waterlogged areas are dominated by hydrophytes. The coast is silty to clayed silt substratum with some sandy part. The areas near the seashore are mostly affected by tides and remain submerged for considerable time.

3.9.2 FOREST

Bharuch area is characterized by tropical dry deciduous forests. The total forest area of district is 1449. 68 sq. km. That accounts for 0.73 % of the total geographical area of the district. The study area does not have any identified endangered species and also does not have any designated forest, national park, sanctuaries in 10 KM area.

(Source: Forest Department, Government of Gujarat).

3.9.3 FLORA

The list of flora found during field survey is given in Table 3.15.

TABLE: 3.15

LIST OF FLORA

Sr. No.	Scientific name	Common name	Family
I	Trees		
1	Acacia auriculiformis	Bangali Babool	Fabaceae
2	Acacia leucopholia	Aniar	Fabaceae
3	Acacia catechu	Khair	Fabaceae
4	Acacia ferrungula	Pandhara Khair	Fabaceae
5	Acacia nilotica	Babul	Fabaceae
6	Acacia lebeck	Siris	Fabaceae
7	Acacia procera	Siris	Fabaceae

EIA FOR EXPANSION OF M/S. A-ONE CHEMICALS, GIDC, ANKLESHWAR.

Sr. No.	Scientific name	Common name	Family
8	Acacia polycantha	Garad	Fabaceae
9	Adina cordifolia	Hed	Rubiaceae
10	Aegle marmelos	Bela	Rutaceae
11	Ailanthus excelsa	Maharukh	Simaroubaceae
12	Alangium salvifolium	Ankol	Alangiaceas
13	Albizia odoratissimus	Siris	Fabaceae
14	Annogeissus latifolia	Dhavda	Combritaceae
15	Annona squamosa	Sitafal	Annonaceae
16	Azardirachta indica	Nim	Moraceae
17	Bahuania purpurea	Kachamar	Fabaceae
18	Bombax ceiba	Semal	Verbenaceae
19	Bridelia retusa	Asta (Kathmohli)	Fabaceae
20	B.squamosa	Asan	Fabaceae
21	Buchanania lanzan	Charoli	Anacardiaceas
22	Butea monospesma	Palas	Fabaceae
23	Callistemon lancealatus	Bottlebrush	Mytraceae
24	Casuarina equisetifoier	Sura	Casuarineae
25	Careya arborea	Kumbh	Mytraceae
26	Casearia elliptica	Manjo	Symydaceae
27	Caseria graveoiens	Dedak manio	Samidacea
28	Cassia fistula	Sunari	Fabaceae
29	Cestrum noctusnum	Ralkirani	Solana ceae
30	Cochiospermum religiosun	Ganeri	Cochlospermaceds
31	Cocas nicifera	Nariyal	Palmeae
32	Cordia dichotoma	Gundi	Boranginacea
33	Dalbergia paniculata	Dhobin	Fabaceae
34	D. latifolia	Sisso	Fabaceae
35	Murraya koenigii	Karlilimb	Rata ceae
36	Ixora parviflora	Kara	Rubiaceae
37	Lnigricans	Kukeri	Rubiaceae
38	Delonix elala	Gulmohar	Fabaceae
39	Diosphyros melanoxylon	Tendu	Ebenaceae
40	Dolichandrone falcate	Mallar sing	Bignoniaceae
41	Elaeodendron roxburghii	Alinar	Ceiastracea
42	Eucalyptus globules	Safeda	Eucalyptaceae
43	Emblica officinalis	Aonla	Euphobiaceae
44	Erithina uliginosa	Pungara	Fabaceae
45	Eramphis uliginosa	Almi	Rubiaceas
46	Ficus. Religiosa	Pipal	Moraceae
47	F.rumphii	Pilari	Moraceae
48	F.benghalensis	Bara	Moraceae
49	Flacourtia indica	Rankdi	Bixaceae
50	Garua pinnata	Kakad	Burseraceae
51	Griwia teliaefolia	Dhaman	Tiliaceae
52	Haidwickia bipinnata	Aniar	Caesalpinaceae
53	Holoptelia intigrifolia	Valva	Uticaceae
54	Kydia calycia	Bhindi	Malvaceae
55	Lagerstroemia	Nano	Fabaceae

EIA FOR EXPANSION OF M/S. A-ONE CHEMICALS, GIDC, ANKLESHWAR.

Sr. No.	Scientific name	Common name	Family
	lanceolata		
56	L.parviflora	Sidha	Fabaceae
57	Michellia champaca	Champa	Bignoneaceae
58	Lannea caromadallia	Modad	Anacardiaceae
59	Madhuca indica	Mahua	Sapotaceae
60	Mangifera indica	Amm	Anacardiaceae
61	Miliusa tomentosa	Gulambh	Annonacea
62	Millgntonia hortensis	Indian Coral tree	Bignoniaceae
63	Mitragyna parvifolia	Kalam	Rubiaceae
64	Michelia Champa	Champa	Mangnoliaceae
65	Moringa oliefera	shevga	Moringaceae
66	Musa paradisiacea	Kela	Musaceae
67	Oroxyium indicum	Tetu	Bignoniaceae
68	Phoenix sylvestris	Shindi	Palminae
69	Prosopis juliflora	Babul	Mimoceae
70	P.cineraria	Babul	Mimoceae
71	Pithecelobium ducle	Chisbalai	Fabaceae
72	Pongamia pinnata	Karanja	Fabaceae
73	Pisidium guajava	Guava	Mutraceae
74	Pterocarpus marsupium	Bija	Fabaceae
75	Punica grantalum	Anar	Pomergrannatae
76	Sapindus emergginatus	Aritha	Sapindaceae
77	Soymida febrifuga	Rohan	Meliaceae
78	Poleathia langifolia	Ashok	Apocnaceae
79	Saraca indica	Ashok	Apocnaceae
80	Thevetia neirifolia	Pilakanton	Apocnaceae
81	Sterculia urens	Kodaya	Sterculiaceae
82	Syzygium cuminii	Jamun	Myrtaceae
83	Terminalia crenulata	Salad	Fabaceae
84	T.bellirica	Behada	Combretaceae
85	T. arjuna	Arjun	Combretaceae
86	T.caltapa	Jangli badam	Combretaceae
87	Tamarindus indica	Tentuli	Fabaceae
88	Tecoma stans	Nellow bell	Bisgnonia ceae
89	Tectona grandis	Sag	Verbanaceae
90	Trema orientalis	Gol	Ulmaceae
91	Wrightia tinctoria	kudo	Apocynacea
92	Zizyphus xylocarpus	Ghatbor	Rhamnaceae
93	Z.mauritiana	Bordi	Rhamnaceae
	Shrubs		
1	Argemone mexicana	Darudi	Papaveraceae
2	Caranthus resus	Sudufuli	Apocyanaceae
3	C.calatropis	Mundar	Asclepiadaceae
4	Calatopis gigantean	Rui	Asclepiadaceae
5	Carrissa carandas	Karvand	Apocyaninnae
6	Clerodendrum multyfolium	Multaiforum	Verbenaeae

EIA FOR EXPANSION OF M/S. A-ONE CHEMICALS, GIDC, ANKLESHWAR.

Sr. No.	Scientific name	Common name	Family
7	Gymnosporia spinosa	Spinosa Rekii	Fabaceae
8	Lantana camera	Ghaneri	Verbanaceae
9	Opuntia dillenii	Nivdang	Cactacealea
10	Euphorbia nerifolia	Wavding	Celastraceae
11	Ocium gratissium	Rantulro	Labiataeae
12	Helicteres isora	Atali	Sterculiaceae
13	Ficus hispida	Tet umaro	Moraceae
14	Datura fastuasa	Dhotara	Solanaceae
15	Vitex negundo	Nirgudi	Verbaceae
16	Cassia tora	Tarota	Fabaceae
17	Zizyphus nummularia	Beri	Rhannaceae
18	Euphorbia tirucolli	Thor	Euphorbiaceae
	Bamboos		
1	Dendrocalamus strictus	Manvel	Grammineae
2	Abrus precatorius	Gunj	Fabaceae
3	Capparis sepiraria	Lamtjar	Cappariaceae
4	Cocculus hirutus	Asanwel	Menispermaceae
5	Combretum ovalifolium	Jal	Combratae
6	Cayratia carnosia	Khatumbo	Vitaceae
	Grasses		
1	Andropogon pumilus	Kusal	Gramineae
2	Cenchrus setgerus	Dhramnu	Gramineae
3	Cynodon dactylon	Durva	Gramineae
4	Cymbopogen marinil	Rosha	Gramineae
5	Heteropogon contortus	Gawat	Gramineae
6	Sorghum halepense	Baru	Gramineae
7	Themeda triandra	Bhathdu	Gramineae
	Crops		
1	Ricinus communis	Arand	Euphorbiaceae
2	Saccharum officinarum	Ganna	Gramineae
3	Sorghum vulgae	Juwar	Gramineae
4	Zea mays	Makai	Gramineae
5	Arachis hypogaea	Ground nut	Logumin
6	Oryza sativa	Chokha	Gramineae
	Macrophytes		
1	Eichhornia crassipes	Jalkumbhi	Pontederiace
2	Ipomea aquatica	Kalmisay	Volvulaceae
3	Trapa latifolia	Lotus	Nymphaceae
4	Nelumbo nucifera	Lotus	Nymphaceae
5	Azolla pinnata	Commom duckweed	Lemnaceae
6	Muntiacus muntjak	Barking deer	Bovidae
7	Felis chaus	Jungle cat	Falidae
8	Myaena hyaena	The striped hyena	Canidae
9	Presbytis entellus	Hanuman langur	Colobinae

(Courtesy: State forest Dept., Bharuch, Gujarat)

3.9.4 FAUNA

Some of the fauna found in study area is listed in Table 3.16.

TABLE: 3.16**LIST OF FAUNA**

Sr. No.	Scientific name	Common name	Family
1	<i>Acridothera tristis</i>	Common myna	Sturnidae
2	<i>A. ginginianus</i>	Bank myna	Sturnidae
3	<i>Athene brama</i>	Spotted owlet	Striginae
4	<i>Aegithina tiphia</i>	Common lora	Lrenidae
5	<i>Ardeola grayee</i>	Pond Heron	Ardeidae
6	<i>Amaurornis phoenicurus</i>	Whitebreasted waterhen	Phasinidae
7	<i>Babulcus ibis</i>	Cattle Egret	Ardeidae
8	<i>Centropus cinensis</i>	Crow-pheasant	Cuculidae
9	<i>Columba Livia</i>	Blue Rock Pigeon	Columidae
10	<i>Corvus splendens</i>	House Crow	Carvidae
11	<i>Coracius benghalensis</i>	Indian Roller	Coracidae
12	<i>Dicrurus adsimilis</i>	Black Drongo	Dieruridae
13	<i>Dinophum benghalense</i>	Goldenbacked Woodpecker	Picidae
14	<i>Eudynamys scolopacea</i>	Koel	Cuculidae
15	<i>Fracolinus francollinus</i>	Black partiridge	Pharianidae
16	<i>Halcyon rustica</i>	Whitebreasted Kingfisher	Aicenidae
17	<i>Hirundo rustica</i>	Common swallow	Hirundinidae
18	<i>Lanius exubitor</i>	Grey Shrike	Daniidae
19	<i>Lauchura malabarica</i>	Whitethroated munia	Estrildinae
20	<i>Megalaima rubricapilla</i>	Smallgren barbet	Capilonidae
21	<i>Merops orientalis</i>	Littlegreen Bea-eater	Miropidae
22	<i>M. malabarica</i>	Crimsonbrestd Barbet	Capilonidae
23	<i>Milvus migrans</i>	Pathi Kite	Accipitridae
24	<i>Motacilla maderatensis</i>	Large pied wagtail	Motacillidae
25	<i>Nectarinia asiatica</i>	Purplerumped sunbird	Nectarinidate
26	<i>Nectarinia minima</i>	Small sunbird	Nectarinidae
27	<i>Oriolus oriolus</i>	Golden oriole	Oriolidae
28	<i>Orthotomus sutorius</i>	Tailor Bird	Pachycephaline
29	<i>Passer domesticus</i>	House Sparrow	Passerinae
30	<i>Psittacula cyanocephala</i>	Blossamheaded parakeet	Psittacidae
31	<i>Pycnonotus caffer</i>	Redvented bulbul	Pycnonotidae
32	<i>Ploceus philipinensis</i>	Weaver bird	Plocidae
33	<i>Sexicoloides fulicate</i>	Indian Robin	Corvidae

Sr. No.	Scientific name	Common name	Family
34	Sopsychus saularis	Magpie Robin	Corvidae
35	Streptopelia chinensis	Spotted dove	Columbidae
36	S.senegalensis	Little brown dove	Columbidae
37	Sternus pagodramus	Brahiminy myna	Sternidae
38	Turdoides caudatus	Commom Babbler	Muscicapidae
39	Upupa epops	Hoopoe	Upupidae
40	Vanellus indicus	Redwattled Lapwing	Jacanidae
41	Metopidius indicus	Brongewinged jacana	Jacanidae
42	Ardea alba	Large egrd	Ardeidae
43	A.cinerea	Grey Heron	Ardeidae
44	Falica atra	Coot	Rallidae
45	Phalacrocorax niger	Little cormorant	Phalacrocoracidae

(Courtesy: State forest Dept., Bharuch, Gujarat)

3.10 SOCIO-ECONOMIC ENVIRONMENT

As assessment of socio-economic environment forms an integral part of an EIA study, baseline information for the same was collected during the study period. The baseline socio-economic data collected for the study region, before the proposed expansion is operational, has been identified for the four major indicators viz. demography ,civic amenities, economy and social culture. The baseline status of the above indicators is compiled in forthcoming sections.

3.10.1 DEMOGRAPHIC DATA WITHIN THE REGION OF INTEREST

Demography covers the information related to population density sex ratio and literacy level of the public in the study area. Table 3.17 provides the data on inhabitations of the Ankleshwar Taluka.

On an average, Taluka Jhagadia has population density of about 228 persons per sq.km. (2011 Census data), compared to the Bharuch District, which has a population density of about 295 persons per sq.km. (2011 Census data).

TABLE: 3.17**DEMOGRAPHIC DATA**

Sr. No	Village name	Taluka	Total population	Total male	Total female	Total population <6 years
1	Amrutpura	Ankleshwar	943	502	441	125
2	Avadar	Ankleshwar	1333	707	626	152
3	Dadhal	Ankleshwar	3695	1838	1857	540
4	Jitali	Ankleshwar	4225	2160	2065	523
5	Kararvel	Ankleshwar	1526	785	741	199
6	Mandvabuzarg	Ankleshwar	5938	2995	2943	646
7	Motali	Ankleshwar	895	459	436	153
8	Naugama	Ankleshwar	920	502	418	101
9	Pardi Mokha	Ankleshwar	586	292	294	63
10	Piprod	Ankleshwar	607	298	309	97
11	Samor	Ankleshwar	1294	670	624	152
12	Sangpor	Ankleshwar	2670	1369	1301	286
13	Sarangpore	Ankleshwar	16671	9373	7298	2666
14	Uchhali	Ankleshwar	895	451	444	117
15	Andharkachhala	Jhagadia	293	156	137	45
16	Boridara	Jhagadia	960	495	465	94
17	Borjai	Jhagadia	1519	787	732	199
18	Bhojpur	Jhagadia	698	369	329	89
19	Dadheda	Jhagadia	1094	559	535	135
20	Dholakuva	Jhagadia	310	158	152	45
21	Damalai	Jhagadia	563	298	267	77
22	Fulwadi	Jhagadia	1783	916	867	202
23	Govali	Jhagadia	4381	2297	2084	444
24	Haripara	Jhagadia	816	433	383	70
25	Jhagadia	Jhagadia	5446	2779	2667	550
26	Kapalsadi	Jhagadia	2024	1038	986	208
27	Kharchi	Jhagadia	1068	575	493	108
28	Kharchi Bhilwada	Jhagadia	998	501	497	158
29	Kharia	Jhagadia	531	277	254	74
30	Kunvarpara	Jhagadia	200	99	101	31
31	Karad	Jhagadia	727	368	359	94
32	Limet	Jhagadia	1739	893	846	215
33	Malpor (Dumala)	Jhagadia	906	466	440	121
34	Moran	Jhagadia	866	437	429	106
35	Mota Sanja	Jhagadia	1053	526	527	84
36	Mulad	Jhagadia	1043	529	514	119
37	Nana Sanja	Jhagadia	1644	852	792	188

EIA FOR EXPANSION OF M/S. A-ONE CHEMICALS, GIDC, ANKLESHWAR.

Sr. No	Village name	Taluka	Total population	Total male	Total female	Total population <6 years
38	Navagam Mota	Jhagadia	520	261	259	71
39	Padal	Jhagadia	1743	880	863	209
40	Panvadi	Jhagadia	592	307	285	71
41	Rajpore	Jhagadia	339	165	174	44
42	Randedi	Jhagadia	447	230	217	63
43	Ranipara	Jhagadia	2225	1125	1100	266
44	Ratanpor	Jhagadia	2130	1093	1037	262
45	Sardarpura	Jhagadia	456	247	209	38
46	Selod	Jhagadia	1653	836	817	179
47	Sultanpura	Jhagadia	5864	3003	2861	570
48	Shiyali	Jhagadia	1069	559	510	135
49	Talodara	Jhagadia	2057	1026	1031	250
50	Uchedia	Jhagadia	2438	1249	1189	250
51	Untia	Jhagadia	752	378	374	92
52	Vanthevad	Jhagadia	661	349	312	82
53	Vasna	Jhagadia	1522	778	744	223
54	Vaghpara	Jhagadia	274	133	141	37
55	Bhilod	Valia	3476	1745	1731	389
56	Dholgam	Valia	2556	1311	1245	303
57	Hirapor	Valia	1963	1019	944	272
58	Kondh	Valia	4562	2372	2190	544
59	Valia	Valia	7678	3829	3849	769

(Source: Census-2011 for Bharuch District)

TABLE -3.18

POPULATION DENSITY & SEX RATIO

Sr. No	Name	Population (Persons)	Population Density (Person/Sq.km.)	Sex ratio (No. of females per 1000 males)
1	Within 10 km radius (2011)	117837	375	928
2	Taluka Jhagadia (2011)	185337	228	949
3	Taluka Ankleshwar (2011)	315596	725	882
4	Taluka Valia (2011)	145400	283	962
5	District Bharuch (2011)	1551019	295	925

(Source: Census-2011 for Bharuch District)

3.10.2 LITERACY RATE

The literacy rate is a major factor, which influences the socio-cultural condition of a particular place. Details of literacy rate in percentage in district Bharuch and Taluka Jhagadia are given in Table 3.19.

TABLE- 3.19**LITERACY RATE**

Sr. No.	Name	Literacy rate (%)
1	Within 10 km radius	78.13%
2	Taluka Ankleshwar (2011)	75.62 %
3	District Bharuch(2011)	72.09 %

(Source: Census-2011 for Bharuch District)

TABLE: 3.20**LITERACY RATE WITHIN 10 KM RADIAL DISTANCE OF STUDY AREA**

Sr. No.	Village name	City/block name	Total population	Population < 06 years	Population Literate	Literacy (%)
1	Amrutpura	Ankleshwar	943	125	619	75.67
2	Avadar	Ankleshwar	1333	152	963	81.54
3	Dadhal	Ankleshwar	3695	540	2708	85.83
4	Jitali	Ankleshwar	4225	523	2897	78.25
5	Kararvel	Ankleshwar	1526	199	1039	78.29
6	Mandvabuza rg	Ankleshwar	5938	646	4089	77.26
7	Motali	Ankleshwar	895	153	545	73.45
8	Naugama	Ankleshwar	920	101	656	80.09
9	Pardi Mokha	Ankleshwar	586	63	467	89.29
10	Piprod	Ankleshwar	607	97	360	70.58
11	Samor	Ankleshwar	1294	152	699	61.20
12	Sangpor	Ankleshwar	2670	286	1783	74.79
13	Sarangpore	Ankleshwar	16671	2666	11430	81.61
14	Uchhali	Ankleshwar	895	117	597	76.73
15	Andharkac hhala	Jhagadia	293	45	139	56.04
16	Boridara	Jhagadia	960	94	696	80.37
17	Borjai	Jhagadia	1519	199	1072	81.21
18	Bhojpur	Jhagadia	698	89	482	79.14
19	Dadheda	Jhagadia	1094	135	642	66.94
20	Dholakuva	Jhagadia	310	45	208	78.49
21	Damalai	Jhagadia	563	80	314	65.01
22	Fulwadi	Jhagadia	1783	202	1141	72.17
23	Govali	Jhagadia	4381	444	2917	74.09
24	Haripara	Jhagadia	816	70	530	71.04
25	Jhagadia	Jhagadia	5446	550	4081	83.35
26	Kapalsadi	Jhagadia	2024	208	1572	86.56

EIA FOR EXPANSION OF M/S. A-ONE CHEMICALS, GIDC, ANKLESHWAR.

Sr. No.	Village name	City/block name	Total population	Population < 06 years	Population Literate	Literacy (%)
27	Kharchi	Jhagadia	1068	108	859	89.47
28	Kharchi Bhilwada	Jhagadia	998	158	640	76.19
29	Kharia	Jhagadia	531	74	278	60.83
30	Kunvarpara	Jhagadia	200	31	119	70.41
31	Karad	Jhagadia	727	94	471	74.40
32	Limet	Jhagadia	1739	215	1149	75.39
33	Malpor (Dumala)	Jhagadia	906	121	487	62.03
34	Moran	Jhagadia	866	106	603	79.34
35	Mota Sanja	Jhagadia	1053	84	731	75.43
36	Mulad	Jhagadia	1043	119	758	82.03
37	Nana Sanja	Jhagadia	1644	188	1152	79.12
38	Navagam Mota	Jhagadia	520	71	273	60.8
39	Padal	Jhagadia	1743	209	1066	69.49
40	Panvadi	Jhagadia	592	71	417	80.03
41	Rajpore	Jhagadia	339	44	164	55.59
42	Randedi	Jhagadia	447	63	256	66.66
43	Ranipara	Jhagadia	2225	266	1284	65.54
44	Ratanpor	Jhagadia	2130	262	1177	63
45	Sardarpura	Jhagadia	456	38	384	91.86
46	Selod	Jhagadia	1653	179	1150	78.09
47	Sultanpura	Jhagadia	5864	570	4506	85.11
48	Shiyali	Jhagadia	1069	135	634	67.88
49	Talodara	Jhagadia	2057	250	1415	78.3
50	Uchedia	Jhagadia	2438	250	1601	73.17
51	Untia	Jhagadia	752	92	512	77.57
52	Vanthevad	Jhagadia	661	82	429	74.09
53	Vasna	Jhagadia	1522	223	959	73.82
54	Vaghpara	Jhagadia	274	37	183	77.21
55	Bhilod	Valia	3476	389	2392	77.48
56	Dholgam	Valia	2556	303	1595	70.79
57	Hirapor	Valia	1963	272	1321	78.11
58	Kondh	Valia	4562	544	3208	79.84
59	Valia	Valia	7678	769	6004	86.9

(Source: Census-2011 for Bharuch District)**3.10.3 OCCUPATIONAL STRUCTURE**

In economic development of the region its geographical location, natural resources, business and employment, industries and manpower play vital role. Table 3.19 provides the occupational patterns in all villages of Ankleshwar Taluka.

EIA FOR EXPANSION OF M/S. A-ONE CHEMICALS, GIDC, ANKLESHWAR.

TABLE-3.21

OCCUPATIONAL STRUCTURE

Sr. No.	Village name	Cd block Name	Total population	Total Work Population	Total main Worker Population	Total marginal Worker Population	Total non Worker population	Employment ratio %
1	Amrutpura	Ankleshwar	943	388	252	136	555	41.14
2	Avadar	Ankleshwar	1333	607	361	246	726	45.53
3	Dadhal	Ankleshwar	3695	1301	1152	149	2394	35.21
4	Jitali	Ankleshwar	4225	1610	1384	226	2615	38.1
5	Kararvel	Ankleshwar	1526	544	403	141	982	35.64
6	Mandvabuz arg	Ankleshwar	5938	2258	2086	172	3680	38.02
7	Motali	Ankleshwar	895	385	347	38	510	43.01
8	Naugama	Ankleshwar	920	412	361	51	508	44.78
9	Pardi Mokha	Ankleshwar	586	199	191	8	387	33.95
10	Piprod	Ankleshwar	607	264	251	13	343	43.49
11	Samor	Ankleshwar	1294	617	587	30	677	47.68
12	Sangpor	Ankleshwar	2670	1186	1147	39	1484	44.41
13	Sarangpore	Ankleshwar	16671	5905	5587	318	10766	35.42
14	Uchhali	Ankleshwar	895	324	297	27	571	36.2
15	Andharkac hhala	Jhagadia	293	140	81	59	153	47.78
16	Boridara	Jhagadia	960	411	377	34	549	42.81
17	Borjai	Jhagadia	1519	478	466	12	1041	31.46
18	Bhojpur	Jhagadia	698	398	397	1	300	57.02
19	Dadheda	Jhagadia	1094	331	282	49	763	30.25
20	Dholakuva	Jhagadia	310	185	124	61	125	59.67
21	Damalai	Jhagadia	563	340	95	245	223	60.39

EIA FOR EXPANSION OF M/S. A-ONE CHEMICALS, GIDC, ANKLESHWAR.

Sr. No.	Village name	Cd block Name	Total population	Total Work Population	Total main Worker Population	Total marginal Worker Population	Total non Worker population	Employment ratio %
22	Fulwadi	Jhagadia	1783	748	535	213	1035	41.95
23	Govali	Jhagadia	4381	1857	1774	83	2524	42.38
24	Haripara	Jhagadia	816	515	219	296	301	63.11
25	Jhagadia	Jhagadia	5446	2164	2003	161	3282	39.73
26	Kapalsadi	Jhagadia	2024	787	654	133	1237	38.88
27	Kharchi	Jhagadia	1068	538	397	141	530	50.37
28	Kharchi Bhilwada	Jhagadia	998	382	239	143	616	38.27
29	Kharia	Jhagadia	531	214	210	4	317	40.3
30	Kunvarpara	Jhagadia	200	72	66	6	128	36
31	Karad	Jhagadia	727	354	333	21	373	48.69
32	Limet	Jhagadia	1739	683	679	4	1056	39.27
33	Malpor (Dumala)	Jhagadia	906	579	566	13	327	63.90
34	Moran	Jhagadia	866	381	327	54	485	43.99
35	Mota Sanja	Jhagadia	1053	498	483	15	555	47.29
36	Mulad	Jhagadia	1043	437	393	44	606	41.89
37	Nana Sanja	Jhagadia	1644	755	506	249	889	45.92
38	Navagam Mota	Jhagadia	520	160	160	0	360	30.76
39	Padal	Jhagadia	1743	664	442	222	1079	38.09
40	Panvadi	Jhagadia	592	363	356	7	229	61.31
41	Rajpore	Jhagadia	339	134	133	1	205	39.52
42	Randedi	Jhagadia	447	145	110	35	302	32.43
43	Ranipara	Jhagadia	2225	1030	1005	25	1195	46.29
44	Ratanpor	Jhagadia	2130	743	545	198	1387	34.88
45	Sardarpura	Jhagadia	456	202	106	96	254	44.29

EIA FOR EXPANSION OF M/S. A-ONE CHEMICALS, GIDC, ANKLESHWAR.

Sr. No.	Village name	Cd block Name	Total population	Total Work Population	Total main Worker Population	Total marginal Worker Population	Total non Worker population	Employment ratio%
46	Selod	Jhagadia	1653	626	550	76	1027	37.87
47	Sultanpura	Jhagadia	5864	2025	1844	181	3839	34.53
48	Shiyali	Jhagadia	1069	403	344	59	666	37.69
49	Talodara	Jhagadia	2057	715	579	136	1342	34.75
50	Uchedia	Jhagadia	2438	1057	931	126	1381	43.35
51	Untia	Jhagadia	752	506	402	104	246	67.28
52	Vanthevad	Jhagadia	661	253	235	18	408	38.27
53	Vasna	Jhagadia	1522	605	581	24	917	39.75
54	Vaghpara	Jhagadia	274	79	78	1	195	28.83
55	Bhilod	Valia	3476	1312	1127	185	2164	37.74
56	Dholgam	Valia	2556	900	499	401	1656	35.21
57	Hirapor	Valia	1963	869	743	126	1094	44.26
58	Kondh	Valia	4562	1783	1563	220	2779	39.08
59	Valia	Valia	7678	2976	2558	418	4702	38.76

(Source: Census-2011 for Bharuch District)

Main worker is a worker who has worked last year for six month or more. Marginal worker is a worker who has worked last year for less than six months. Non-worker is worker who did not work at all during the reference period of one year.

Distribution of main worker and marginal worker into further following four categories are shown in Table 3.22.

- Cultivators
- Agricultural labors
- Household industry
- Others workers

EIA FOR EXPANSION OF M/S. A-ONE CHEMICALS, GIDC, ANKLESHWAR.

TABLE- 3.22

DISTRIBUTION OF WORKERS

Sr. No.	Village name	Main population				Marginal population			
		Cultivator	Agriculture	HouseHold	Other	Cultivator	Agriculture	Household	Other
1	Amrutpura	38	147	2	65	32	87	2	15
2	Avadar	82	33	5	241	6	235	0	5
3	Dadhal	137	385	39	591	8	63	9	69
4	Jitali	126	642	34	582	11	192	2	21
5	Kararvel	70	117	2	214	21	49	1	70
6	Mandvabuzarg	272	1264	29	521	13	130	4	25
7	Motali	67	187	1	92	8	25	0	5
8	Naugama	45	197	0	119	1	45	0	5
9	Pardi Mokha	35	68	0	88	1	4	0	3
10	Piprod	21	147	0	83	2	7	0	4
11	Samor	52	437	2	96	2	20	0	8
12	Sangpor	161	755	16	215	2	28	1	8
13	Sarangpore	67	443	108	4969	11	25	15	267
14	Uchhali	49	178	0	70	3	20	0	4
15	Andharkachhala	18	58	1	4	3	55	0	1
16	Boridara	141	143	10	83	5	11	0	18
17	Borjai	95	238	41	92	1	8	1	2
18	Bhojpur	13	378	0	6	1	0	0	0
19	Dadheda	88	153	4	37	4	42	0	3
20	Dholakuva	46	73	0	5	1	60	0	0
21	Damalai	45	14	8	28	1	243	0	1
22	Fulwadi	77	128	4	326	14	144	1	54

EIA FOR EXPANSION OF M/S. A-ONE CHEMICALS, GIDC, ANKLESHWAR.

Sr. No.	Village name	Main population				Marginal population			
		Cultivator	Agriculture	HouseHold	Other	Cultivator	Agriculture	Household	Other
23	Govali	309	1038	14	413	17	42	0	24
24	Haripara	54	108	20	37	19	201	28	48
25	Jhagadia	209	506	25	1263	6	32	15	108
26	Kapalsadi	138	351	8	157	20	82	0	31
27	Kharchi	89	116	1	191	20	85	3	33
28	Kharchi Bhilwada	60	65	2	112	6	84	0	53
29	Kharia	14	145	0	51	0	3	1	0
30	Kunvarpara	2	64	0	0	1	5	0	0
31	Karad	40	190	10	93	1	4	4	12
32	Limet	93	518	3	65	1	0	1	2
33	Malpor (Dumala)	3	535	0	28	1	11	0	1
34	Moran	33	287	0	7	1	53	0	0
35	Mota Sanja	48	312	0	123	0	3	1	11
36	Mulad	76	213	7	97	12	24	2	6
37	Nana Sanja	77	256	2	171	43	54	4	148
38	Navagam Mota	4	154	0	2	0	0	0	0
39	Padal	63	292	0	87	22	170	2	28
40	Panvadi	28	231	1	96	0	6	0	1
41	Rajpore	25	78	0	30	0	1	0	0
42	Randedi	14	67	0	29	1	22	0	12
43	Ranipara	140	777	1	87	9	3	2	11
44	Ratanpor	11	296	0	238	35	155	0	8
45	Sardarpura	28	12	1	65	5	78	3	10
46	Selod	129	347	14	60	14	49	2	11
47	Sultanpura	108	404	181	1151	16	26	2	137

EIA FOR EXPANSION OF M/S. A-ONE CHEMICALS, GIDC, ANKLESHWAR.

Sr. No.	Village name	Main population				Marginal population			
		Cultivator	Agriculture	HouseHold	Other	Cultivator	Agriculture	Household	Other
48	Shiyali	65	265	0	14	0	48	0	11
49	Talodara	108	292	11	168	19	93	4	20
50	Uchedia	177	523	23	208	1	108	4	13
51	Untia	97	124	2	179	44	49	0	11
52	Vanthevad	9	173	3	50	0	13	2	3
53	Vasna	117	381	0	83	1	21	0	2
54	Vaghpara	3	70	0	5	1	0	0	0
55	Bhilod	221	562	19	325	10	143	9	23
56	Dholgam	96	280	2	121	16	277	1	107
57	Hirapor	56	469	0	218	6	82	0	38
58	Kondh	102	551	12	898	18	112	2	88
59	Valia	122	459	35	1942	30	60	16	312

(Source: Census-2011for Bharuch District)

3.11 TRAFFIC SURVEY**3.11.1 RECONNAISSANCE**

The traffic survey, to ascertain the traffic density in the study area was conducted on the road near the project site. The composition of Traffic includes Two Wheelers, Three Wheelers (Goods & Passenger Autos, Four Wheeler (Passenger Cars) and Four Wheeler Heavy Vehicles like Trucks, Lorries, Busses etc.

3.11.2 TRAFFIC SURVEY OF THE STUDY AREA

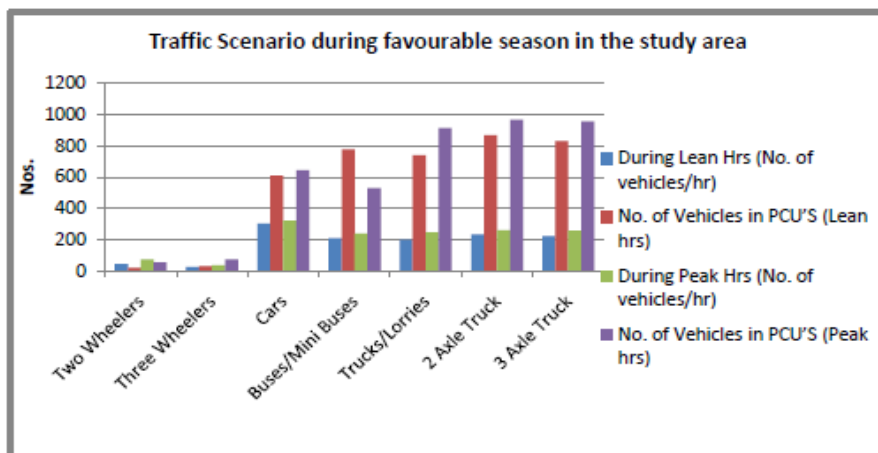
Data was collected by physically counting the number of vehicles playing in both directions of NH-8: Delhi to Mumbai Highway. The hourly counts were carried out for the different type/ category of vehicles. The variation in the traffic flow at the given road along with the numbers of vehicles during peak hour & lean hour is presented in the table below. While it's graphical representation is done in figure below.

TABLE: 3.23**DELHI TO MUMBAI HIGHWAY (NH-8)**

Sr. No.	Vehicle Type	During Lean Hrs. (No. of Vehicles/Hr)	No. of Vehicles In PCU During Lean Hrs	During Peak Hrs (No. of Vehicles/Hr)	No. of Vehicles In PCU During Peak Hrs
1.	Two Wheelers	45	22.5	75	56.25
2.	Three Wheelers	26	31.2	37	74
3.	Cars	304	608	321	642
4.	Buses/ Mini Buses	210	777	240	528
5.	Trucks/ Lorries	200	740	246	910.2
6.	2 Axle Truck	234	865.8	261	965.7
7.	3 Axle Truck	224	828.8	258	954.6

FIGURE: 3.9

GRAPH OF VEHICULAR CONCENTRATION AT PEAK HOUR & LEAN HOUR FOR NH-8 DELHI TO MUMBAI (A TO B)



3.11.3 EXISTING TRAFFIC SCENARIO AND LEVEL OF SERVICES (UP)

- The road from Delhi to Mumbai is four lane with divider.
- Capacity of road as per IRC= 2500 PUC's/ hr
- Total volume during peak hours= 1438
- Existing volume / capacity ratio= 310/2500=0.57
- The level of service is "C" that is good

TABLE: 3.24

LEVEL OF SERVICE		
Sr. No.	Existing volume/ Capacity Ratio	Levels of Services
1.	0.0 to 0.2	"A" (Excellent)
2.	0.2 to 0.4	"B" (Very Good)
3.	0.4 to 0.6	"C" (Good)
4.	0.6 to 0.8	"D" (fair)
5.	0.8 to 1.0	"E" (Poor)

Location: From B to A (Down): From Mumbai to Delhi

TABLE: 3.25

MUMBAI TO DELHI HIGHWAY (NH-8)

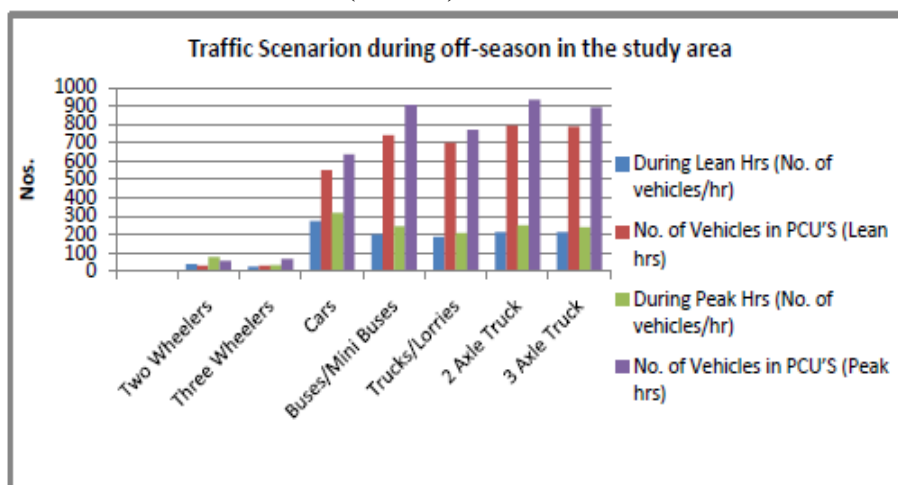
Sr. No.	Vehicle Type	During Lean Hrs. (No. of Vehicles/ Hr)	No. of Vehicles In PCU During Lean Hrs	During Peak Hrs (No. of Vehicles/ Hr)	No. of Vehicles In PCU During Peak Hrs
1.	Two Wheelers	40	30	78	58.5

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2.	Three Wheelers	27	32.4	34	68
3.	Cars	275	550	318	636
4.	Buses/ Mini Buses	200	740	245	906.5
5.	Trucks/ Lorries	189	699.3	208	769.6
6.	2 Axle Truck	214	791.8	252	932.4
7.	3 Axle Truck	213	788.1	241	891.7

FIGURE: 3.10

GRAPH OF VEHICULAR CONCENTRATION AT PEAK HOUR & LEAN HOUR FOR NH-8 MUMBAI TO DELHI (B TO A)



3.11.4 Existing Traffic Scenario and Level of Services (Down)

- Capacity of road as per IRC= 2500 PUC's/ hr
- Total volume during peak hours= 1376
- Existing volume / capacity ratio= 1376/2500=0.55
- The level of service is "C" that is good

Results:

The above traffic reveals the LOS (Levels of Service) as "C" Good for the NH-8 Road, Which are 4 lane roads divider for proposed project scenario. Since adequate parking is provided and increase in traffic due to proposed project shall be taken care by the 4 lane road.

Chapter -4

ANTICIPATED ENVIRONMENTAL IMPACT & MITIGATION MEASURES

INTRODUCTION

This chapter identifies and predicts the potential impacts on different environmental components due to the construction and operation of the proposed project. It details all the potential impacts on biophysical and socio-economic components of the local environment due to the proposed activities and sub-activities.

Prediction of impacts is the most important component in the Environmental Impact Assessment studies. Several qualitative and quantitative techniques and methodologies are used to conduct analysis of the potential impacts likely to build up as a result of the proposed development activities on physico-chemical, ecological and socio-economic environments. Such predictions are superimposed over the baseline (pre-project) status of the environmental quality to derive at the ultimate (post-project) scenario of environmental conditions. The prediction and identification of impacts helps to minimize the adverse impacts and maximize the beneficial impacts on environmental quality during pre and post project execution.

The proposed project would create impacts on the environment in two distinct phases:

- 1) During the construction phase which may be regarded as temporary or short term.
- 2) During operation phase which would have long term effects.

4.1 IDENTIFICATION OF IMPACT

Identification of significant impacts for the proposed project is a prominent step in the process of environmental impact assessment. This provides a way forward to other elements of EIA study such as quantification and evaluation of site specific impacts exclusively from proposed project. Although, variety of concerns/ issues are identified while describing existing (baseline) environmental status, it is necessary to identify the likely critical impacts on various components of environment due to proposed project.

For construction and operation phases of the proposed project the “Network Method” has been adopted for identification of impacts, which involves understanding of cause-condition effects relationships between an activity and the consequences/ impacts on environmental and socio-economic parameters for identification of significant impacts and has been found to be the most appealing tool.

The impact networks have been delineated for construction and operation phases of proposed project. The type of identified potential impacts on various environmental components i.e. Air, Noise, Water and Land are presented in below Figure 4.1 to 4.6.

It should be noted that in these illustration the lines are to be read as “might have an effect on”.

4.1.1 IMPACT DURING CONSTRUCTION PHASE

The impact during construction will be localized and short term with permanent changes in profile of the project site as compared to the current conditions. Impact will be primarily related to the civil works and less intensive impact is expected during erection of the equipment and trial operation. The various activities involved in construction phase of a proposed project are listed below:

A) Excavation. B) Construction. C) Erection/Installations of equipment and machinery
D) Transportation E) Material handling F) Employment of labor.

4.1.2 IMPACT ON AIR ENVIRONMENT

The main source of emission during the construction phase is the movement of equipment and vehicles at site. Equipment deployed during the construction phase is also likely to result in marginal increase in the levels of SO₂, NOX, and PM and fugitive emissions. The impact is reversible, marginal and temporary in nature. The construction activities at site will be restricted to civil and structural fabrication. The main sources of air pollution are: Fugitive dust emissions from digging, filling, material handling, transportation and use of construction machinery etc.

Increase in traffic volume resulting in additional vehicular emissions from vehicles bringing construction material and labor onsite.

The impact will be for short duration and will be confined to the project boundary.

However, use of tarpaulin for covering the material being transported in trucks, sprinkling of water will control the dust generated and proper maintenance of vehicle will be carried out.

Mitigation Measures:

Water sprinkling will be regularly carried in order to arrest the fugitive dust to the maximum extent possible. All construction equipment will be maintained properly. Only “PUC” certified vehicles of contractor will be deployed at site. The green belt will reduce fugitive emissions in the environment.

FIGURE: 4.1

IMPACT NETWORK ON AIR ENVIROENMENT

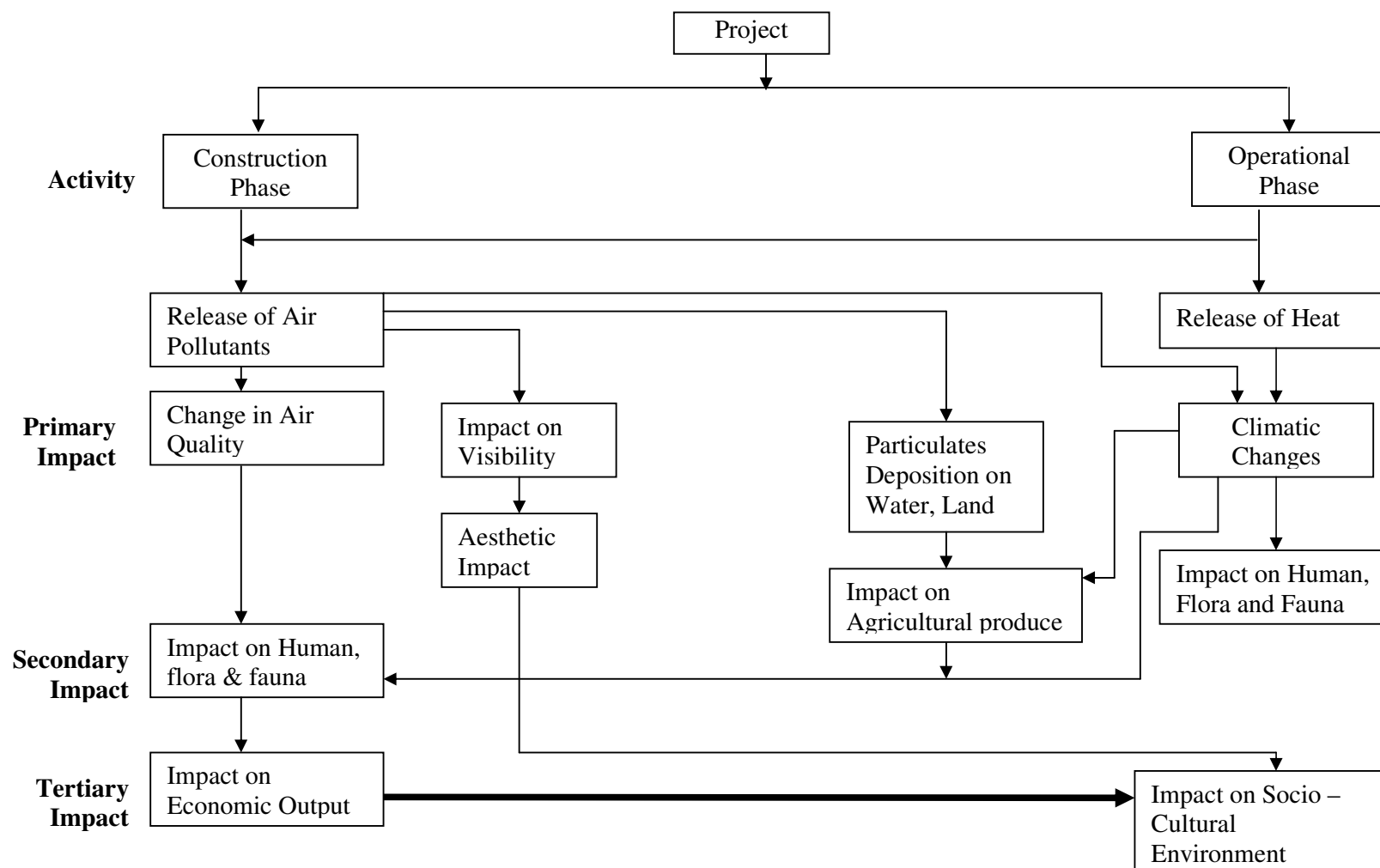


FIGURE: 4.2

IMPACT NETWORK ON NOISE ENVIRONMENT

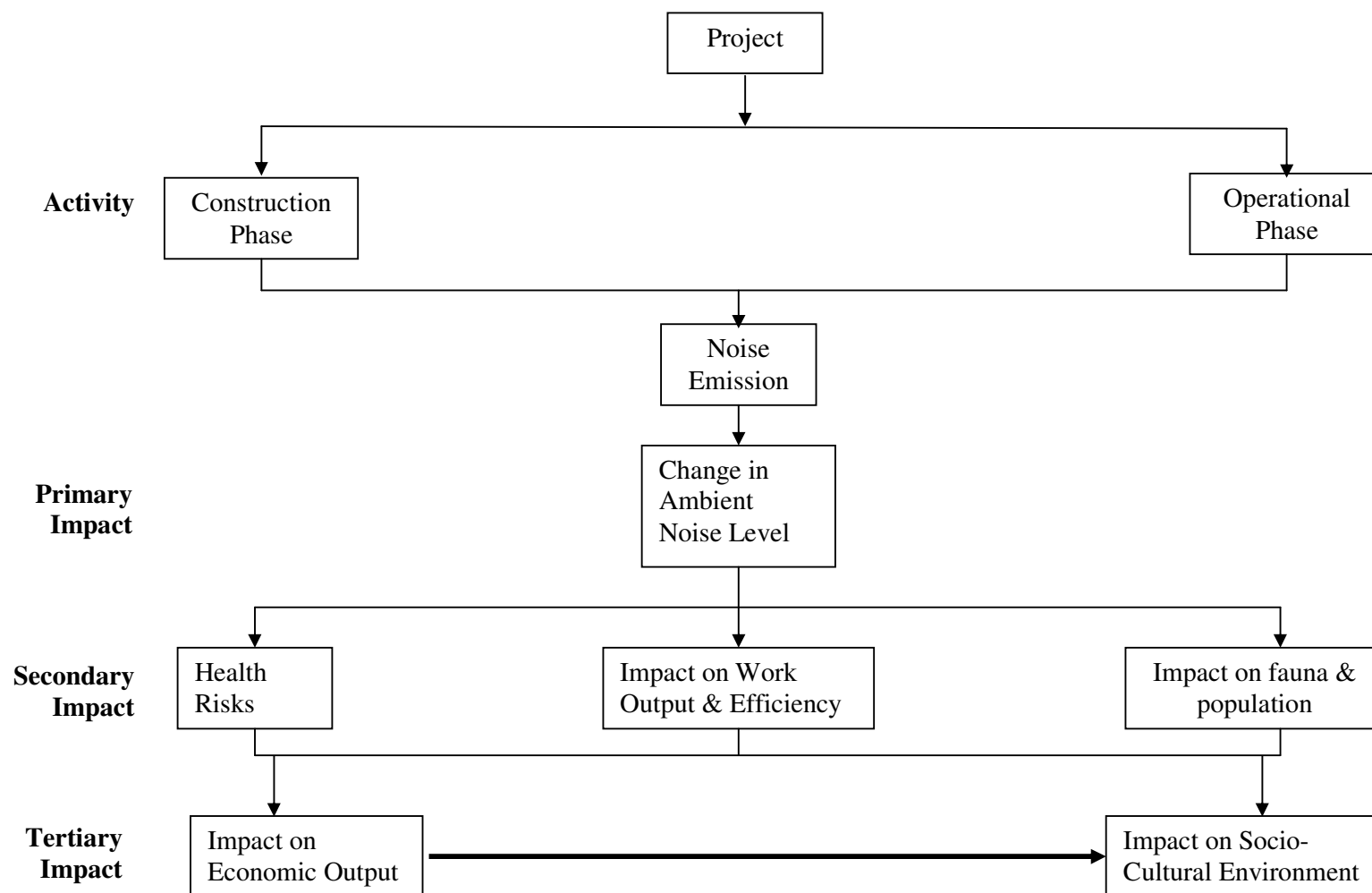


FIGURE: 4.3

IMPACT NETWORK ON WATER ENVIRONMENT

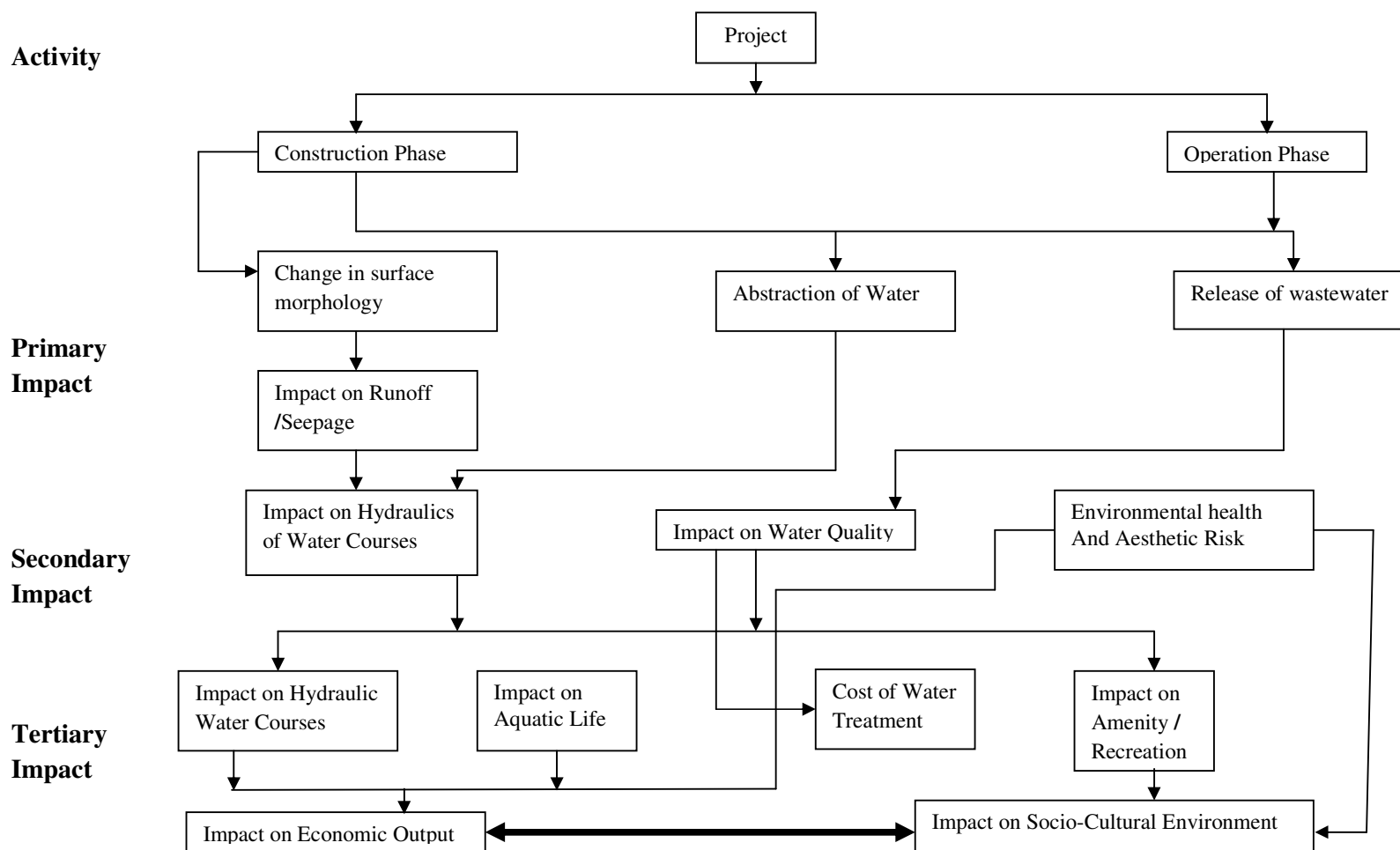


FIGURE: 4.4

IMPACT NETWORK ON GROUND WATER ENVIRONMENT

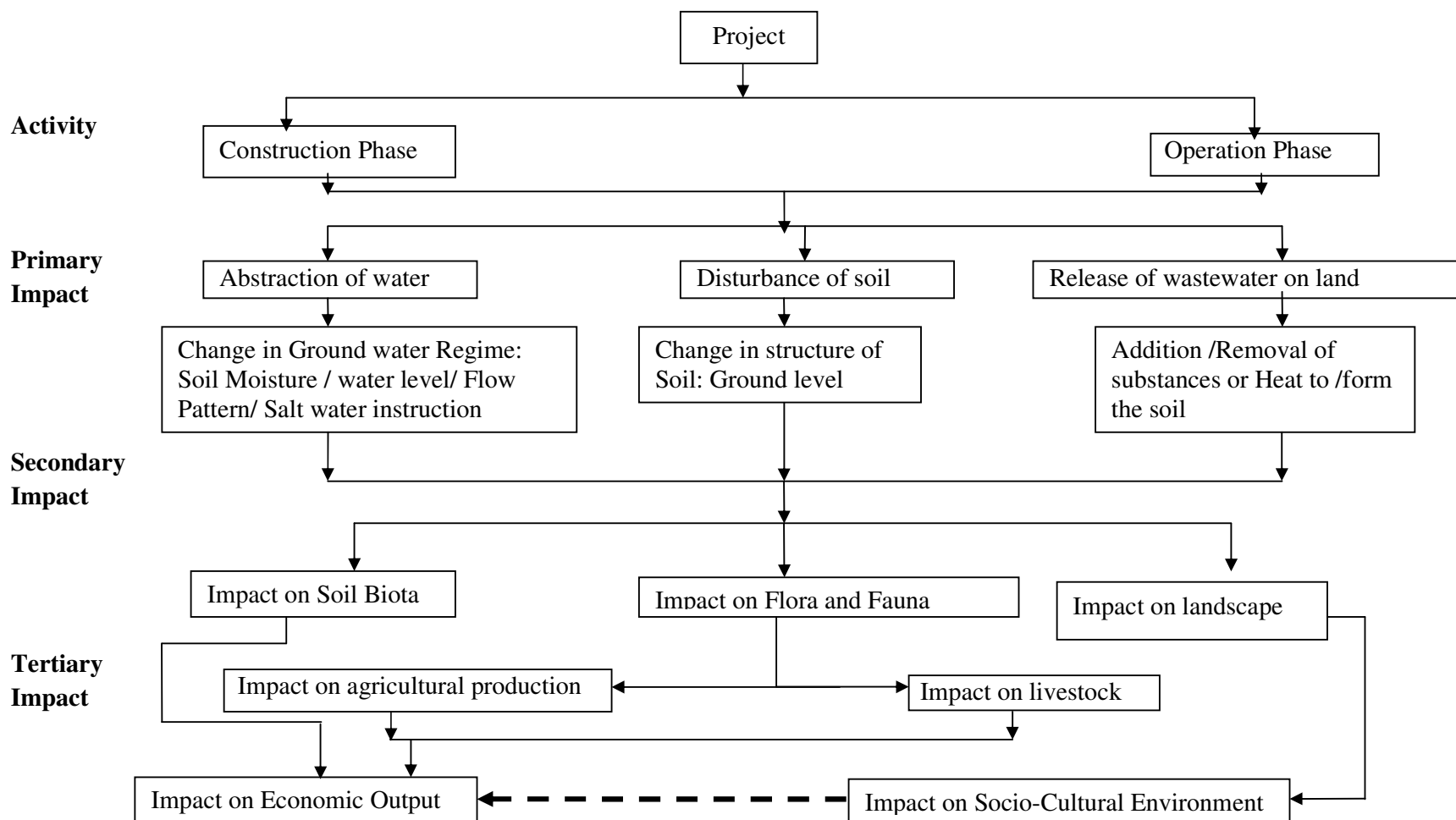


FIGURE: 4.5

IMPACT NETWORK ON SOCIO-AND CULTURAL ENVIRONMENT

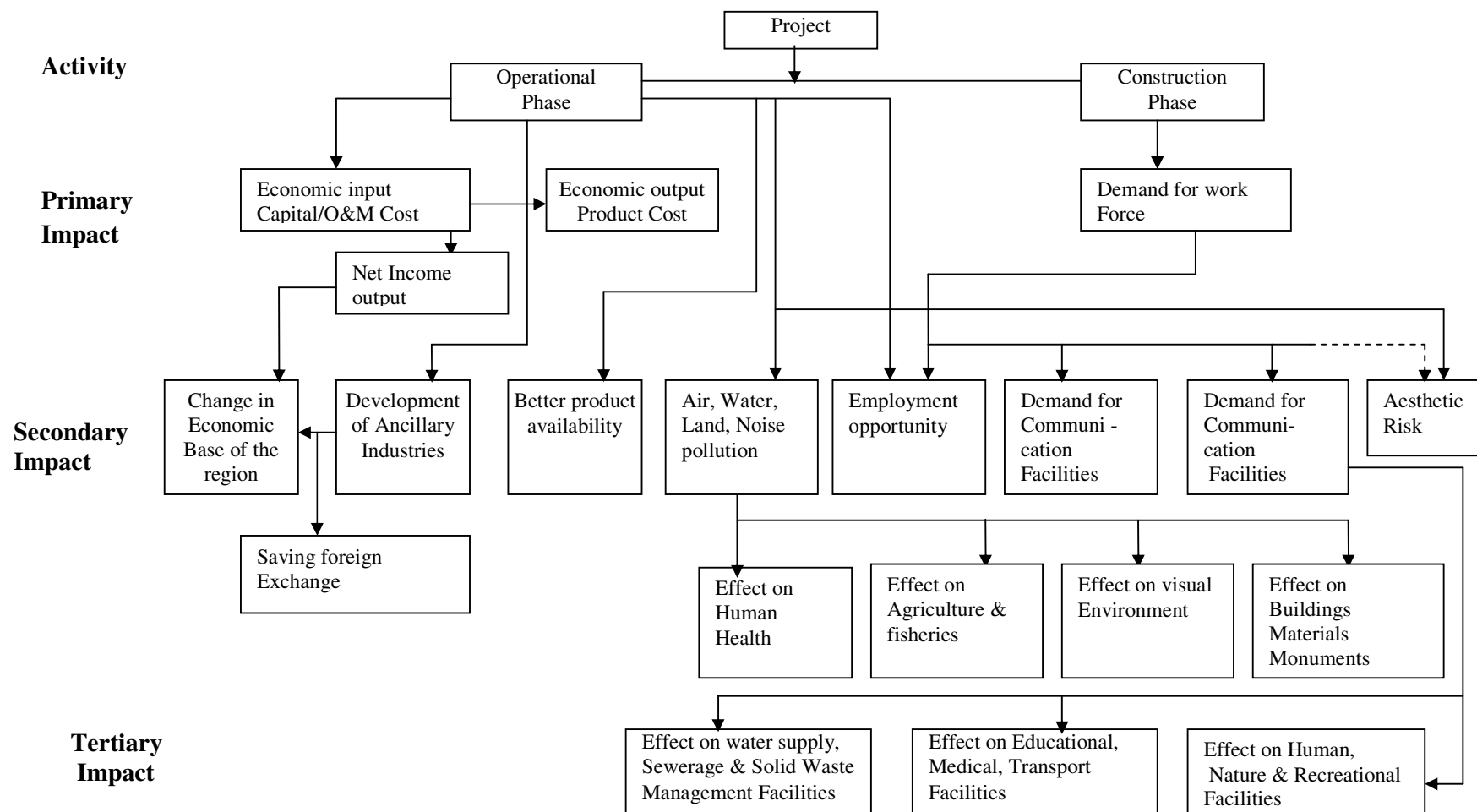
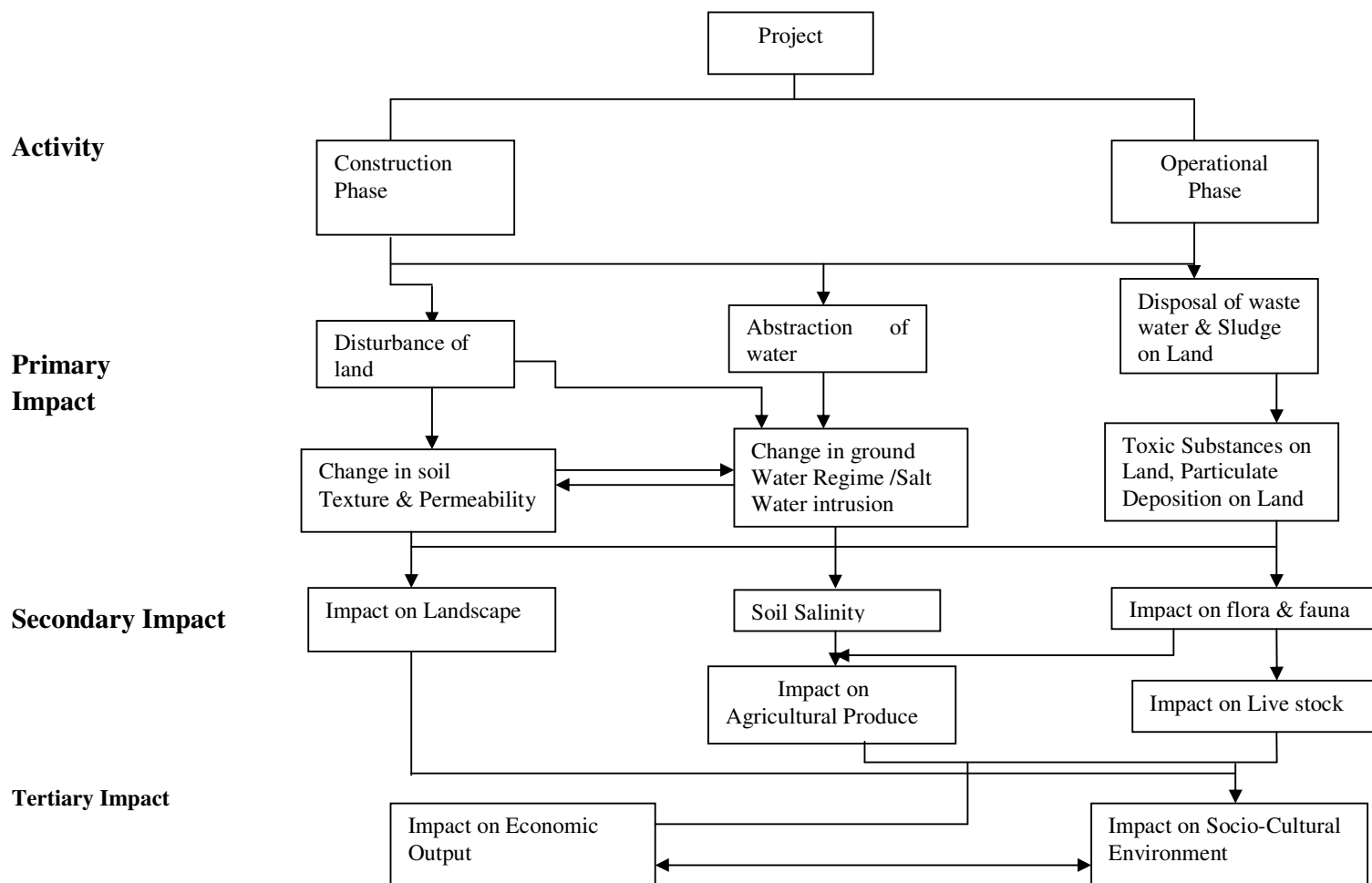


FIGURE: 4.6

IMPACT NETWORK ON LAND ENVIRONMENT



4.2 PREDICTION AND ASSESSMENT OF IMPACT

An impact can be defined as any change in physical, chemical, biological, cultural and/or Socio-economic environment that can be attributed to activities related to alternatives under study for meeting the project needs. Impact methodology provides an organized approach for prediction and assessing these impacts.

Scientific techniques and methodologies based on mathematical modeling are available for studying impacts of various project activities on environmental parameters.

The nature of the impacts due to said project activities are discussed here in detail. Each parameters identified in the proceeding chapter, is singularly considered for the anticipated impact due to various activities listed. The impact is quantified using numerical scores 0, 1, 2, 3, 4 and 5 in increasing order of activity. In order to assess the impact accurately, each parameter is discussed in detail covering the following:

- 1) Project activities likely to generate impact
- 2) Quantification and prediction of impact

4.2.1 WATER ENVIRONMENT

4.2.1.1 CONSTRUCTION PHASE IMPACTS

During construction phase, water will be required for construction of structures, sprinkling for dust suppression. The raw water for the various purposes will be supplied by GIDC only.

There will be no impact on surrounding ground water quality and quantity during construction phase.

4.2.1.2 OPERATIONAL PHASE IMPACTS

Water consumption & waste water generation is given in table 2.17 & 2.18. Details of ETP are discussed under topic 2.8.2 & 2.8.3 of Chapter 2. There will be no extraction of ground water, so that no direct impact is found on ground water availability and quality in nearby surrounding area. Hence, overall there won't be any significant adverse impact due to proposed activity on the water environment. Ground water and Soil will not get contaminated, as M/s. A- One Chemicals will not be going to discharge any effluent on

land or water bodies. With the above, it can be said that there will be no significant adverse impact on surface and ground water or soil quality.

Mitigative Measures

As per CCA, the wastewater generation is 254.5 KL/Day. After proposed expansion, total industrial effluent generation will be 709.5 KL/Day (Existing: 254.5 KL/Day E + Proposed: 438 KL/Day). Out of 709.5 KL (Process Effluent), 254.5 send in NCT after ETP treatment + 215 internal reuse + 219 will be send to MEE+ 11 Blow down reuse water scrubber followed in coal handling +10 washing water reuse in Process.

4.2.2 AIR ENVIRONMENT

4.2.2.1 CONSTRUCTION PHASE IMPACTS

Dust will be generated during excavation and hauling operation and vehicle transportation on unpaved tracks at the site. Other exhaust gases like PM_{2.5}, PM₁₀, SO₂, NO_x, HCl, Cl₂, NH₃, and VOC may be also slightly released into the local ambient air due to vehicular traffic movement. Thus, the local ambient air quality may be temporarily affected. It will be confined within the project boundary and expected to be negligible outside the plant boundaries.

Mitigative Measures

Water sprinkling and provision of enclosures will allow the particles to settle down prior to discharge. There will be provision of enclosures to construction area to allow the particles to settle down prior to discharge.

4.2.2.2 OPERATION PHASE IMPACTS

The project will result flue gas emission, process emission and fugitive emission.

Flue Gas Emission:

There is one stack of two boiler (2TPH), ten stack of Thermic fluid heater (capacity: 4 Lac Kcal/Hrs. each) and one stack of Pre-heating tank.

There will be one stack of Hot Air Generator for Spray Dryer and one stack of Boiler (5TPH) due to Proposed Expansion.

Process Gas Emission:

Process emission is from two numbers of stacks. There is one stack attached to Reactor 1, 2, 3 & 4, one stack attached to Spin Flash Dryer. There will be one stack attached to Reactor 5,

6&7. Two stage water scrubbers with each reactor followed by venturi scrubber is attached as APCM for boilers and Bag filter is attached as APCM for spray dryer.

Fugitive Emission:

There will be fugitive emission of VOC and acid mist during material handling, transferring and at storage area.

Mitigative Measure

The NH_3 will be absorbed in 2 stage water scrubber with each reactor followed by venturi scrubber before venting out to achieve GPCB norms. Bag filter is provided with spin flash drier to control particulate matter. Adequate stack height will further help in dispersion of pollutants. Closed feeding and transferring system, proper local and exhaust ventilation and more solvent recovery efficiency will control fugitive emission. The installation of water scrubber followed by carbon absorption tower will control VOC going into the atmosphere. The air quality impact of source is evaluated by use of model. The model simulates the relationship between air pollutants emission, meteorology and air chemistry, all of which are determined by formulating impact scenario.

Modeling Details

The dispersion of pollutants in the atmosphere is a function of several meteorological parameters like temperature, wind speed and direction, mixing depths, inversion level etc. The air quality impacts of source or collection of sources is evaluated by use of models. The model stimulates the relationship between air pollutants emission, meteorology and air chemistry, all of which are determined by formulating impact scenario. Estimation of emissions from the plant has been made by Industrial Source. Complex Short Term (ISCST-3) model developed by United States Environment Protection Agency (USEPA). ISCST is based on a modified steady state Gaussian Plume equation and it has been recommended for use in EIA studies by Ministry of Environment & Forests and Climate Change (MoEF & CC) in EIA manual.

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TABLE: 4.1

EXISTING STACKS EMISSION DETAILS

Sources of gaseous emissions	Boiler -1 (2 TPH) (Natural Gas Based)	Boiler - 2 (2 TPH) (coal Based)	Thermopek 1, 2&10	Thermopek 3,4,5 , 6,7,8,& 9	Pre- heating tank	Reactor I, II, III & IV	Spin Flash Dryer
Fuel used	Natural Gas	Coal	Natural Gas	Natural Gas	Natural gas	--	Natural gas
Quantity of fuel	2600 m3/day	6 MT/Day	500 m3/day	1250 m3/day	200 m3/day		1200 m3/day
Type of emissions	PM SO2 NOx	PM SO2 NOx	PM SO2 NOx	PM SO2 NOx	PM SO2 NOx	NH3	PM SO2 NOx
Stack height (m)	30	30	20	20	20	25	12
Stack diameter at the top (mm)	0.6 m	0.6 m	0.6 m	0.6 m	0.6 m	0.3 m	0.6 m
Stack gas exit temperature (°C)	150 °C	150 °C	150 °C	150 °C	150 °C	40 °C	150 °C
Stack gas exit velocity (m/s)	7 m/s	7 m/s	7 m/s	7 m/s	7 m/s	6.5 m/s	8 m/s
APCM		Multi cyclone Separator + Bag filter+ water scrubber	--	--	--	2 stage water scrub with each reactor followed by venturi scrubber.	--
Emissions:							
PM Concentration	150 mg/NM3	150 mg/NM3	150 mg/NM3	150 mg/NM3	150 mg/NM3	--	150 mg/NM3
NOx Concentration	100 ppm	100 ppm	100 ppm	100 ppm	100 ppm	--	100 ppm
SO2 Concentration	50 ppm	50 ppm	50 ppm	50 ppm	50 ppm		50 ppm
NH3 Concentration	--	--	--	--	--	175 mg/Nm3	--

TABLE: 4.2**PROPOSED STACKS EMISSION DETAILS**

Sources of gaseous emissions	Boiler (5 TPH)	Hot Air Generator for Spray Dryer	Reactor V, VI & VII
Fuel used	Coal fired	Coal fired	---
Quantity of fuel	15 MT/ Day	11MT/ Day	--
Type of emissions	Particulate Matter SO ₂ NO _x	Particulate Matter SO ₂ NO _x	NH ₃
Stack height (m)	35	30	25
Stack diameter at the top (mm)	1.0 m	0.6 m	0.3 m
Stack gas exit temperature (°C)	150 °C	150 °C	40 °C
Stack gas exit velocity (m/s)	7 m/s	7 m/s	6.5 m/s
APCM	Multi cyclone Separator + Bag filter+ water scrubber	3 stage water Scrubber and Multi Cyclone Separator	2 stage water scrub with each reactor followed by venturi scrubber.
Emissions:			
PM Concentration	150 mg/NM ³	150 mg/NM ³	--
NO _x Concentration	100 ppm	100 ppm	--
SO ₂ Concentration	50 ppm	50 ppm	--
NH ₃ Concentration	--	--	175 mg/Nm ³

As natural gas in Boiler 1 & 2, Thermopack 1 to 6 and Coal in Hot Air Generator for Spray Dryer & Boiler 3 will be used as fuel, 15% of the Maximum GPCB permissible limits for SO₂, 50% for NO_x and 100 mg/Nm³ for PM were used for carrying out atmospheric dispersion modeling studies. Based on the modeling results, the highest incremental increase in concentration of SO₂, NO_x, PM, and NH₃ are summarized in the table 4.3, and 4.4.

TABLE: 4.3**CONCENTRATION OF PM, SO₂ & NO_x**

Highest Values	Incremental increase in Concentration (µg/m ³)			X Co-ord (mts)	Y Co-ord (mts)
	PM	SO ₂	NO _x		
1	4.654	4.05	2.88	-1000	-1000
2	4.333	3.765	2.719	-1000	-1000
3	3.861	3.381	2.262	-1000	-1000
4	3.496	3.031	2.23	-1000	-1000
5	3.246	2.821	2.031	-1000	-1000
6	3.062	2.663	1.908	-1000	-1000
7	2.917	2.537	1.862	-1000	-1000
8	2.891	2.512	1.814	-1000	-1000
9	2.837	2.451	1.812	-1000	-1000
10	2.715	2.361	1.692	1000	1000

TABLE: 4.4**CONCENTRATION OF NH₃**

Highest Values	Incremental increase in Concentration (µg/m ³)	X Co-ord (mts)	Y Co-ord (mts)
	NH ₃		
1	0.308	1000	1000
2	0.257	-1000	-1000
3	0.243	-1000	-1000
4	0.221	-1000	-1000
5	0.211	-1000	-1000
6	0.205	1000	1000
7	0.199	1000	0
8	0.191	-1000	-1000
9	0.19	-1000	-1000
10	0.188	2000	2000

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Based on the modeling results, isopleths for SO₂, NO_x, PM, and NH₃ were drawn and were superimposed on an aerial view of the site using maps from Google Earth which is as shown in the figures given below.

FIGURE: 4.7

ISOPLETH FOR SO₂ (Site Coordinates 0, 0)

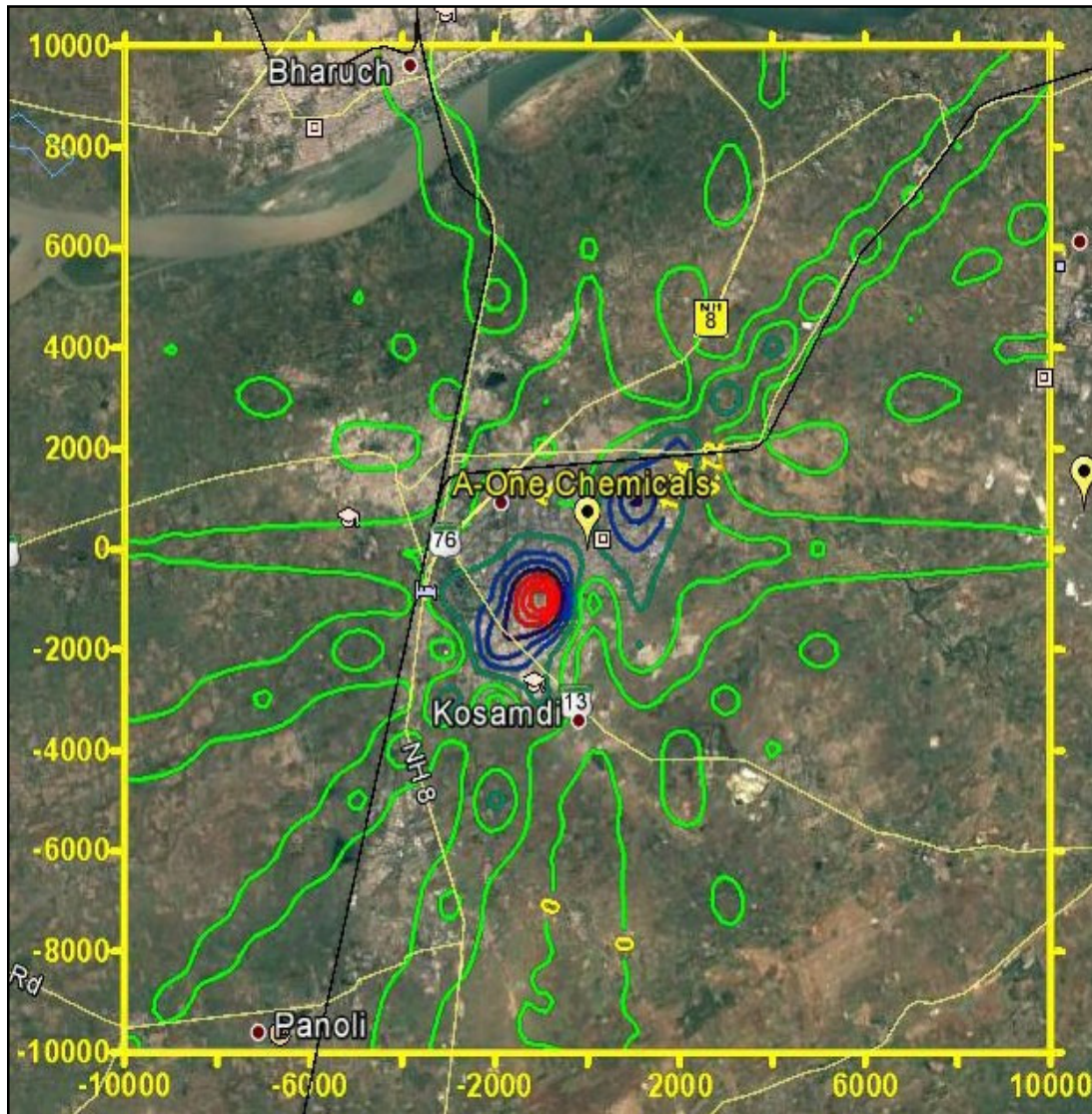


FIGURE: 4.8

ISOPLETH FORNO_x(Site Coordinates 0, 0)



FIGURE: 4.9

ISOPLETH FOR PM(Site Coordinates 0, 0)

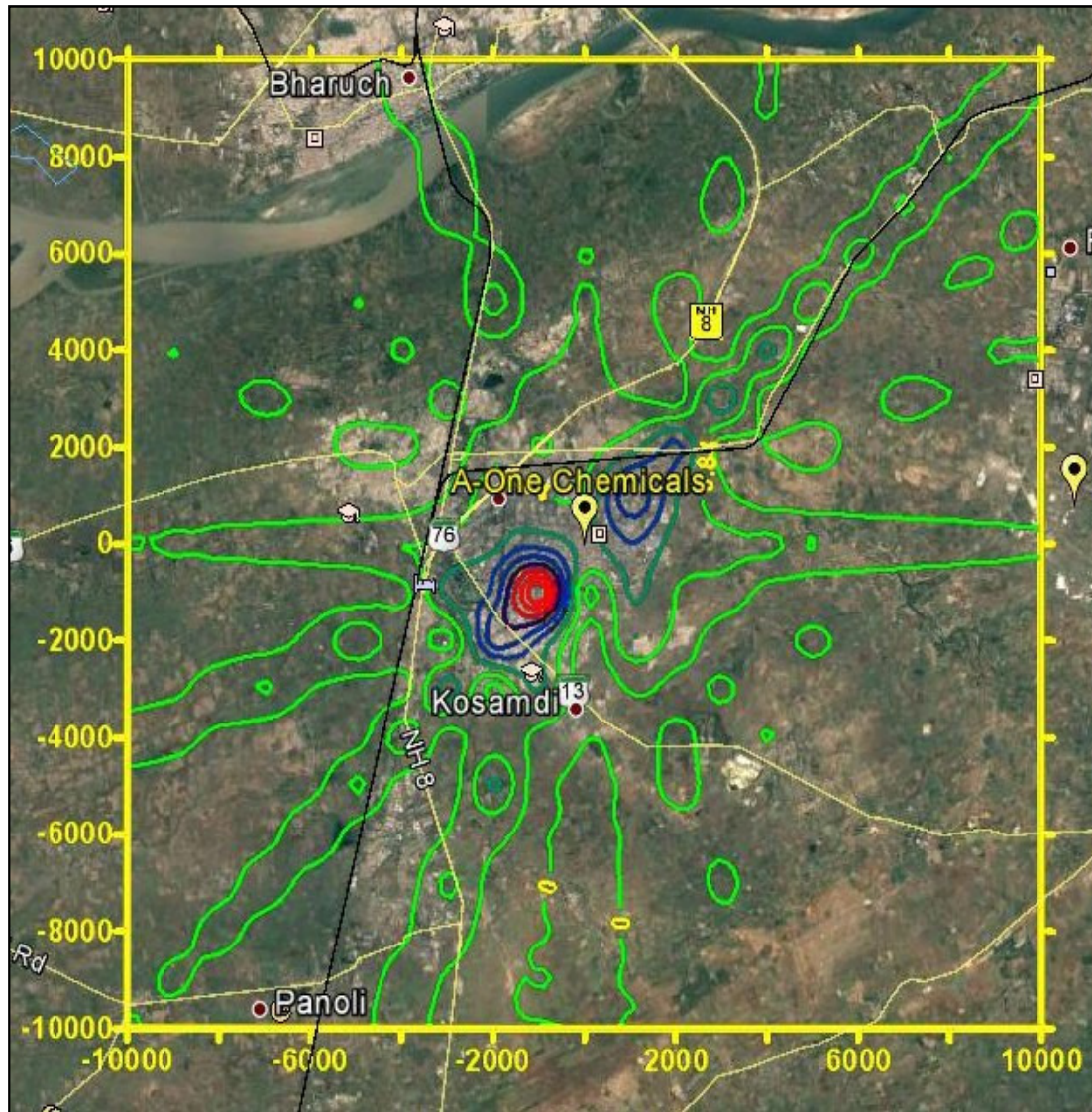
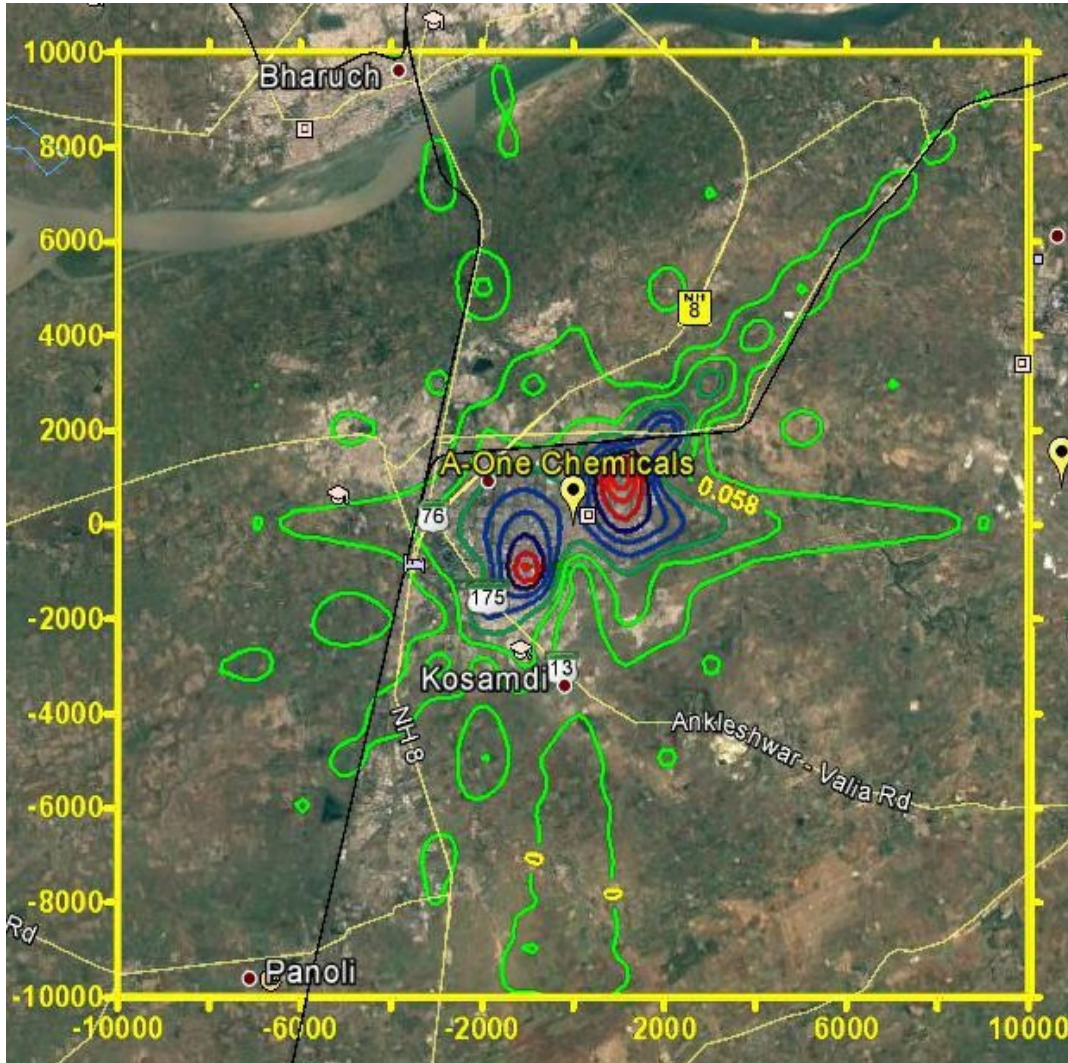


FIGURE: 4.10

ISOPLETH FOR NH_3 (Site Coordinates 0, 0)



Observations from dispersion modeling studies:

From the dispersion modeling studies conducted, it was observed that the maximum ground level concentration occurs in the South West direction. The maximum incremental increase in concentration for PM, SO_2 and NO_x is $4.654 \mu\text{g}/\text{m}^3$, $4.05 \mu\text{g}/\text{m}^3$ and $2.88 \mu\text{g}/\text{m}^3$ respectively at a distance of about 1 km in the South West direction. Whereas, the maximum incremental increase in concentration for NH_3 is $0.308 \mu\text{g}/\text{m}^3$ at a distance of about 1 km in the North-East direction.

4.2.3 NOISE ENVIRONMENT

4.2.3.1 CONSTRUCTION PHASE IMPACTS

Noise will be generated during the intermittent operation of machineries for site clearing and construction work. Vehicular movement will be also a source of noise generation. There will be short term, localized and reversible impact on ambient noise levels during the construction activities.

Mitigative Measures:

- Operation of construction equipments generating higher noise will be strictly restricted during 10 p.m. to 6 a.m.
- The construction machinery and equipment will be well maintained. Provision of enclosure, damper and other engineering control will control noise pollution.
- Workers operating these equipments will be given ear plugs/muffs.

4.2.3.2 OPERATIONAL PHASE IMPACTS

The sources of noise pollution will be Boilers, D.G.sets and other noise generating units. Vehicular movements during operation phase for loading/unloading of raw materials and finished products and other transportation activity may also increase noise level.

Mitigative Measures:

- Adequate noise control measures such as mufflers, silencers at the air inlet/outlet, anti-vibration pad for equipment with high vibration etc. shall be provided.
- Housing/casing shall be provided for all noise generating machines.
- Job rotation will reduce exposure to some extent. Moreover, PPE like earmuff and ear plugs will be provided to the operators/worker exposed to high noise.
- The proposed green belt will further be helpful in reducing the ambient noise level.

4.2.4 LAND ENVIRONMENT

4.2.4.1 CONSTRUCTION PHASE IMPACTS

As the project site is fairly flat terrain without any rock, there will be no blasting. As the site is uneven, some leveling work will be required. Local workers will be engaged for construction activities of proposed project. So, the construction phase of the proposed project will not involve any temporary housing for construction workers.

Mitigative measures:

The solid waste generated during construction activity will be stored and disposed properly. Sewage generated from sanitation facility will be disposed through soak pit. Hence, there will be no significant adverse impact on land environment due to handling of hazardous solids waste.

4.2.4.2 OPERATIONAL PHASE IMPACTS

If the raw materials and hazardous wastes are not handled properly, it can pose danger of land contamination and can affect land system adversely.

Transportation is one of the most important areas of concern associated with handling and spillage of raw materials and hazardous waste because of the packaging and method of transporting hazardous waste will prevent the likelihood that an accident or spill would occur.

Mitigative measures:

The unit has closed hazardous waste storage area with impervious flooring. Transportation of hazardous waste to the TSDF site is governed as per the Hazardous Waste (Management, Handling and Trans Boundary Movement) Rules.

Separate collection system is provided for collection of spillage material. Impervious layer, RCC roads and flooring is provided to area, where the chemical storage and handling activities will be involved.

Separate storm water collection system is provided to prevent contamination of soil through contaminated water.

Hence, there will be no significant adverse impact on land environment due to handling of hazardous solids waste. The unit is following Standard Operating Procedure (SOP) for storing and handling of hazardous wastes.

STANDARD OPERATING PROCEDURE

1. All the departments will collect the various types of the waste and segregate it in various types like paper and packing material, plastic bags, process waste, metal waste, glass waste etc.
2. After collecting the waste, respective departments will fill up the slip along with format number for disposal
3. The person will shift the various type of waste in the designated areas of the waste category. Before shifting it person will inform and hand over the filled slip to ETP Operator/ Chemist/ EHS – HOD.
4. On sufficient stock of the waste type, it will be disposed off.

5. Spent/used oil will be given to MoEF registered re-processor.
6. For disposal of discarded bags and containers, the guideline provided by the Gujarat Pollution Control Board will be followed. It will be ensured that containers are empty before taken for disposal. As per the guidelines all the containers will be washed properly, the washings will be checked for pH and COD. The pH should be neutral and COD should be NIL. This will ensure that the containers are cleaned before taken for disposal. Removal or defacing of all labeling and content of all product and waste material will be regular practice. The sticker will be put on individual container as "cleaned". The container will be deposited in the area marked for disposal. Then the containers will be inspected by the certifying agency approved by the GPCB. In confirmation of the quality of the cleaning they will issue the stickers for identification. After receiving the stickers that should be pasted on to the containers. Then the containers are disposed off to actual raw material supplier.

CARE TO BE TAKEN DURING HANDLING OF WASTE

1. Person handling the hazardous waste should wear gloves, shoes/ gum boots etc. mask like Personal Protective Equipment.
2. If spillage occurred swipe it and collect it in to the bag and mix it with the waste.
3. Forklift will be used in shifting, loading and unloading operation for hazardous waste to minimize manual handling of hazardous waste.

4.2.5 ECOLOGICAL ENVIRONMENT

The impact due to the proposed expansion on ecological parameters like natural vegetation, cropping pattern, fishers and aquatic life, forest land species diversity are briefly summarized below:

4.2.5.1 CONSTRUCTION PHASE IMPACTS

The project site is located within the GIDC. The project site is devoid of trees; it will not harbor any important flora. There will be no impact on natural vegetation during construction. Since, the project is established on a non-agriculture land, it will not alter the crop production of the area. The project site is at a far distance from the forest land, wild life sanctuaries and national parks. Hence, no adverse impact on this account is anticipated.

4.2.5.2 OPERATIONAL PHASE IMPACTS

The study area does not have any type of forest and endangered fauna within 5 km area. However, all the environmental and related issues have been properly addressed with its impacts and Mitigation measures in the proposed project. There will not be any major impact on the terrestrial ecology of the project site due to proposed project.

Mitigative Measures

- The green belt will be developed by unit having different species of flora, which will lead to beneficial impact on ecological environment.
- There will be necessary environmental protection measures which have been planned under EMP i.e. air pollution control system designed to take care of release of the gaseous pollutants like PM, SO₂, NO_x, NH₃ and VOC.
- The waste water generation from process will be treated in ETP. In addition, proper care will be taken to prevent any spillage/leakage. Proper storage facility will be provided for raw material and hazardous waste. Hence there will be no impact on ground water and surface water quality.
- Raw material and hazardous waste will be transported by road and will be stored in plant premises.
- The project proponent shall consider all the safety measures in planning, designing and operation of the plant as per standard practices.
- Hence, no adverse impact on this account is anticipated.

4.2.6 INFRASTRUCTURE AND SERVICES

4.2.6.1 CONSTRUCTION PHASE IMPACTS & OPERATION PHASE IMPACTS

The plant is located in a GIDC Ankleshwar, Gujarat having all essential facilities such as water, power, post and telecommunication. There is a well laid down broad roads already existing in GIDC, Ankleshwar. There will be 5-7 trucks per day for transportation of raw material and finished good products. The transportation facilities will also expect to improve due to increase in the movement of workers and raw material and finished products. This will have almost negligible impact on road network.

The unit have electricity from Daxin Gujarat Vij Company Ltd. The existing electricity consumption is 750 KVA and proposed consumption will be 950 KVA. Total electricity consumption will be 1700 KVA will be fulfilled from DGVCL.

The fresh water requirement for domestic and industrial purpose is met through GIDC water supply. The infrastructure services e.g. roads, post and telegraph, communication, medical facilities, education; housing will be improved in surrounding area.

Infrastructure facility such as sanitation, fuel, restroom etc. will be provided to the labor force during construction as well as to the casual workers including truck drivers during operation phase.

4.2.7 SOCIO-ECONOMIC IMPACT

4.2.7.1 CONSTRUCTION PHASE IMPACTS

4.2.7.1.1 POPULATION

- During the peak construction phase, construction manpower including construction workers will be employed.
- However, to the maximum extent possible, construction workers will be employed from within the study area.
- Since the construction phase of this project will be for short time period, the socio-economic impact due to construction of this project is going to be temporary.
- Considering the above-mentioned factors, the construction phase of the project will have minor impact on population in the study area.

4.2.7.1.2 EMPLOYMENT

- Around 45 workers will be employed in the construction work. This will increase construction employment in the study area although temporality. Hence, the proposed project will have minor impact on employment in construction phase.

4.2.7.1.3 TRANSPORTATION

- For transportation of construction material, the existing road infrastructure is adequate.
- Moreover, as the construction phase for the proposed project will be few months, the impact would be temporary.

4.2.7.2 OPERATION PHASE IMPACTS

4.2.7.2.1 POPULATION

About 45 workers will be employed for in the operational phase the proposed project. This number of employee is very small compared to the total population of the study area. Also as a social impact mitigation measure, Unit will endeavor to employ most of these people from within the study area at worker level, subject to availability of suitable manpower in the area. So the proposed project in its operational stage is not expected to directly affect the total number or composition of population in the study area significantly. However the population of the study area is expected to increase marginally due to migration of persons from outside of the study area.

4.2.7.2.2 EMPLOYMENT

All efforts will be made to employ local people as far as possible. In addition, employment will be generated by the secondary supporting activities e.g. transportation, communication, boarding, daily utility services.

4.2.7.2.3 TRANSPORTATION

Because of the good network of transportation facilities in the study area, the additional truck traffic generated during the operational phase is not expected to bring any considerable load to the existing transportation system.

4.2.7.2.4 IMPACT DUE TO FIRE ACCIDENT

The project design and development has been planned with care and all provisions have been made for the safety and security of the property as well as the personnel.

4.2.7.2.5 IMPACT ON PUBLIC HEALTH

The discharge of waste materials (gaseous emission and solid wastes) from the project can have some adverse impact on public health in the surrounding area, if appropriate treatment procedures are not followed.

4.2.7.2.6 ACCIDENT HAZARD AND SAFETY

During operational phase accident / hazards will be greatly minimized and ensure further safety of the local people. In addition, by adopting mitigation measures it will ensure high safety standards.

Mitigative Measure:

- Provision of adequate APC and maintains of APC will prevent any accidental emission from stacks and reduce risk to the health of the people in the vicinity of the project.
- All safety measures will be carried out to prevent any accident. The unit will have onsite /offsite emergency plan.

4.3 IMPACT MATRIX

The parameter discussed are presented in the form of a matrix in table 4.5. There will be both construction and operation phases.

The quantification of impact is done using numerical scores 0 to 5 as per the following criteria.

Score	Severity criteria
0	No Impact
1	No damage
2	Slight/short term effect
3	Occasional reversible effect
4	Irreversible /Long –term effect
5	Permanent Damage

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TABLE : 4.6

ENVIRONMENT IMPACT MATRIX (WITH MITIGATION MEASURES)

Phase	Activities during the Phase	Air quality	Water quality	Noise & Odour	Land Quality	Infra-Structure /Services	Ecological environment	Health safety & Aesthetics	Socio-Economic Status
Construction phase	Excavation, civil work, transportation of construction vehicle	2	1	2	2	2	2	2	1
Operation phase	Water requirement	0	1	0	0	1	0	0	0
	Material Storage/handling/ Transport	2	1	2	2	2	2	2	0
	Effluent discharge (considering discharge to CETP)	0	2	0	0	2	1	0	0
	Utilities	2	1	1	1	1	1	1	0
	Gaseous emissions	2	0	1	1	0	1	2	0
	Fugitive emissions	2	0	0	0	0	0	2	0

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Phase	Activities during the Phase	Air quality	Water quality	Noise & Odour	Land Quality	Infra-Structure /Services	Ecological environment	Health safety & Aesthetics	Socio-Economic Status
	Solid/hazardous Waste Disposal	1	1	1	1	2	1	2	0
	Spills & Leaks	2	1	0	1	1	1	2	0
	Plant Operations	2	2	1	0	1	1	2	1
	Equipment Failures/ Shutdown/Startup	2	2	1	0	2	1	2	1
	Transport of workers/Movement of vehicles	1	0	1	0	1	1	1	1
Cumulative score		18	12	10	08	15	12	18	04

TABLE: 4.7

CUMULATIVE IMPACT CHART

EnvironmentalParameter	Total Cumulative
Air Quality	18
Water Quality	12
Noise and Odor	10
Land Quality	08
Infrastructure/ Service	15
Ecological environment	12
Socio Economic Status	18
Health safety & Aesthetics	04

Conclusion:

The source of water will be GIDC water supply scheme. There will be no extraction of ground water. The entire waste water generated is treated in unit's own Effluent Treatment Plant. Even though after provision of APCM, there will be minor increase in ground level concentration of SO₂, NOX, PM, NH₃, and VOC in ambient air due to construction and operational activities of proposed project.

Construction activities will disturb soil profile but impact will be insignificant. The unit will take adequate measure for storage, handling and disposal of hazardous waste. Hence, there will be no significant adverse impact on land environment.

Engineering control, use of PPE, restriction of construction activity during 10 p.m. to 6 a.m., and green belt will reduce impact of noise pollution due to construction work, vehicular movement and noise generating equipment. There will be minor increase in ambient noise level and impact will be insignificant.

The project site is at a far distance from the forest land, wild life sanctuaries and national parks. The unit is located in Ankleshwar GIDC, Gujarat. There will be not significant impact on crops & vegetation as the proposed APCM will take care of flue gas emission and process emission.

This will be a beneficial impact on the local socio-economic environment as increase in demand for essential utilities and employment during both construction and operational phase.

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This will be a beneficial impact on the local infrastructure services e.g. roads, post and telegraph, communication, medical facilities, education, housing will be improved in surrounding area.

CHAPTER -5

ANALYSIS OF ALTERNATIVES (TECHNOLOGY & SITE)

5.1 SITE SELECTION

The expansion is proposed within existing site premise.

Following are the justifications for site selection:

- The land for the expansion is already in the possession of project proponent as expansion to be executed in the existing premises. Hence no new land will be required.
- The existing project site is well connected by road to National Highway No. 8.
- As the unit is located in Notified Area, no prime agricultural land / forest land needed to be converted for industrial use.
- The industrial Estate is basically a declared “Chemical Zone” where about 705 of the industrial units are either Chemical or Chemical related, such as, Dyes and Dyes intermediates, pigments pesticides, fine chemicals, pharmaceuticals, etc. The remaining 30% comprises of paper mills, packing, plastics, engineering, textiles, paints, food processing, printing, etc.
- Majority of the raw materials are available from the nearby vendors as unit is located in GIDC area.
- Easy availability of manpower for the expansion project.

5.2 TECHNOLOGY SELECTION

The process of Organic synthetic chemicals involves various steps like reactions, Mixing, filtration and drying of products. There is no alternative technology available as elaborated in Chapter 2

CHAPTER -6

ENVIRONMENTAL MONITORING PROGRAM

6.1 INTRODUCTION

Environmental monitoring describes the processes and activities that need to take place to characterize and monitor the quality of the environment. Environmental monitoring is used in the preparation of environmental impact assessments, as well as in many circumstances in which human activities carry a risk of harmful effects on the natural environment. All monitoring strategies and programmes have reasons and justifications which are often designed to establish the current status of an environment and Prediction of the impact of future development and/or alteration in the operation and design of existing installations. Environmental Monitoring Network is operation phase of the project for monitoring of various environmental parameters like air, water, noise, soil etc.

A well-defined environmental monitoring programme would be employed with trained and qualified staff of Environmental Management Cell of the proposed expansion project to monitor the environmental attributes of the area with respect to EMP as well as the guidelines of the GPCB/CPCB. Environment monitoring schedule proposed to be adopted by the project.

6.2 OBJECTIVES OF ENVIRONMENTAL MANAGEMENT PLAN

- To comply with the provision of Factory Act & MSIHC Rules.
- To verify the results of the impact assessment study in particular with regards to new development.
- Identification of any significant adverse transformation in environmental condition to plan additional mitigation measures; if & as required.
- To check or assess the efficiency of the controlling measures.
- To ensure that new parameters, other than those identified in the impact assessment study, do not become critical through the commissioning of new project.
- To establish a data base for future Impact Assessment Studies for new project.

6.3 IMPLEMENTATION SCHEDULE OF MONITORING MEASURES

Monitoring should be done as periodically to understand the environmental condition of the site.

The mitigation measures suggested in the Chapter-4 should be implemented so as to reduce the impact on environment due to the operations of the proposed project. In order to facilitate easy implementation, mitigation measures are phased as per the priority implementation. The priority of the implementation schedule is given in Table 5.1.

TABLE 6.1**IMPLEMENTATION POLLUTION CONTROL MEASURES**

Sr. No.	Required Measures	Stage	Remarks
1.	Air pollution control measures	During operation stage	Adequate stack height for flue gas emission and Scrubber system will be provided as APCM for process gas emission
2.	Ground Water Criteria and Drinking Water parameter.	During construction and Operation stage.	As per IS 10500 Standard Quarterly monitor quality of water.
3.	Waste Water Treatment	Operation phase of the project	Treated at ETP and treated wastewater is sent to GIDC Pipeline.
4.	Greenbelt development	During construction stage & operation stage.	Plantation will be done along the periphery within premises. Total green belt area 24 % of plot area.
5.	Solid waste disposal	Construction and operation phase of the project	Solid waste to be segregated and disposal as per guideline.
6.	Hazardous waste disposal	Operation phase of the project	Collection /storage /transportation /disposal at TSDF-& disposal as per Hazardous waste rule 2016.

6.4 POLLUTION MONITORING AND SURVEILLANCE SYSTEM

Regular monitoring of important parameters is of immense importance to assess the status of environment during plant operation. With the knowledge of baseline conditions, a properly planned monitoring program can serve as an indicator for assessment of any deterioration in environment conditions. This will facilitate undertaking suitable measures to mitigate adverse impact during the operation of the plant and further help to protect the environment in the area. The main attributes for which monitoring shall be carried out are:

- Ambient Air Quality
- Stack Emission
- Effluent water Quality
- Noise Level

The above mentioned sources will be monitored so as to meet the requirements of the State Pollution Control Board.

6.4.1 AMBIENT AIR QUALITY MONITORING

The ambient air quality with respect to PM₁₀, PM_{2.5}, SO₂, and NO_x shall be monitored at ETP, process area, storage area and one location in downwind direction. The frequency of monitoring will be every three month by external approved monitoring agency.

The log book shall be maintained at environment cell for evaluation of impact and to decide required migratory measures.

6.4.2 STACK MONITORING

All the flue gas stacks in the proposed project shall be monitored with respect to temperature, oxides of nitrogen (NO_x), Suspended Particulate Matter (SPM) and Sulphur dioxide (SO₂) level.

6.4.3 NOISE MONITORING

Monitoring of noise levels is essential to assess the effectiveness of Environmental Management Plan implemented to reduce noise levels. A good quality sound level meter and noise exposure meter may be procured for the same. Audiometric tests shall be conducted periodically for the employees working close to the high noise sources. The noise levels due to machines/equipments viz. compressor, motors, engines etc shall be monitored regularly.

6.4.4 WATER AND WASTE WATER QUALITY MONITORING

Daily analysis of effluent stream is recommended. Sampling and analysis of the raw effluent, collection tank, Primary Settling Tank, Secondary Settling Tank and tertiary treatment. will be conducted regularly. Online meter will be fitted for monitoring of flow, pH, COD.

The detailed monitoring plan is tabulated in Table 6.2.

TABLE: 6.2

ENVIRONMENT MONITORING PLAN

TABLE: 5.2

EMISSION MONITORING PLAN

Sr. No.	Description	Location	Parameter To be Monitored	Frequency of Monitoring
1.	Flue Gas Emission Monitoring Plan	Three boilers stacks (Coal/Natural Gas), four stacks of Thermopack (10 Nos.), (D.G.Set) (2 Nos.), One stack of Hot Air Generator for	PM ,SO ₂ and NO _x	Monitoring will be done by external monitoring agency once in three months. Online monitoring system with alarm and recording facility .

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Sr. No.	Description	Location	Parameter To be Monitored	Frequency of Monitoring
		Spray Dryer		
2.	Process Emission Monitoring Plan	Reactor Vessels, Spin flash Drier	PM and NH ₃	Quarterly by external monitoring agency. Online monitoring system with alarm and recording facility .
3.	Fugitive Emission Monitoring Plan	Process area & storage area	Relevant solvent (VOC) and acidic fumes.	Daily by internal system. Quarterly by external monitoring agency.
4.	Ambient Air Monitoring Plan	ETP, Process area, storage area and one location in downwind direction	PM ₁₀ , PM _{2.5} , SO ₂ , NO _x	Within premises ambient air monitoring station will be established in consultation with GPCB. Quarterly by external monitoring agency
5.	Noise Monitoring	Any five location within company premises	Noise	Quarterly by external monitoring agency in day time and night time.
6.	Water Quality Monitoring			
6.1	Effluent Quality Before Neutralization	Primary equalization tank	For TDS, pH, COD, TSS, Ammonical nitrogen, Chlorides, Sulfates, oil and grease	1) Every three month by external approved monitoring agency. 2) Every day by self-analytical facility.
6.2	Effluent quality after neutralization	Neutralization Tank	For TDS, pH, COD, TSS, Ammonical nitrogen.	1) Every three month by external approved monitoring agency. 2) Every day by self-analytical facility.
6.3	Water quality	Aeration	For TDS, pH,	Every day by self-

EIA REPORT FOR EXPANSION OF M/S. A-ONE CHEMICALS, GIDC, ANKLESHWAR.

Sr. No.	Description	Location	Parameter To be Monitored	Frequency of Monitoring
	after Aeration		TSS, Chlorides, Ammonical nitrogen.	analytical facility.
7.	Water Quantity Monitoring			
7.1	Inlet & Outlet	ETP	Quantity in KL	Flow meter
7.2	Inlet & Outlet	Boiler	Quantity in KL	Flow meter
7.3	Inlet & Outlet	Cooling Tower	Quantity in KL	Flow meter
7.4	Inlet	Process	Quantity in KL	Flow meter
7.5	Inlet	Domestic	Quantity in KL	Flow meter
8.	Hazardous waste quantity Monitoring			
8.1	ETP Sludge	ETP	Quantity generated & Disposed in MT	Record Maintain
8.2	Spent Oil	Lubrication	Quantity generated & Disposed in MT	Record Maintain
8.3	Discarded Container	Storage	Quantity generated & Disposed in Nos.	Record Maintain
8.4	Spray Dryer Salt	Spray Drier	Quantity generated & Disposed in MT	Record Maintain
9.	Electricity Consumption Monitoring			
9.1	ETP Plant	Low TDS effluent treatment plant	Electricity	Separate electricity meter and daily reading will be noted.
9.2	Air pollution control system	Scrubbers	Electricity	Separate electricity meter and daily reading will be noted.
10	Environment Audit			
10.1	Environment audit will be carried out once in year through GPCB recognized schedule-1 Environment Auditors. This is as per directive of Hon. Gujarat High Court.			

6.5 COST PROVISION FOR ENVIRONMENTAL MEASURES

For environment protection, management and pollution control and treatment and monitoring systems, appropriate budgetary provision would be made and provision for recurring expenditure for environment management of the project would be made.

6.6 MONITORING EQUIPMENT AND CONSUMABLES

A well-equipped laboratory with consumable items will be established for monitoring of important environmental parameter. Alternatively, monitoring can be outsourced from NABL / MoEF recognized laboratory. Details of equipments and in-house monitoring facilities is shown in table 6.3

TABLE 6.3
LIST OF LAB EQUIPMENTS

Sr. No.	Title
1.	Conductivity Meter
2.	Digital Balance
3.	pH Meter

6.7 ENVIRONMENTAL MANAGEMENT CELL

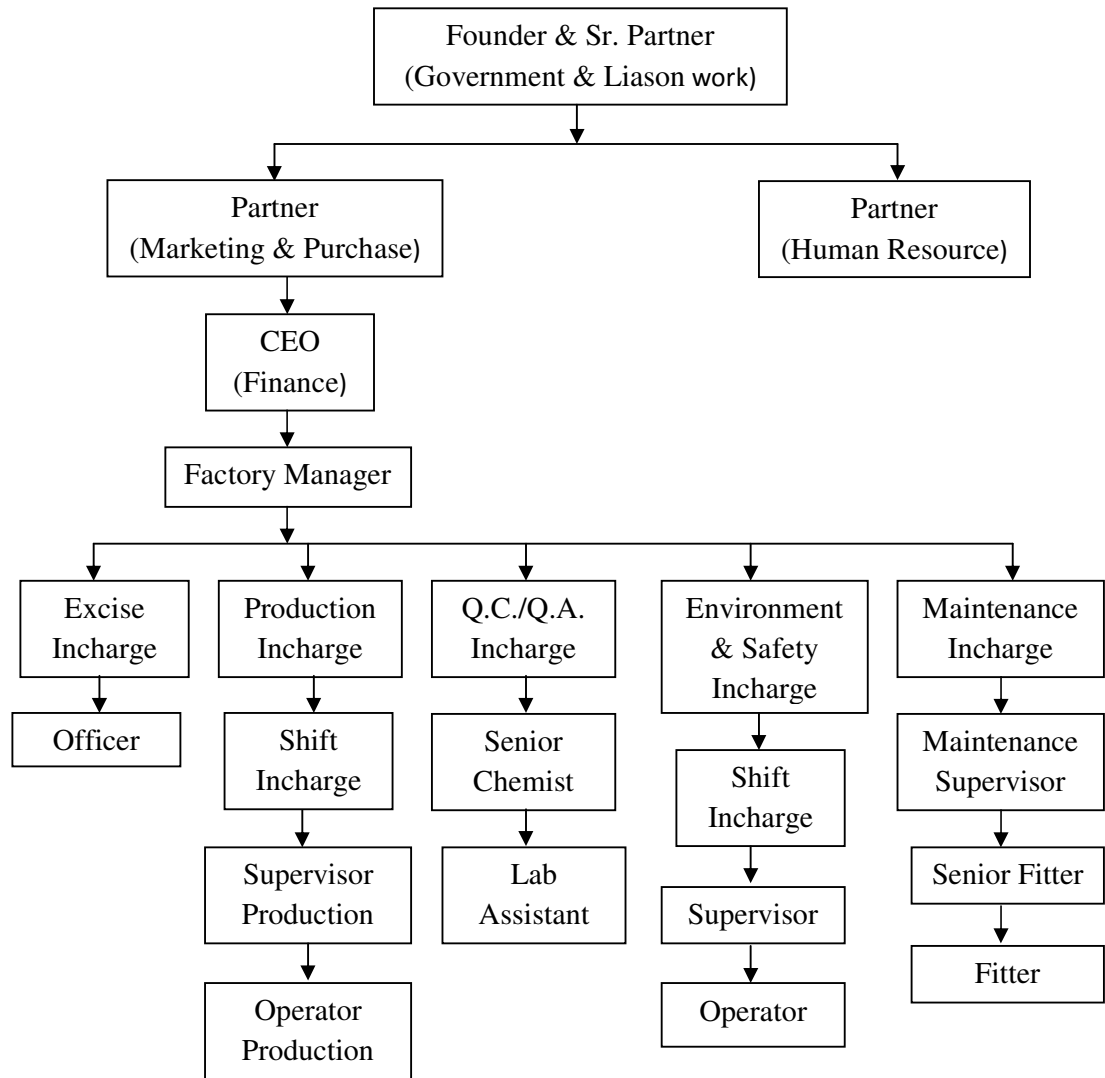
Company will ensure to conduct all business operations in compliance with applicable laws, regulations and standards related to occupational Health, Safety and Environment. An Environmental Management Cell with adequate professional expertise and resources shall be established to discharge responsibilities related to environmental management including statutory compliance, pollution prevention, environmental monitoring, etc. The EMC will be made responsible for all issues related to environmental management of the proposed project facilities.

There shall be EHS department for overseeing all environment and safety responses to ensure the implementation of EMP mentioned during construction and operation phase including findings / recommendations of third party audits and monitoring results as mentioned in the EMP.

At least one permanent employee with adequate educational and professional qualification and experience to discharge responsibilities related to environmental management including statutory compliance, pollution prevention, environmental monitoring will be employed by company and will directly report to the Director of the organization operations. Environment management cell is shown in below Figure 6.1.

FIGURE: 6.1

FLOW DIAGRAM OF ENVIRONMENT MANAGEMENT CELL

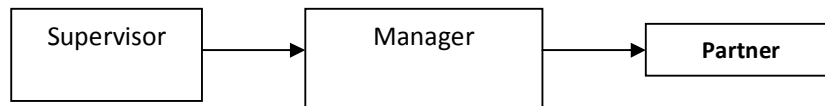


The unit has already developed system of reporting of non-compliances / violations of environmental norms to the Board of Directors of the company.

Whenever such situations come in, which could be detrimental to environmental in that case, shift in-charge will directly coordinate with plant Head & Manager (EHS). This will ultimately lead to the highest chain of command which has authority to take decisions. The unit has developed environment violation reporting system is shown in below Figure 8.2.

FIGURE: 6.2

FLOW DIAGRAM OF ENVIRONMENT VIOLATION REPORTING SYSTEM



The copy of Environment, Health and Safety Policy is attached as Annexure- VIII.

CHAPTER – 7

ADDITION STUDIES

ADDITIONAL STUDIES

In order to support the environment impact assessment and environment management plan, following additional studies have been included in this report.

- Risk Assessment
- Onsite and Offsite Disaster (natural and manmade) Preparedness and Emergency Management Plan
- Occupational Health Programme

7.1 SCOPE OF THIS STUDY:

The QRA study in this report has been conducted considering the Terms of References (TORs) given by Expert Appraisal Committee of MoEF for Environment Clearance (EC).

The study has been carried out with a view to comply the following TOR points:

The study has been carried out with a view to comply the following TOR points:

- **Part A. Std TOR NO.: 3.9:** Hazard identification and details of proposed safety systems.
- **Part A. Std TOR NO.: 7.6:** Measures for fugitive emission control.
- **Specific TOR No. 13:** Risk assessment for storage and handling of hazardous chemicals /solvents. Action plan for handling & safety system to be incorporated.
- **Specific TOR No. 14:** Arrangements for ensuring health and safety of workers engaged in handling of toxic materials.
- **Specific TOR No. 4:** Work zone monitoring arrangements for hazardous chemicals.
- **TOR No. 41. (Annexure 1):** Disaster Preparedness and Emergency Management Plan including Risk Assessment and damage control needs to be addressed and included.
- **Part A. Std TOR NO.: 8 Occupational Health:**
 1. Plan and fund allocation to ensure the occupational health & safety of all contract and casual workers.
 2. Details of exposure specific health status evaluation of worker. If the workers' health is being evaluated by pre designed format, chest X-rays, Audiometry, Spirometry, Vision testing (Far & Near vision, colour vision and any other ocular defect) ECG, during pre-placement and periodical examinations give the details of the

same. Details regarding last month analyzed data of above mentioned parameters as per age, sex; duration of exposure and department wise.

3. Details of existing Occupational & Safety Hazards. What are the exposure levels of above mentioned hazards and whether they are within Permissible Exposure level (PEL). If these are not within PEL, what measures the company has adopted to keep them within PEL so that health of the workers can be preserved.
4. Annual report of health status of workers with special reference to Occupational Health and Safety.

7.2 METHODOLOGY OF RISK ASSESSMENT

M/s. A-One Chemicals, Ankleshwar handles various chemicals, some of which are hazardous in nature by virtue of their intrinsic chemical properties or their operating temperatures or pressures or a combination of them. Fire, explosion, toxic release or combinations of them are the hazards associated with industrial plants using hazardous chemicals. More comprehensive, systematic and sophisticated methods of Safety Engineering, such as, Hazard Identification and Qualitative/Quantitative Risk Assessment have been developed to improve upon the integrity, reliability and safety of industrial plants, the same has been discussed in detail under their respective headings.

7.2.1 OBJECTIVES OF RISK ASSESSMENT

Risk analysis follows an extensive hazard analysis. It involves the identification and assessment of risks the neighboring populations are exposed to as a result of hazards present. This requires a thorough knowledge of failure probability, credible accident scenario, vulnerability of population etc. Much of this information is difficult to get or generate. Consequently, the risk analysis is often confined to maximum credible accident studies.

Risk assessment is carried out with the following objectives:

1. To identify hazard and risk resulting from the hazards
2. To study and foresee the effects of such risks on the workers, public, property and environment and to find out necessary control measures to prevent or minimize risk.
3. To comply the legal requirement by various safety and environment laws of the country like...
 - The Factories Act, 1948
 - The Gujarat Factories Act, 1963
 - The Environment Protection Act and Rules, 1986
 - Hazardous waste (Management & Handling) Rules, 1989

- Public Liability Insurance Act & Rules, 1991
- Chemical Accident, (Emergency, planning, preparedness and response) Rules, 1996

To get the necessary information for Emergency planning and evacuation.

7.2.2 DETAILS OF STORAGE FACILITIES

The storage facilities for **major hazardous chemicals** have been marked on the company layout given below:

EIA REPORT FOR EXPANSION OF M/S. A-ONE CHEMICALS, GIDC, ANKLESHWAR.

TABLE: 7.1

DETAILS OF HAZARDOUS RAW MATERIALS

Sr.	Name of Raw Material	Max. storage cap. at site	Mode of storage & Material of Construction	Storage Location	Hazards	Control Measures Provided
1	IBA/Xylene	20 MT	MS tank	14 no. (Tank Farm)	Spill, Fire & Toxic	• Well ventilated storage area is provided. • Dyke wall will be provided. • Eye wash station is made available near storage & handling area. • PPEs like Splash goggles, Full suit, Vapor respirator or self contained breathing apparatus, Boots, Gloves etc., are used while handling this chemical. • Refer point no. 7.5 for more details.
2	ONT	20 MT	MS tank	14 no. (Tank Farm)	Spill, Fire	

EIA REPORT FOR EXPANSION OF M/S. A-ONE CHEMICALS, GIDC, ANKLESHWAR.

TABLE 7.2

PROPERTIES OF HAZARDOUS CHEMICALS

Sr. no	Chemical	Physical State	FP °C	BP °C	SP. GR @ 20oC	Vap. Den. vs air	Vap. Pr. mm Hg @ 20oC	LE L %	UE L %	LD50 ORAL mg/kg	LD50 DERMA L mg/kg	LC50 mg/L	IDLH Value by ACGIH/NIO SH	STEL by OSHA (PPM)	TLV-TWA by OSHA (PPM)
1	Xylene (F)	Liq.	21-27	135-155	0.87	3.7	0.9 KPa	1	7.1	4300 (Rat)	12400	4550	-	655 mg/m ³ 15 minutes	435 mg/m ³ 8 hours
2	IsoButanol (F)	Liq.	Close d Cup: 28°C	108	0.806	2.56	1.2 KPA	1.2	10.9	2460 mg/kg [Rat.]	3400 mg/kg [Rabbit.]	-	-	-	-
3	ONT (O-Nitro toluene) (Toxic & slightly fl.)	Liq	95	222	1.16	4.73	0.16 mbar @ 20 °C	2.2	NA	890 mg/kg (Rat)	5000 mg/kg (Rat)	197 ppm (Rat) 4 h	200 ppm	10 ppm	TWA: 2 ppm

7.3 RISK ASSESSMENT

Identification of hazards in the proposed project activity is of primary significance. Hazard states the characteristics of system/plant/process that presents potential for an accident. All the components of a system/plant/process needs to be thoroughly examined to assess their potential for initiating or propagating an unplanned event/sequence of events, which can be termed as an accident.

HAZARDS IDENTIFICATION AND DETAILS OF PROPOSED SAFETY SYSTEMS

At **M/s. A-One Chemicals, Ankleshwar**, major risks have been identified for the following areas:

- Tank Farm Area (Storage Area) at no.: 14

As a conservative approach, we have analyzed the risk qualitatively and quantitatively both, as mentioned below.

In this study, the Storage & Handling of IBA, Xylene & ONTIBA, Xylene & ONT has been considered for Quantitative Risk Assessment (Consequence Analysis). Their storage location has been shown in Figure-7.1. Hazardous properties of these chemical have been summarized in Table 7.2.

And, Storage & Handling of Solid Chemicals and Acids have been considered for Qualitative Risk Assessment.

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7.3.1 QUALITATIVE RISK ASSESSMENT

Many a times Risk involved in various processes / process equipments cannot be addressed completely by Consequence Analysis. As a conservative approach, these risks have been considered separately under this topic. The approach is to identify hazards associated in operation of equipments as well as in processes, assessing its impacts, ranking the risk posed by it and finally to propose remedial actions/mitigation measures such that the risk is minimized to tolerable level.

The Risk Matrix presented below should be referred in evaluating this assessment.

In Qualitative Risk Assessment, risk has been analyzed using methodology called HIRA- Hazards Identification & Risk Assessment. In HIRA, major manual activities carried out by plant personnel as well as contract labors have been considered.

EIA FOR EXPANSION OF M/S. GANESH POLYCHEM LIMITED, GIDC, VAPI.

For the following areas, Qualitative Risk Assessment has been carried out to identify the risk, ranking them as per their severity & probability, identifying the existing mitigation measures and finally to propose recommendations, if existing measures are not enough.

1. Storage & Handling of Solid Chemicals

2. Storage & Handling of Acids

TABLE: 7.3

RISK MATRIX FOR QUALITATIVE RISK ASSESSMENT

Like hood/ Probability		Severity				
		Catastrophic (Death/ System Loss)	Major/ Critical (Serious injury/Illness)	Moderate (Less Serious Injury/Illness)	Minor/ Marginal (Minor Injury/Illness)	Insignificant/ Negligible (No injury /illness)
		1	2	3	4	5
Almost Certain	E	H	H	H	M	M
Likely	D	H	H	M	M	L
Possible	C	H	M	M	M	L
Unlikely	B	M	M	M	L	L
Impossible	A	M	M	L	L	L

TABLE: 7.4

RISK RANGE & ACCEPTABILITY CRITERIA

Risk Range	Risk Acceptability Criteria	Remarks
H	Unacceptable/ High	Management's Decision/Action Plan Required. Potential off-site Impact.
M	Medium	Generally Minor Impact. Acceptable with Management's Review. Specific monitoring or SOP to be followed.
L	Low	Acceptable without Review. Manage through Routine Procedure.

EIA FOR EXPANSION OF M/S. A ONE CHEMICALS, GIDC, ANKLESHWAR.

7.3.1.1 STORAGE AND HANDLING OF SOLID CHEMICALS

TABLE: 7.5

RISKS AND RECOMMENDATIONS

Sr. No.	Process Or Activity	Associated Hazards	Health & Safety Impact (Risk)	Initial Risk			Existing Measures	Residual Risk			Additional Recommendations
				Severity	Likelihood	Risk		Severity	Likelihood	Risk	
1.	Handling Chemical bags	• Chemical dust Exposure	• Skin/Eye irritation.	4	C	M	• Chemicals are stored in isolated storage rooms having provision for natural & forced ventilation. • Certified Dust respirator is used. • Suitable protective clothing, gloves, respirator and other PPEs are used.	4	B	L	1. Operators/Workers to be trained for Safe Work Practices. 2. Chemical handling bags to be labeled and segregated properly.
2.	Cleaning of Chemical Spillage.	• Fumes Inhalation. • Dust Exposure.	• Severe irritation to eyes, skin. • Inhalation.	2	C	M	• Certified Dust respirator is used. • Suitable protective clothing, gloves, boots, etc. are used.	4	B	L	3. Same as above.

EIA FOR EXPANSION OF M/S. A ONE CHEMICALS, GIDC, ANKLESHWAR.

Sr. No.	Process Or Activity	Associated Hazards	Health & Safety Impact (Risk)	Initial Risk			Existing Measures	Residual Risk			Additional Recommendations
				Severity	Likelihood	Risk		Severity	Likelihood	Risk	
							• Spillage is cleaned or neutralized with suitable media. • Cleaning activities are carried out under Strict vigilance. • Provision for natural & forced ventilation is available.				

EIA FOR EXPANSION OF M/S. A ONE CHEMICALS, GIDC, ANKLESHWAR.

7.3.1.2 STORAGE AND HANDLING OF ACIDS (H₂SO₄, Spent Acid, etc)

TABLE: 7.6

RISKS AND RECOMMENDATIONS

Sr. No.	Process Or Activity	Associated Hazards	Health & Safety Impact (Risk)	Initial Risk			Existing Measures	Residual Risk			Additional Recommendations
				Severity	Likelihood	Risk		Severity	Likelihood	Risk	
1.	Acids Loading & Unloading.	- Exposure to acidic fumes due to leakage in pipe/container/valves etc. - Spillage of acids.	- Skin/Eye irritation. - Toxic Vapor inhalation etc.	4	C	M	- Dyke Wall is available. - Loading & Unloading activity is carried out in well ventilated area. - Periodic Inspection of flanges/ferrule joints is carried out. - Neutralization media is made available in areas where acids are stored/handled/used. - PPEs are used.	5	B	L	4. Operators/Workers to be trained for Safe Work Practices. 5. Allied facilities to be inspected on periodic basis. 6. Health check up of the concerned personnel to be carried as per the plan.
2.	Working in Storage Area.	Exposure to acid fumes.	- Severe irritation to eyes, skin. - Body	4	C	M	- Storage area is well ventilated. - Acid proof flooring is available. - Neutralization is done immediately with soda	5	B	L	7. Refer pt. no.: 1 of this section.

EIA FOR EXPANSION OF M/S. A ONE CHEMICALS, GIDC, ANKLESHWAR.

			burns.				ash/lime or spill is absorbed in a sand or by suitable adsorbent. • PPEs like face mask, gloves etc. are worn by concerned person.				
3.	Tank overflow/leakage from joints etc.	• Exposure to Acid fumes.	• Severe irritation to eyes, skin.	3	C	M	• Level Indicator is provided. • Other relevant measures are same as above.	4	B	L	8. Proper entry & exit to be provided for ONT/Xylene storage area. 9. Proper means of communication to be made available for ONT/Xylene area. 10. LDR program to be implemented for ONT/Xylene area (on terrace). 11. Pump curb wall to be cleaned at regular interval.

7.3.2 QUANTITATIVE RISK ASSESSMENT

Quantitative Risk Assessment (QRA) is a structured approach to identifying and understanding the risks associated with Storage and Handling of flammable/toxic chemicals. The assessment starts by taking into account an inventory of hazardous chemicals stored, likelihood of leakage/spillage associated with it and selecting the worst case scenario for consequence estimation.

Finally, suggesting the measures to minimize or mitigate risks to meet appropriate acceptability criteria. The planning for emergency evacuation shall be borne in mind whilst interpreting the results.

7.3.2.1 CONSEQUENCE ANALYSIS

In a plant handling hazardous chemicals, the main hazard arises due to storage and handling of hazardous chemicals as mentioned above. If these chemicals are released into the atmosphere, it may cause damage due to resulting fires or vapour clouds. Blast Overpressures depend upon the reactivity class of material between two explosive limits.

7.3.2.2 DAMAGE CRITERIA

In Consequence Analysis studies, in principle three types of exposure to hazardous effects are distinguished:

1. Heat radiation, from a jet, pool fire, a flash fire or a BLEVE.
2. Explosion
3. Toxic effects, from toxic materials or toxic combustion products.

In the next three paragraphs, the chosen damage criteria are given and explained as per the Guidelines for QRA – Phast (Micro) Software (DNV) & Purple Book for QRA released by Centre for Chemical Process Safety (CCPS).

Heat Radiation

The consequence caused by exposure to heat radiation is a function of:

- The radiation energy onto the human body [kW/m^2];
- The exposure duration [sec];
- The protection of the skin tissue (clothed or naked body).

In this report following damage criteria has been considered for the effects due to fire.

TABLE: 7.7

EFFECTS DUE TO INCIDENT RADIATION INTENSITY

INCIDENT RADIATION – kW/m²	TYPE OF DAMAGE
37.5	Immediate ignition of wood (without flame Contact). 100 % fatal.
25	Minimum Energy required for igniting wood (Without flame contact). 100 % fatal in 1 min. Significant injury in 10 sec.
12.5	Minimum heat required to ignite wood (With flame contact). 1 % fatal in 1 min. First degree burn in 10 sec.
4	Pain after 20 sec. Blistering unlikely.
2	No discomfort for long exposure.

Explosion

In case of vapour cloud explosion, two physical effects may occur:

- * a flash fire over the whole length of the explosive gas cloud;
- * a blast wave, with typical peak overpressures circular around ignition source.

As explained above, 100% lethality is assumed for all people who are present within the cloud proper.

The following damage criteria may be distinguished with respect to the peak overpressures resulting from a blast wave:

TABLE: 7.8

Damage Due To Overpressures

Peak Overpressure	Damage Type
0.40 bar	Ear Drum Rupture to humans 50 % probability of fatality inside 15% probability of fatality in open
0.21 bar	Structural Damage to buildings

	20% probability of fatality to personnel inside 0% probability of fatality in the open
0.13 bar	Minor Structural Damage to near by structures 10% probability of fatality to personnel inside 0% probability of fatality in the open
0.02 bar	Glass Damage
0.01 bar	Minor Damage

Intoxication

In this report, LC₅₀ concentration and IDLH concentrations have been considered for Consequence Analysis.

7.3.2.3 ASSUMPTIONS FOR CONSEQUENCE ANALYSIS

For Consequence Analysis, assumptions regarding Meteorological, Pasquill Stability Classes, Wind velocity, Ambient Temperature, Relative Humidity, Inventory, Ground Roughness, Model used etc. are very important. In this report, the following assumptions have been considered.

i. Meteorological Paste other tables

- Atmospheric Conditions: No Inversion
- Ambient Temperature: 35⁰C has been considered.
- Relative Humidity: As the site is not in rainy zone RH of 50% has been considered.

ii. Pasquill Stability Classes

- Pasquill Stability category D/F is considered as conservative approach.

iii. Other assumptions:

- Ground Roughness: Ground Roughness has been considered as 0.3 M.
- Dispersion model of both Heavy Model and also Gaussian distribution have been used as applicable/appropriate.
- Inventory: Release of 100% of the inventory has been considered. For this, failure of the container has been considered from the bottom.
- Storage conditions: Storage conditions have been considered as they are practically stored at site.

Following Weather data has been used for the study:

TABLE :7.9

WEATHER DATA USED FOR THE STUDY

WIND SPEED (M/S)	PASQUILLSTABILITY
1.5	F
1.5	D
5	D

7.3.2.4 SOFTWARE USED FOR CALCULATIONS

1. PHAST MICRO

7.3.2.5 SCENARIOS CONSIDERED FOR CONSEQUENCE ANALYSIS

1. In this study, the scenarios for consequence analysis have been selected considering:

- The physical and chemical properties of hazardous materials.
- Storage conditions & Modes of Storage (Barrels & Carboys).
- Hazards ranking by NFPA.
- Guidelines by OSHA (29 CFR).
- Operating and Storage Conditions for handling and storage of hazardous chemical.

2. This report considers the worst case scenario which is possible during any set of operation variable and production methodologies. The objective of the study is emergency planning, hence only holistic & conservative assumptions are used for obvious reasons. Hence though the outcomes may look pessimistic, the planning for emergency concept should be borne in mind whilst interpreting the results.

In this regard, **the failure cases which may lead to release of hazardous chemicals are as under, put of which the worst case relevant scenario shall be considered::**

- Failure of unloading arm of the ISO tanker during unloading of solvents.
- Leakage from Flange joints.

3. The results of consequence analysis shall be used for;

- a. Emergency Planning
- b. Deciding Evacuation Routes
- c. Deciding Location of Assembly Points and ECC

d. Resource Allocation for mitigation

TABLE: 7.10

SCENARIOS IDENTIFIED FOR CONSEQUENCE ANALYSIS

Scenarios	Description of Scenario	Storage Pressure & Temp.	Scenarios considered
FLAMMABLE CHEMICAL RELEASE SCENARIOS			
1.	Release of Xylene	Ambient	Flash Fire, Overpressure (UVCE), Late Pool Fire.
2.	Release of IBA	Ambient	Flash Fire, Overpressure (UVCE), Late Pool Fire.
TOXIC GAS RELEASE SCENARIOS			
3.	Release of ONT	Ambient	Dispersion, Flash Fire, Late Pool Fire

Considerations Made:

- In **Case of Xylene, IBA & ONT** we have considered the failure case of unloading line (50 mm pipe dia.) during the unloading of this chemical from tanker till the complete inventory is emptied out from one compartment. As the solvents tankers are compartmentalized, the maximum release quantity equals the storage quantity (5 m³) of a single compartment.
- In **Case of Dispersion for ONT**, we have considered the following scenarios:
 - ✓ Leak from 50 mm hole size for 10 min for LC₅₀ (197 ppm) concentration.
 - ✓ Leak from 50 mm hole size for 10 min for IDLH (200 ppm) concentration

Note: Release of above chemicals from process equipments like Reactor is not possible as these chemicals will be in diluted/intermediate form in all process equipments and not in pure form.

Selection Criteria of Scenarios:

- As per the relevant guidelines for consequence analysis, we have considered the **maximum credible scenarios** for all the above mentioned chemicals, for a period of 600 seconds leakage duration, which is the representative of all kinds of minor/major leakages.
- Modeling has been carried out for dispersion up to LC₅₀ concentration and IDLH concentration, in case of toxic chemical. Evacuation should be carried out in less than 30 min from the area covered under IDLH in case of relevant leakage scenario. The

purpose is to avoid irreversible health effects to persons inside the area of IDLH concentration.

- Based on the above considerations and the input parameters considered for worst case scenarios, the risk contours are plotted on the plant layout map clearly showing which of the facilities would be affected in case of an accident taking place. Based on the same the safety measures/recommendations are proposed and On-Site & off-Site emergency plan is prepared as mentioned under the section 7.7.

TABLE: 7.11

SCENARIO#1 – RELEASE OF XYLENE (FULL BORE RUPTURE OF UNLOADING PIPELINE 2’')

Basis: Release/Leakage of Xylene due to failure of :					
• Full Bore Rupture of Unloading Pipeline (2’')					
Input Data:					
Stored quantity in one compartment			5 m ³		
Leak Size Considered			2’’		
Release rate			4280.77 gms/sec		
Leak Duration Considered			600 Sec		
Pressure			Ambient		
Temperature			35 deg C		
Weather Condition			1.5/F, 1.5/D, 5/D		
LFL			11000 ppm		
UFL			70000 ppm		
CASE:1 FLASH FIRE					
			Distance (m)		
			Category 1.5/F	Category 1.5/D	Category 5/D
Furthest Extent	5500	ppm	5.91718	6.35565	2.24592
Furthest Extent	11000	ppm	2.16082	1.88812	1.83384
CASE:2 VAPOR CLOUD EXPLOSION (UVCE – Overpressure Results)					
NOT REACHED					
CASE:3 POOL FIRE (Late Pool Fire - Effects of Radiation Level)					
			Distance (m)		
			Category 1.5/F	Category 1.5/D	Category 5/D
RadiationLevel	4	kW/m2	15.5269	15.5302	17.2067
RadiationLevel	12.5	kW/m2	8.21203	8.21528	10.7526
RadiationLevel	25	kW/m2	4.91999	4.92325	5.20969
RadiationLevel	37.5	kW/m2	4.91999	4.92325	5.01989

FIGURE: 7.2

RISK CONTOURS FOR FLASH FIRE

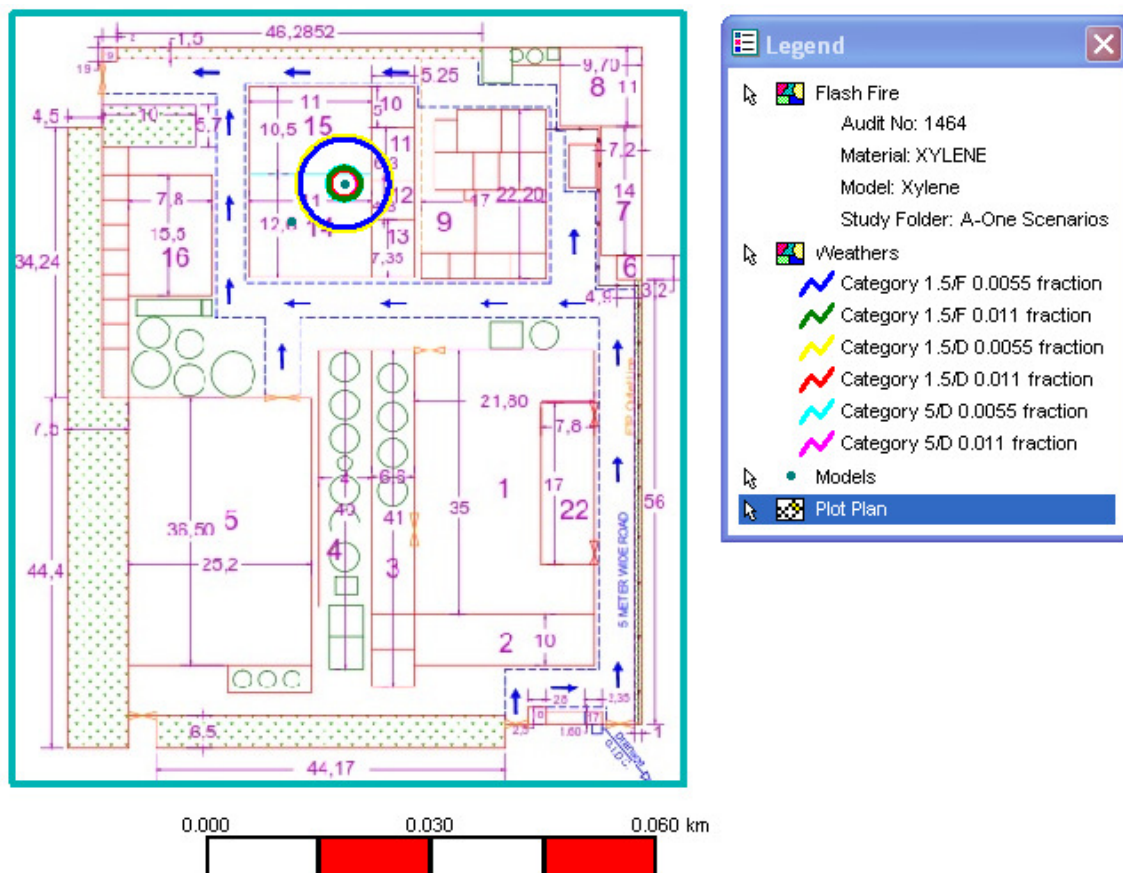


FIGURE: 7.3

RISK CONTOURS FOR UVCE (OVERPRESSURE RESULTS):

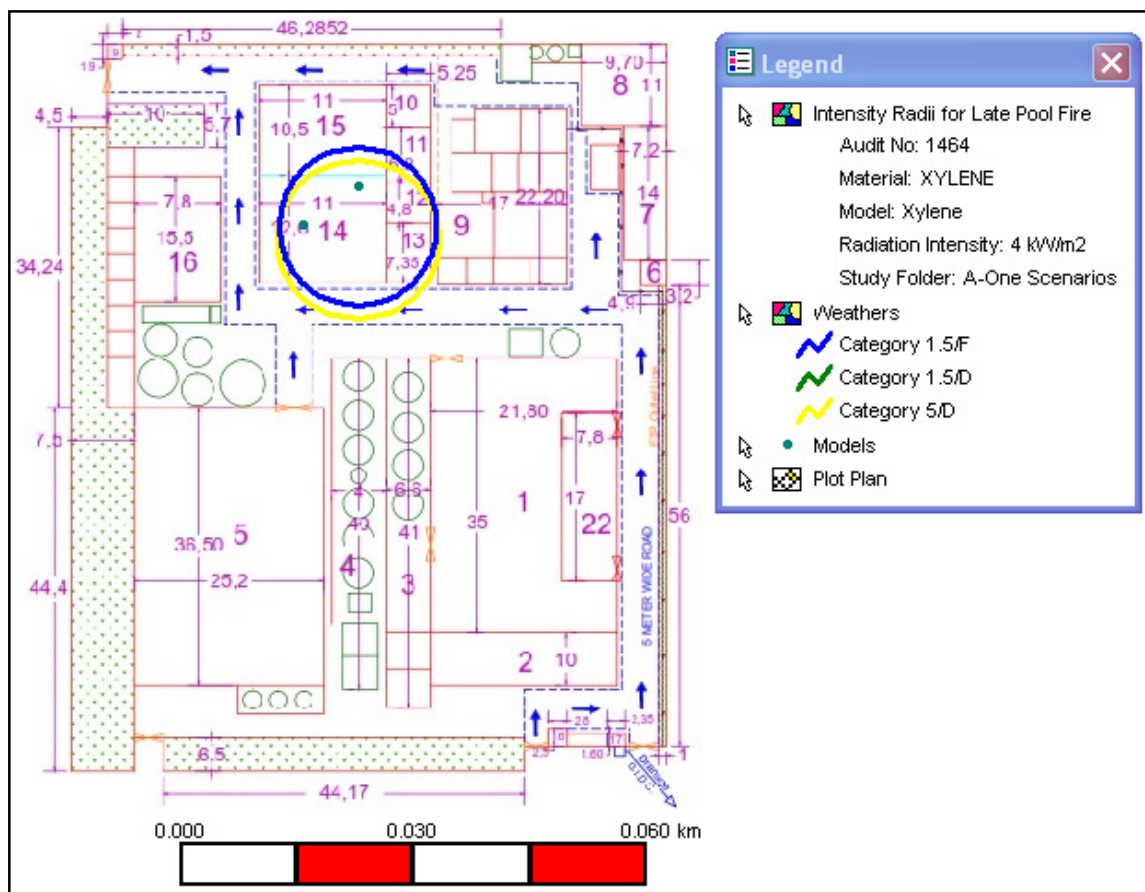


TABLE: 7.12**SCENARIO#2 – RELEASE OF IBA**

Basis: Release/Leakage of IBA due to failure of :					
• Full Bore Rupture of Unloading Pipeline (2’')					
Input Data:					
Stored quantity in one compartment			5 m ³		
Leak Size Considered			2’’		
Release rate			3925.43 gms/sec		
Leak Duration Considered			600 Sec		
Pressure			Ambient		
Temperature			35 deg C		
Weather Condition			1.5/F, 1.5/D, 5/D		
LFL			17000 ppm		
UFL			109000 ppm		
CASE:1 FLASH FIRE					
Distance (m)					
			Category 1.5/F	Category 1.5/D	Category 5/D
Furthest Extent	8500	ppm	5.18482	5.31192	1.95875
Furthest Extent	17000	ppm	1.92216	1.78476	1.83798
CASE:2 VAPOR CLOUD EXPLOSION (UVCE – Overpressure Results)					
NOT REACHED					
CASE:3 POOL FIRE (Late Pool Fire - Effects of Radiation Level)					
Distance (m)					
			Category 1.5/F	Category 1.5/D	Category 5/D
RadiationLevel	4	kW/m2	17.3082	17.3118	17.8653
RadiationLevel	12.5	kW/m2	11.3782	11.3818	12.5299
RadiationLevel	25	kW/m2	8.23684	8.2404	10.2122
RadiationLevel	37.5	kW/m2	5.98348	5.98704	7.264

FIGURE: 7.4

RISK CONTOURS FOR FLASH FIRE

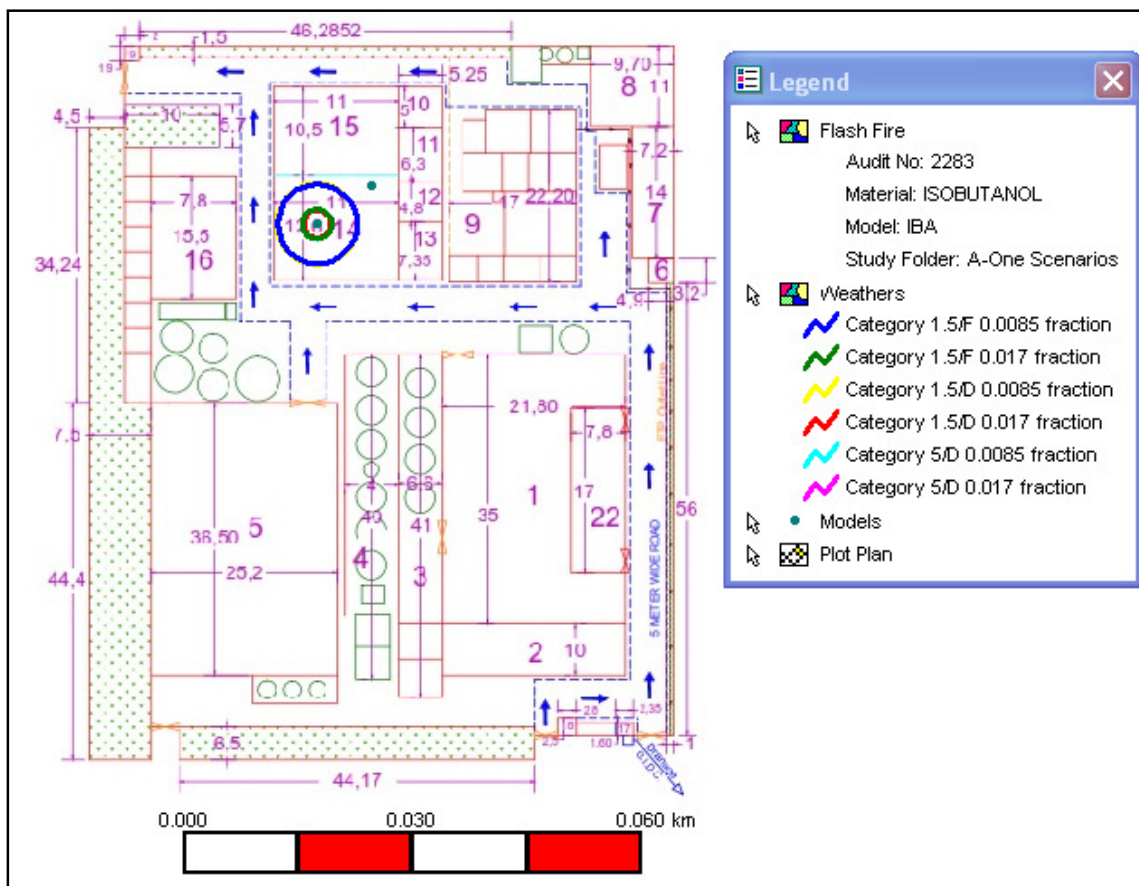


FIGURE: 7.5

RISK CONTOURS FOR LATE POOL FIRE

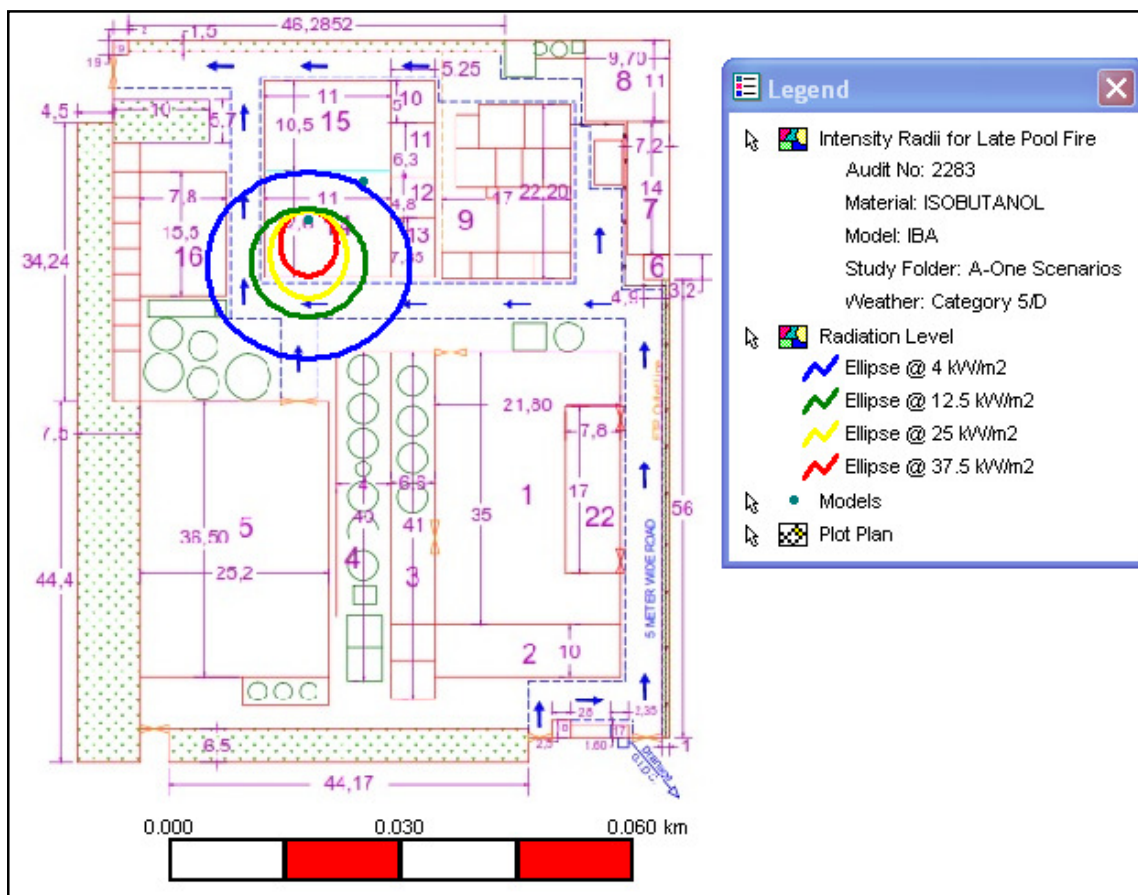


TABLE: 7.13

SCENARIO#3 – RELEASE OF ONT (FULL BORE RUPTURE OF UNLOADING HOSE 2’')

Basis: Possible Release/Leakage due to failure of Unloading Arm of Tanker.					
Input Data					
Stored quantity in one compartment of tanker			5 m ³		
Leak Duration Considered			600 secs		
Leak Size considered			50 mm		
Release Rate			6103.5 gms/sec		
Pressure			Ambient		
Temperature			Ambient		
Weather Condition			1.5/F, 1.5/D, 5/D		
LFL			22000 ppm		
UFL			76000 ppm		
CASE:1 FLASH FIRE					
			Distance (m)		
			Category 1.5/F	Category 1.5/D	Category 5/D
Furthest Extent	11000	ppm	1.85155	1.80786	1.88078
Furthest Extent	22000	ppm	1.85014	1.80708	1.87853
CASE:2 VAPOUR CLOUD EXPLOSION (OVERPRESSURE RESULTS)					
Not Reached					
CASE:3 LATE POOL FIRE (EFFECTS OF RADIATION LEVEL)					
			Distance (m)		
			Category 1.5/F	Category 1.5/D	Category 5/D
Radiation Level	4	kW/m2	17.0399	16.9956	17.4228
Radiation Level	12.5	kW/m2	11.2869	11.2426	12.2879
Radiation Level	25	kW/m2	8.28706	8.24277	10.0536
Radiation Level	37.5	kW/m2	6.12792	6.08362	7.31668

Dispersion Distances:

Since IDLH & LC₅₀ Concentrations are almost in the same range, the contours & readings are also same.

TABLE: 7.14

DISPERSION DEAIL

Sr. No.	Concentration	Downwind Distance (meters)		
		Category 1.5/F	Category 1.5/D	Category 5/D
1	IDLH (200 ppm)	4.32	3.17	1.76
2	LC ₅₀ (197 ppm)	5.00	3.97	2.71

FIGURE: 7.6

RISK CONTOURS FOR DISPERSION OF ONT (IDLH CONCENTRATION):

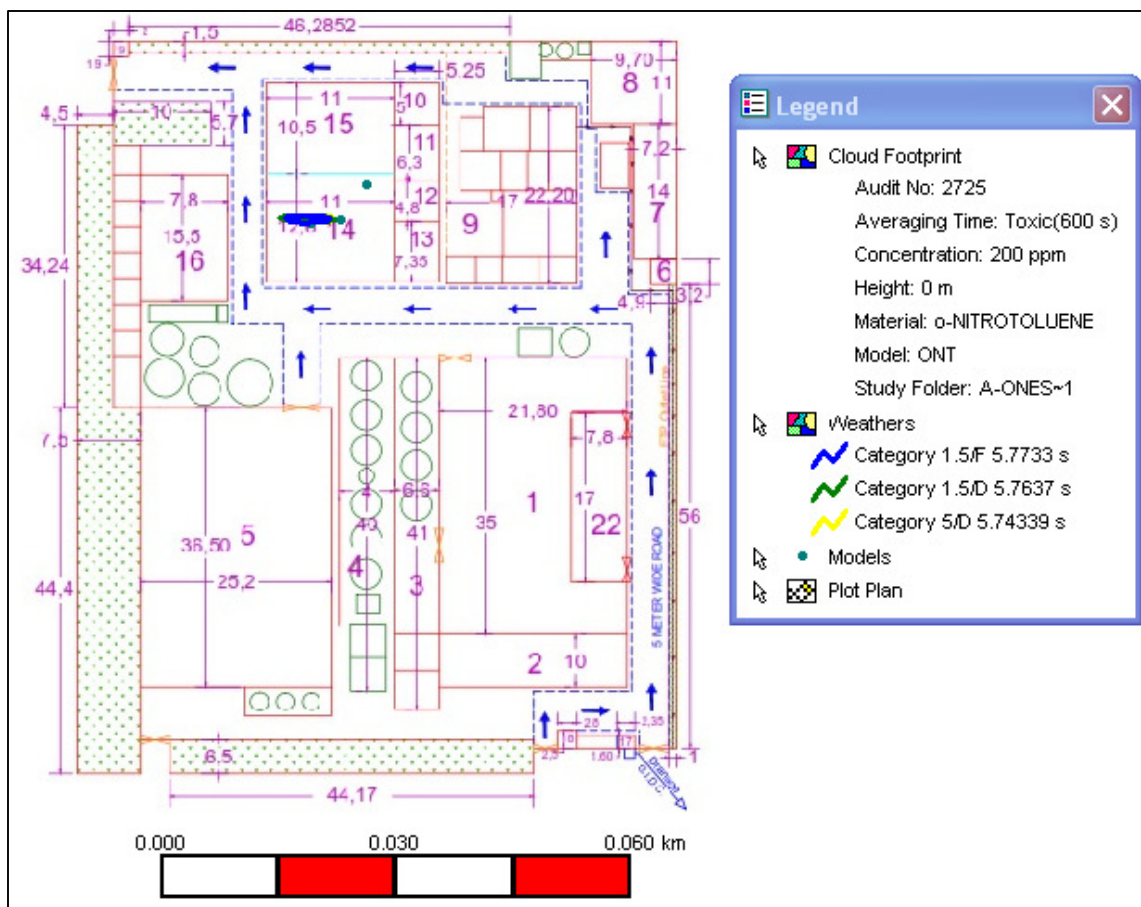


FIGURE: 7.8

RISK CONTOURS FOR DISPERSION OF FLASH FIRE:

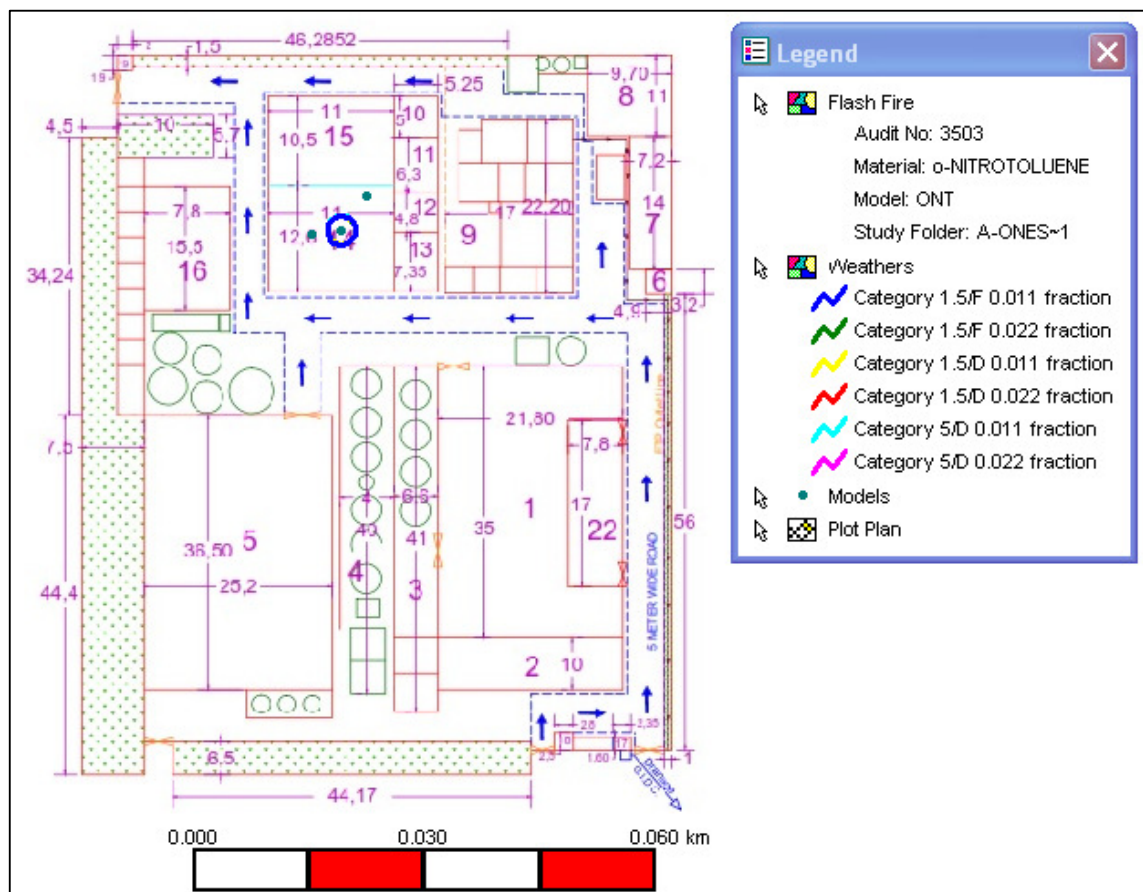
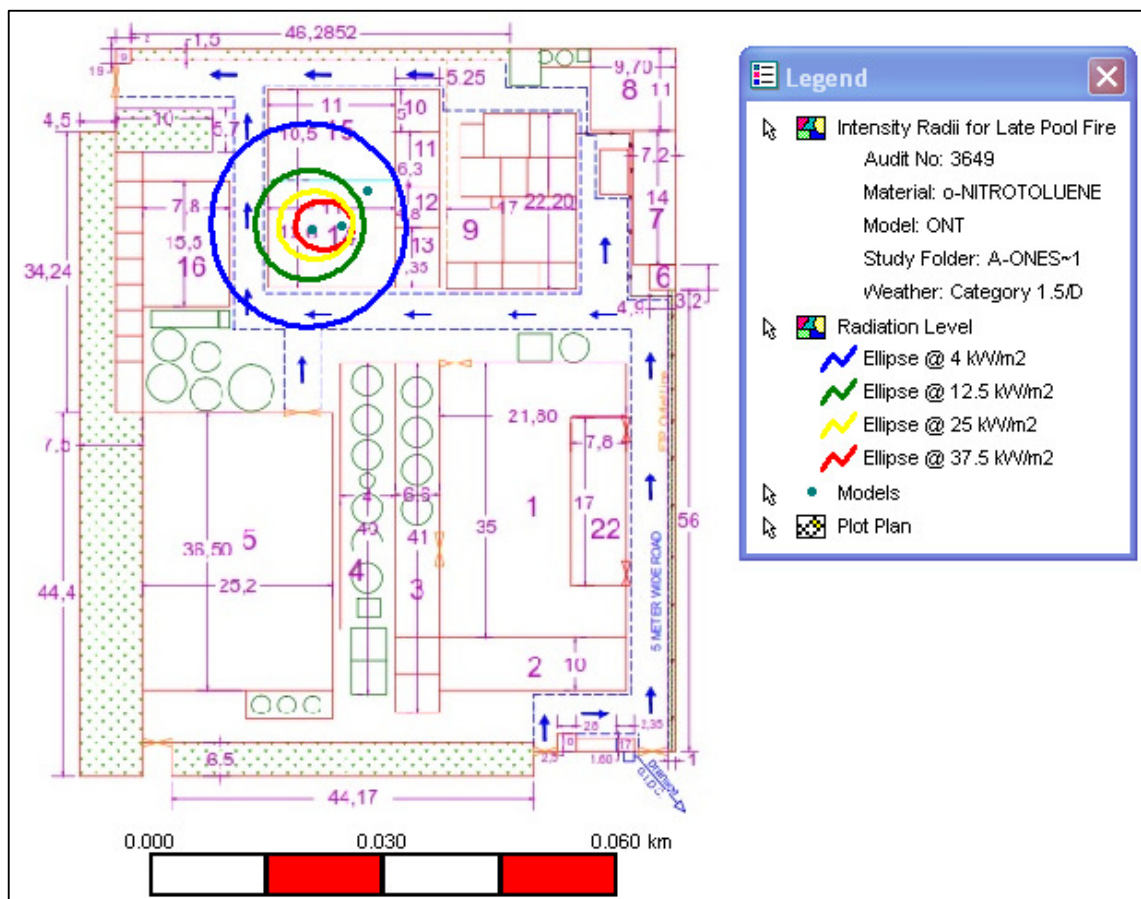


FIGURE: 7.9

RISK CONTOURS FOR DISPERSION OF LATE POOL FIRE:



7.3.2.6 CONSEQUENCE ANALYSIS SUMMARY**TABLE: 7.15****FLASH FIRE SCENARIOS**

SR. No.	Scenario	Concentration (ppm)	Distance (meters)		
			Category 1.5/F	Category 1.5/D	Category 5/D
1	Release of Xylene	LFL Frac.5500	5.91	7.35	2.24
		LFL. 11000	2.16	1.88	1.83
2	Release of IBA	LFL Frac.8500	5.18	5.31	1.95
		LFL. 17000	1.92	1.78	1.83
3	Release of ONT	LFL	1.85	1.80	1.88
		LFL. 22000	1.85	1.80	1.87

TABLE: 7.16**LATE POOL FIRE SCENARIOS:**

SR. No.	Scenario	Radiation Level (KW/m ²)	Downwind Distance (meters)		
			Category 1.5/F	Category 1.5/D	Category 5/D
1	Release of Xylene	4	15.52	15.53	17.20
		12.5	8.21	8.21	10.75
		25	4.91	4.92	5.20
		37.5	4.91	4.92	5.01
2	Release of IBA	4	17.3	17.31	17.86
		12.5	11.37	11.38	12.52
		25	8.23	8.24	10.21
		37.5	5.98	5.98	7.26
3	Release of ONT	4	17.03	17.99	17.42
		12.5	11.28	11.24	12.28
		25	8.28	8.24	10.05
		37.5	7.12	7.08	7.31

TABLE: 7.17

TOXIC RELEASE SCENARIOS

Sr. No.	Concentration	Downwind Distance (meters)		
		Category 1.5/F	Category 1.5/D	Category 5/D
1	IDLH (200 ppm)	4.32	3.17	1.76
2	LC ₅₀ (197 ppm)	5.00	3.97	2.71

Since IDLH & LC50 Concentrations are almost in the same range, the contours & readings are also same.

7.4 CONSEQUENCE ANALYSIS

7.4.1 COMMENTS / RECOMMENDATIONS BASED ON CONSEQUENCE ANALYSIS

Flash Fire and UVCE Scenarios:

- In case of release of Xylene & IBA in 1.5/F & D weather condition, vapor travels to the farthest distance of 7.35 mtr (at the max.).
- It is observed that in all the cases, the overall distance covered by the flash fire is very less comparatively, so as to create UVCE (Unconfined vapor cloud explosion).
- Thus, Vapor Cloud Explosion (UVCE) is not reached for any of the considered chemical scenarios and hence no damage is observed due to impact of overpressure waves.
- Weather condition 5/D is safer as compared to all other weather conditions.

Late Pool Fire Scenarios:

- It can be seen from the summarized table above that the risk of late pool fire is more in case of release of ONT & IBA for 4 kw/m² radiation level in 5/D weather condition.

Toxic Release Scenarios:

- In case of toxic release scenario for ONT, since IDLH & LC50 Concentrations are almost in the same range, the contours & readings are also same.
- Dispersion covers more distance (5 m) in case of 1.5/F weather condition.
- Evacuation plan to be designed considering the above mentioned worst case scenario of Late Pool Fire.
- Thus, the category 5/D is the limiting one to decide for evacuation plan.

7.5 ACTION PLAN FOR SAFE HANDLING OF CHEMICALS & SAFETY SYSTEMS/ SAFEGUARDS TO REDUCE THE RISK OF FIRE, EXPLOSION AND TOXIC RELEASE:

1. Following Safety Precautions Are Considered During Transportation, Unloading, Handling & Storage Of Solvents (like flammable chemicals - Methanol, MCB & Toxic Chemicals, etc) , the same shall be updated to cover the new facilities, if required:

TABLE: 7.18

SAFETY PRECAUTIONS

Sr. No.	Activity	Safety Precautions
1.	Transportation of Solvents/chemicals by road tanker.	• Training is given to driver and cleaner regarding the safe driving, hazards of chemicals, emergency handling, use of SCBA sets. • TREM card is kept with TL. • SCBA set is kept with TL. • Fire extinguishers are kept with TL. • Flame arrestor is provided to TL exhaust. • Instructions are given not to stop road tanker/truck in populated area. • Hazard Identification symbol and emergency telephone number are displayed as per HAZCHEM CODE. • Appropriate PPEs are kept with TL.

Sr. No.	Activity	Safety Precautions
		In case of leak or spill: • Source of leakage are checked. • Damaged containers or spilled materials are not attended without wearing appropriate protective clothing. • Leak is stopped, if possible to do so without risk. • Water spray is used to reduce vapors (but do not put water directly on leak, spill area or inside container). • Combustibles (wood, paper, oil, etc.) are kept away from spilled material.
2.	Unloading Activity	• Priority is given to Tanker to immediately enter the storage premises at site and is not kept waiting near the gate or the main road. • Security person checks License, TREM CARD, Fire extinguisher condition; SCBA set condition, Antidote Kit, required PPEs as per SOP & checklist laid down. Following precautions are taken during unloading: • Wheel stopper is provided to TL at unloading platform. • Static Earthing is provided to road tanker. • Tanker unloading procedure is followed according to check list and implemented strictly. • Flexible SS hose connection is done at TL outlet line. • All TL valves are closed in TL. • Only day time unloading is permitted.
3.	Solvents Storage tank safety.	• Pipes and equipment are inspected at regular intervals. • All storage areas are isolated from all sources of open flame and well posted with 'NO SMOKING' signs and provided with adequate fire fighting/extinguishing systems. • Spark-resistant tools are used. • Water spray is used to reduce vapors (but do not put water directly on leak, spill area or inside container). • Combustibles (wood, paper, oil, etc.) are kept away from spilled material. • Dyke wall is provided to storage tanks. • Level indicators/transmitters are available with low level/high level auto cut-off provision.

Sr. No.	Activity	Safety Precautions
		• Vents are connected to water trap and vent of water trap are provided with flame arrestor. • Fire fighting facilities are available as mentioned below. • Sand Buckets are available. • Dumping /Drain vessel/alternate vessel is available to collect the spillage material inside the dyke wall. • FLP type pumps are provided. • Double static earthing is provided to storage tank, as per the requirement. • Double Jumper clip is provided to all solvent handling pipeline flanges. • Vent connected to scrubber has been provided, wherever required. • Curb wall is available for pumps. • Pumps are guarded properly.
4.	Solvents transfer from storage tank to process plant.	• Magnetic driven seal less, gland less FLP type pump are provided. • Double on / off switch is provided at tank farm and process area near day tank. Pump auto cut off with day tank high level is provided. • Flame arrestor with breather valve is provided on vent line. • Lightning arrestor is provided on the top of tallest tank. • Over flow system is provided for additional safety and it is connected to main storage tank. • NRV's are provided on pump discharge line. • Double Jumper clip is provided to all solvent handling pipelines. • Double static earthing is provided to day tank.

2. MEASURES FOR FUGITIVE EMISSION CONTROL**Control Techniques for Fugitive Emissions are in the following order:**

- (1) First preference: Engineering Controls
- (2) Second preference: Administrative / Management Controls
- (3) Last resort: Personal Protective Equipment (PPE).

Fugitive Emissions occurs or may occur during

- (1) Charging of Raw Materials.
- (2) Leakage from Flanges, joints etc
- (3) Tanker loading & unloading

Mitigation Measures

- Regular monitoring of plant area is conducted and records are maintained. At strategic point of the plants, online detectors are provided for detection of such emissions.
- Lines of such hazardous chemicals are tested periodically and such tests are recorded.
- All lines carrying toxic liquid are continuous welded and are provided with proper slopes and special tongue and groove joints to avoid liquid stagnation and leakage.
- In the process area, all the strategic pumps are of submerged type so as to eliminate leakages from glands.
- Safe Operating Procedures and EMERGENCY RESPONSE PROCEDURES are followed strictly.
- Concerned personnel are trained about the safe working practices.
- Dyke wall is provided to storage tanks.
- Level transmitter is also available with low level/high level auto cut-off provision.
- Adequate and relevant PPEs are available.

3. FIRE CONTROL PLAN

M/s. A-One Chemicals , Ankleshwar has considered fire prevention measures at the project planning stage to avoid any outbreak of fire. But the chances of outbreak of fire cannot be totally ignored. Hence to tackle such a situation, company has planned to develop a well-resourced and adequate fire protection system/fire fighting network. The same facilities shall be updated to cover the expansion facilities also, if required.

Water Reservoir Capacity: 20 KL

Fire Pump capacity: 10 Hp

Foam Type Fire Extinguishers : 15 Nos. of 10 kgs.

CO₂ Extinguishers: 15 Nos. of 25 kgs.

DCP Fire Extinguishers: 15 Nos. of 25 kgs.

Sand Bucket stands : Approx. 15-20 Nos.

Other details on Fire Control Plan:

- Fire load calculation has been carried out and fire fighting facilities comprising of main pump, stand by pump, jockey pump and fire water reservoir has been installed as per the GFR and TAC guidelines, the same shall be updated after the expansion of new facilities, if required.
- Fire Extinguishers has been provided as per the GFR and TAC guidelines at conspicuous locations.
- Other Fire fighting facilities like, fire monitor, foam trolley, fire hose boxes with hose pipe, sand buckets, fire blanket, ambu bags, Water Jell Fire Blanket, etc. have been provided within the company at conspicuous locations.
- Working staff is given training to operate DCP and CO₂ extinguishers.
- The Fire Hydrant Network has been installed, capacity of the same shall be updated after the expansion of new facilities, if required.
- Emergency Action Team members are working round the clock in all shifts.
- First aiders are available round the clock in all shifts of all plants / sections.
- Rescue kits with SCBA sets are available at site to treat with any kind of chemical emergencies.
- Volume level indication with alarm and trips for high level are provided for vessels containing flammable materials.
- DG Set is available for power backup.

4. RECOMMENDATIONS TO MITIGATE REACTION HAZARDS

- A comprehensive HAZOP Study for all the stages of Batch process to be conducted and SOPs to be made considering this findings and recommendations of HAZOP Study.
- Only trained persons to be engaged in reaction processes like charging of raw material, loading & unloading of chemicals and operation of reactor, etc.
- Adequate open space to be kept around the periphery of reactor for the ease of operation.
- Adequate fire fighting facilities to be installed.
- All the electrical fittings in the factory to be made of flame proof type.

7.6 DISASTER PREPAREDNESS & EMERGENCY MANAGEMENT PLAN

M/s. **A-One Chemicals, Ankleshwar** has prepared the Disaster Management Plan which is linked with District Disaster Management Plan. This plan has been prepared based on the risk contours plotted on the plant layout map clearly showing the facilities that would be affected, in case an accident takes place.

The purpose of this plan is to provide **M/s. A-One Chemicals, Ankleshwar** with the means to effectively utilize all the resources at its disposal for the protection of life, environment and property. The same DMP shall be updated after expansion to cover new plants or facilities, if required. The details of the same are discussed in the following sections.

7.6.1 DEFINING THE NATURE/LEVEL OF EMERGENCY

THE LEVEL OF EMERGENCY CAN BE CLASSIFIED IN THREE CATEGORIES:

LEVEL - 1:

The leakage or emergency, which is confinable within the plant/area. It may be due to:

- a) Small pipe/valve rupture or similar leakages that do not affect outside premises.
- b) Release of toxic chemicals for short duration.
- c) Small fire in the plant.

LEVEL - 2:

The emergency, which is confinable within the factory premises. It may arise due to -

- a) Leakage of toxic chemicals for long duration.
- b) Medium scale explosion confined to the factory premises.
- c) Medium scale fire inside the factory premises.

LEVEL - 3:

The emergency, which is not confinable within the factory premises and general public in the vicinity are likely to be affected. It may arise due to -

- a) Heavy / Profuse leakage of toxic / flammable gases for a long duration.
- b) Explosion of high magnitude affecting the adjacent area.
- c) Major fire inside the factory premises.

7.6.2 OBJECTIVES OF EMERGENCY MANAGEMENT SYSTEM

The objectives of the emergency management system are summarized as under.

- To define and assess emergencies, including risk and environment impact assessment.
- To control and contain incidents.
- To safeguard employees and people in vicinity.
- To minimize damage to property or/and the environment.
- To inform employees, the general public and the authority about the hazards/risks assessed, safeguards provided, residual risk if any and the role to be played by them in the event of emergency.
- To be ready for 'mutual aid' if need arises to help neighboring unit. Normal jurisdiction of an OEP is limited to the own premises only, but looking to the time factor in arriving the external help or off-site plan agency, the jurisdiction must be extended outside to the extent possible in case of emergency occurring outside.
- To inform authorities and mutual aid centers to come for help.
- To effect rescue and treatment of casualties. To count injured.
- To identify and list any serious injuries and or fatalities.
- To inform and help relatives.
- To secure the safe rehabilitation of affected areas and to restore normally.
- To provide authoritative information to the news media.
- To preserve records, equipment etc, and to organize investigation into the cause of the emergency and suggest preventive measures to stop its recurrence.
- To ensure safety of the works before personnel re-enter and resume duty.
- To work out a plan with all provisions to handle emergencies and to provide necessary inputs for emergency preparedness and the periodical rehearsal.

7.6.3 STRUCTURE OF EMERGENCY MANAGEMENT SYSTEM

M/s. A-One Chemicals, Ankleshwar has developed an emergency management team. The management structure includes the following personnel's;

- Site Main Controllers
- Incident Controllers and Deputy Incident Controllers
- Key Personnel's
- Essential Workers

The other elements of Disaster Management Plan are:

- Assembly points
- Emergency control center
- Fire control arrangements
- Medical arrangements
- Other arrangements

7.6.3.1 SITE MAIN CONTROLLER

General Manager and FM are deputed as Site Main Controller. In absence of SMC's, Safety or Shift In Charge will act as a SMC. His task will be to co-ordinate all internal and external activities from the Emergency Control Centre at Main Security Gate from where all operations will be directed. He shall:

- Relieve the incident controller of responsibility for overall main control.
- In consultation with the incident controller decide whether major emergency exists an on declaration of a major emergency ensure that the outside emergency services and mutual help are called, the off side-plan activated and if necessary, nearby factories and population are informed.
- Ensure the key personnel are called.
- Exercise direct operational control of those part of the work outside the affected area.
- Continuously review and assess possible development to determine the most probable causes of event.
- Direct the safe close down and evacuation of plants in consultation with the incident controller and key personnel. If necessary arrange for evacuation of neighboring population.
- Ensure that causality are receiving adequate attention. Arrange for hospitalization victims and additional help if required. Ensure that their relatives are informed.

- Informed and liaison with police services instruct emergency authority and the factory inspectorate and expert on health and safety provide advice on possible effect on are outside the factory.
- In the cases of prolonged emergencies involving risk to outside area by wind blow materials contact meteorological office to receive early notification of impending changes in weather condition.
- Ensure the accounting for personnel and rescue of missing persons.
- Control traffic movement within the factory.
- Arrange for a chronological record of the emergency to be maintained.
- Where the emergency is prolonged arrange for relief of personnel and the provision of catering facilities.
- Issue authorized statement to the news media where necessary inform head office.
- Ensure that proper consideration is given to the preservation of evidence Arrange for photographs / video.
- Control rehabilitation of affected areas and victims on cessation of the emergency. Do not restart the plant unless it is ensured safe to start and authorized the sounding of All Clearance siren which will be one continuous long siren for one minutes".

7.6.3.2 ROLE OF INCIDENT CONTROLLER AND DEPUTY INCIDENT CONTROLLER

As our factory is running 24 hrs, so each plant head or managers from different depts. (like production, stores, P&A, engineering, R&D, etc.) are nominated as I.C and they will be always available in the shift and can take charge till the arrival of SMC. Any one shall be available in each shift & on holiday on call.

His primary duties are to take charge at the scene of the incident. In the initial stage he may be required to take decisions involving the operation of the other plants or to stop or continue any process and to take technical decisions to control the incident. The deputy incident controller should take the charge of incident controller, if he is not available due to any reason. Supervisors & Shift Incharge are deputed as DIC.

Responsibilities/Duties of Incident Controller and Deputy Incident Controller:

All shift Incharges of respective plant / Officer (Production).

Duties / Function: Immediately on being aware of the emergency and its location he will proceed to the scene On arrival he will take charge of accident and operate from scene as well as plant control.

He will :

- Assess the scale of emergency and decide if a major emergency exists or is likely. on his decision he will active the on - side emergency plan and if necessary the off- side emergency plan.
- Inform side main controller and perform as side main controller till his arriving and he will deputed his Dy. incident controller on the scene and he will go the emergency control center. Particularly he will:
 - ✓ Direct the shutting down and evacuation of plant and areas likely to be affected by the emergency.
 - ✓ Ensure that emergency services including mutual aid have been called in.
 - ✓ Ensure that key personnel have been called in.
- Direct all operations within the affected area with the following priorities.
 - ✓ Secure the safety of the personnel.
 - ✓ Minimize damage to plant property and the environment.
 - ✓ Minimize loss of material.
 - ✓ Direct rescue and firefighting operation unit the arrival of the outside fire brigade.
 - ✓ Search for casualties.
 - ✓ Evacuate non essential worker to the assembly points.
 - ✓ Set up a communication point and established telephone messenger contact appropriate with the emergency controller center.
 - ✓ Give advice and information as requested to the head of the fire brigade and other emergency services.
 - ✓ Brief the site main controller and keep informed of development.
 - ✓ Preserved evidence that will be necessary for subsequent inquiry into the cause of the emergency and concluding preventive measures.

7.6.3.3 KEY PERSONNELS

Senior officers of various departments like Fire, Security, Safety, Administration, Engineering, Project, Production, Transport, Pollution control, Technical Services and Stores are nominated as Key Personnel in their respective fields. As necessary, they decides the actions needed to shutdown plants, evacuate personnel, carryout emergency engineering work, arrange for supplies of equipments, utilities, carryout environment monitoring, provide catering facilities, liaise with police, fire brigade and other local authorities, relative of casualties, hospital, press & neighboring industries, action at assembly points, outside shelters and mutual aid center under the direction of the SMC. All the key personnel and other called in so to assist, shall report to the ECC. They are available at any time on duty or on call or on holidays.

7.6.3.4 ESSENTIAL WORKERS

Essential Workers are those who are trained in Fire Fighting, First Aid, Rescue & Salvage. Supervisors, Operators & technicians from production dept. are designated as E.W.'s & are supposed to report at EMERGENCY SITE to take instructions from I.C. or Dy. I.C. Such work instructions will include:

- Fire fighting and spill control till a Fire Brigade takes the charge.
- To help the Fire Brigade and mutual aid teams, if it is so required.
- Shutting down plant and making it safe.
- Emergency engineering work e.g. isolating equipment, material process, providing temporary by-pass lines, safe transfer of materials, urgent repairing or replacement, electrical work, etc.
- Provision of emergency power, water, lighting, instruments, equipments, materials, etc.
- Movement of equipment, special vehicle and transport to or from the scene of the accident.
- Search, evacuation, rescue and welfare.
- The injured is given First Aid.
- Moving tankers or other vehicles from area of risk.
- Carrying out atmospheric test and pollution control.
- Manning of assembly points to record the arrival of evacuated personnel. Manning for outside shelters and welfare of evacuated persons there.
- Assistance at casualties reception areas to record details of casualties.
- Assistance at communication centers to handle out going and in coming calls and to act as messengers if necessary.
- Manning of works entrances in liaison with the police to direct emergency vehicles entering the work, to control traffic leaving the works and to turn away or make alternative safe arrangements for visitors, contractors and other traffic arriving at the works.
- Informing surrounding factories and the public as well as directed by the Site Main Controller.
- Any special help required.

OTHER ELEMENTS OF DMP:

7.6.3.5 ASSEMBLY POINT

In affected & vulnerable plants, all nonessential workers (who are not assigned any emergency duty) will be evacuated from the area & they shall report to specified Assembly Points. Assembly Points are located at a safe place i.e. one near Main Gate and other near control room, well away from area of risk and least affected by the down wind direction.

To ensure that workers do not have to approach the affected area to reach the Assembly Point, proper location and numbers have been marked at Assembly Points. Each Assembly Point is manned by a nominated person to record the names and dept. At each Assembly Point, duties of Assembly Point In-charge are displayed in brief. Before reaching an Assembly Point or subsequently, if it is required to pass through an affected area or due to presence of toxic substances, suitable PPE's including respirators, helmet etc., are issued & made available with workers.

7.6.3.6 EMERGENCY CONTROL CENTER

The Emergency Control Center is the place or room from where the operations to handle the emergency are directed and coordinated. A Room near office building and control room have been earmarked/ identified as the Emergency Control Room.

Telephone and other facilities required with necessary documents are displayed in ECC for ready reference. Designated trained personnel like shift Incharge and supervisor operate ECC. In case of Major Emergency, the Site Main Controller will operate from ECC.

The ECC center is equipped with the following facilities.

1. Internal and external telephone including STD facility
2. Telephone directory/ Telephone nos. of mutual aid centers
3. Factory Layout showing evacuation plan, fire fighting arrangements, emergency control centre, location of assembly points, etc.
4. First Aid
5. Gate pass book
6. Muster roll of Workers
7. Work permit book
8. Identocard register

9. Copy of on site/ off site plan
10. Stationeries like- note book, pen, pencils etc
11. SCBA Sets
12. Sand Buckets & Hydrant Network
13. Adequate numbers of PPE's (like dust mask, safety dress, PVC hand gloves, Full Face piece respirator with 3M cartridge, helmet, goggles, etc)

7.6.3.7 FIRE CONTROL ARRANGEMENTS (FIRE FIGHTING, GAS LEAK CONTROL AND RESCUE OPERATION)

A) Role of Manager (Fire and Safety) / Shift In-Charge (Fire & Safety)

1. Incident Controller directs the fire fighting and Emergency operation. His duties include...
2. Keep the constant touch with the SMC / Incharge - EHS.
3. Direct the crew members to the scene of emergency and arrange replenishment of Manpower / equipment / extinguishing media etc.

B) Role of EHS Representative:

1. On being notified about the location of fire/ gas leakage, he immediately proceeds to the help.
2. Decides his line of action in consultation with Incident controller and takes appropriate measures to handle the emergency.
3. Assessing the severity of the incident, immediately report to emergency controller about the gravity of the situation.
4. He assesses the extra requirement required if any, from the neighboring industry.

C) Fire crew members

1. On hearing fire alarm, emergency siren they immediately reports to control room and proceed to the scene of emergency and work under the direction of IC/ Dy IC.
2. The personal availability at the scene of incident to be made optimize.

D) Emergency Squad Members

1. On hearing Emergency Siren, they immediately reports to site main controller, safety in charge or incident controller.
2. They shall combat the emergency situation as per the direction of site main controller, safety in charge or incident controller.
3. They help for safe evacuation.

7.6.3.8 MEDICAL SERVICES

The roles of Medical officers are as follows;

- a) He will report immediately to the SMC/IC.
- b) He will render necessary treatment, at Occupational Health Center.
- c) He will arrange for Hospitalization and Treatment at outside hospitals, if required.
- d) He will mobilize in getting the services of External medical agencies, other Para – medical services etc. and transportation services etc.
- e) He will arrange for extra medical assistance/antidotes, from out, if required.
- f) He will arrange for first-aid trained volunteers for necessary help.
- g) He will liaise with the Government Health Authorities for treatment of the affected persons nearby.

7.6.3.9 ROLE OF SECURITY IN-CHARGE (SECURITY OFFICER)

- On hearing the emergency siren, he shall find out the location of the incident (fire / gas leak / spill / explosion) and inform the location of the same to the key personnel coming to the plant.
- He will depute the security guards for managing gates and traffic control at the incident site & send remaining guards to the site of incident.
- He will prevent unauthorized entry in to the site
- He will render assistance as demanded by the safety in-charge.
- He will mobilize additional security force for help, if required.
- He will direct ambulance(s) and emergency vehicle(s) to the scene of incident.
- He will help evacuate persons within the scene of incident.
- As directed by the site main controller, he may be required to address the public of surrounding villages for warning / evacuation.

7.6.3.10 ROLE OF MUTUAL-AID MEMBERS

- Company has Mutual Aid with various nearby factories and GIDC fire station & Aarti Industries Limited, etc.
- On receiving the call, they shall proceed immediately with fire squad & fire tenders.
- They will be guided to the place of the incident by the main gate security guard.
- The fire squad in-charge will report to the safety in-charge of the unit in which the incident has occurred.

7.6.3.11 OTHER ARRANGEMENTS

Other arrangements include external transport (transport centre), heavy vehicles, lift/cranes, Utilities, generator sets to supply emergency power, environment monitoring equipment, special instruments/equipments, rescue items etc. is made available from Ankleshwar Association or near by locations, when available resources do not meet the requirements.

STANDARD OPERATING PROCEDURE (FOLLOWED DURING EMERGENCY)

- As soon as emergency alarm is heard, all essential workers shall report to IC or SMC.
- They shall carefully listen to the instructions given by IC or SMC
- According to the type of emergency/accident, they shall get equipped with PPE/Fire fighting equipment and devices.
- The runner among the workers shall inform SMC/IC and key personnel if they are not at site.
- The messenger amongst the workers shall deliver messages to nearby units as per the instructions of SMC/IC.
- The in-charge of medical arrangements shall prepare first-aid and other required facilities for the injured.
- The other essential workers shall try to control the emergency as per the instructions given to IC.
- IC would keep SMC informed about the status of control measures being taken at the site and ask for other requirements eg. Mutual aid, equipment etc. if he find necessary.
- SMC would co-ordinate with outside agencies regarding control measures being taken, need for external help, evacuation, medical treatment etc.

7.6.4 COMMUNICATION SYSTEM

Communication System is a Crucial Factor while handling emergency. Company has quick & effective Communication System through which, any situation, which can lead to emergency, can be informed or known to...

- i. All persons working inside the plant.
- ii. Key Personnel outside during normal working hours & during off-duty hours.
- iii. Outside emergency services, Statutory and Local Authorities and

iv. Neighboring facilities and public leaving in vicinity.

Each and every section, Plant & Department of the Factory are connected by internal telephones with SMC, Supervisor or IC's. External Phone at Office and Residence is also be made available with Key Personnel and top executive of the factory. The Communication System shall begin with raising the alarm declaring the emergency, Telephone messages and Procedure to communicate the emergency to other persons & General Public.

List of external telephone nos. of important agencies like: District Collector & Magistrate, Police Commissioner, Director of Industrial Safety & Health, GIDC Fire Brigade, Vapi Emergency Control Centre, Vapi Industries Association, Surya Hospital and Usha shall by Vapi, etc. is made available to be used in case of an emergency.

7.6.4.1 RAISING THE ALARM

As soon as incident takes place inside the factory and is noticed by someone, the first step shall be to raise the nearest manual emergency bell to alert the nearby people. Next, he/she shall inform the security persons to raise the emergency siren located at the factory gate.

There is siren system available to warn neighboring factories about major toxic release. It is tested at monthly frequency. The security personnel sound the siren.

The alarm sound informs the I.C and the S.M.C that an emergency has been created and emergency organization is to be activated. The I.C. rushes to the site and shall take charge of the scene.

7.6.4.2 DECLARING THE MAJOR EMERGENCY

Major emergency is declared after sufficient and thorough check because the declaration of major emergency puts many agencies on action and it may disturb the running system, which may be Costly at, time or its Consequence may be Serious. Therefore, major emergency must not be decided on whims or immature judgment or without proper thought. Looking to all the above, we have nominated the persons (SMC: Director & Production Manager) who can declare the emergency; we have selected them on the basis of their knowledge & experience. These persons are technically qualified and experienced. The decision about major emergency is taken as early as possible and without wasting time so that control action can be started immediately.

7.6.4.3 TELEPHONE MESSAGES

A Telephone operator who is precise, sharp, attentive and quick in receiving and noting the message and subsequently effective in further Communication, has been appointed. A form to record emergency telephone calls is available with telephone operator or Person available in Emergency Control Center, who records such calls during emergency. Telephonic messages are given out by the telephone operator to Site main Controller and key personnel as per the instructions of the Incident Controller. Telephonic messages are also given to authorities and external agencies to describe the type of emergency. All details of emergency are collected/delivered according to this format, available with the telephone operator.

7.6.4.4 COMMUNICATION OF EMERGENCY & STATUTORY INFORMATION

COMMUNICATION OF EMERGENCY

An effective system to communicate emergency has been made to communicate about the emergency situation as mentioned below:

- Inside the factory i.e. workers including key personnel and essential workers, on duty & inside during normal working hours.
- To key personnel and essential workers not on duty and outside during normal working hours.
- To the outside emergency services and the Government authorities.
- To the neighboring factory & the General Public in the vicinity.

STATUTORY INFORMATION

a) Information to Workers

Set of Statutory information regarding types of hazards and their prevention and control as directed in the Factories Act is prepared by the unit. This information is printed in the local language and given in the form of booklet to all workers including contract workers.

b) To the outside emergency services and District Emergency Authority

Statutory information in the form of booklet is given to outside emergency services and authorities, if required.

c) To neighboring firms, general public & Factory Inspectorate

Statutory information in the form of booklet is given to neighbouring units and the general public of the villages in the vicinity of the unit, if required.

7.7 OCCUPATIONAL HEALTH & SAFETY.

M/s. A-One Chemicals, Ankleshwar has prepared the Occupational Health Surveillance Programme for its existing facility. The same programme shall be updated (if required) after the expansion, to cover new plants or facilities. The details of the existing programme are described in the following sections.

7.7.1 OCCUPATIONAL HEALTH

Occupational health needs attention both during construction & erection and operation & maintenance phases. However, the problem varies both in magnitude and variety in the above phases.

7.7.2 HOSPITAL FACILITIES

Company has made formal agreements with nearby hospital having facilities to attend fire and toxic effect cases for attending the affected persons in the emergency arising out of accidents, if any.

One ambulance is available round the clock in the factory to transport the victim/injured person from the factory to the nearby hospital. Ambulance is equipped with Stretcher, First aid box, Oxygen Cylinder, Mask, etc.

7.7.3 FACTORY MEDICAL OFFICER/OHC

A qualified doctor has been appointed as FMO on retainership basis. Apart from him, Paramedical Staff has also been employed. Adequate no. of employees are trained in First aid.

Proposed Facility to Be Made Available At OHC

A Room has been provided to be operated as OHC. The centre is equipped with following medical equipments:

- | | | |
|----|-------------------|---|
| 1. | Examination Table | |
| 2 | Dressing Tables | For performing Dressing |
| 3. | Glucometer | For measurement of Blood Sugar |
| 4 | Vision chart | to evaluate vision acuity |
| 5. | Nebulizers | For relieving coughs & Breathing Difficulty |
| 7. | Infra red light | for relieving muscular pain |
| 7. | Suction machine | for cleaning airway |
| 8. | Autoclave machine | for sterilizing cotton & dressing material |

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- | | | |
|-----|-----------------------------|---------------------------|
| 9. | Weighing Machine | for measuring body weight |
| 10. | Medical Oxygen Cylinder kit | |
| 11. | Sphygmomanometer | To measure blood pressure |
| 12. | Refrigerator | To preserve medicines |
| 13. | Thermometer | |

7.7.4 PERIODIC MEDICAL EXAMINATION

Periodic Medical Examination is being conducted as per the following schedule;

Workers employed are examined by a Qualified Medical Practitioner/ Factory Medical Officer in the following manner:

- (a) Before employment, to ascertain physical fitness of the person;
- (b) During employment, once in a period of 6 months, to ascertain physical fitness of the person to do the particular job;

Medical examinations are then documented in Form no.: 32 & 33 and maintained.

7.7.5 DETAILS OF EXISTING OCCUPATIONAL AND SAFETY HAZARDS.

Occupational Hazards

- Exposure to Toxic Chemicals.
- Exposure to Flammable Solvents.
- Fire due to Static charge generation
- Slip/trip, fall, electric shock, etc.
- Spillage/leakage,
- Overflow,
- Exposure to Corrosive Chemicals.

Occupational Health Impacts

- Toxication, Irritation,
- Fall Injury, Electrocution,
- Body Injury, Burns, Skin sensitization,
- Severe irritation to eyes & skin,
- Respiratory disorder,
- Damage to nearby equipments,
- Fatality, etc

Mitigation measures/Safety Measures proposed to avoid the human health hazards are mentioned under section 7.5. Personal protective equipments like Helmet, Safety shoes/ Gumboots Hand gloves, Gas Mask / Nose Mask, PVC apron, SCBA Set, PVC pressure suit, Bobble hood are also provided to the required personnel.

7.7.6 MEASURES ADOPTED BY COMPANY TO KEEP AIR BORNE CONCENTRATION OF HAZARDOUS CHEMICALS BELOW PEL/TLV:

- Each workplace is evaluated. Air-borne concentration of toxic chemicals is measured and records are kept. It has been found that, the exposure levels air borne concentration of hazardous chemicals are below PEL.
- For purpose of measuring worker exposure across a single shift, a reasonably accurate exposure measuring device (Alarms will be configured at TLV value) has been placed within the worker's breathing zone, and have it operates for the full shift. Company studies the exposure data when the plant is operative.
- To avoid mixing of hazardous chemicals in air; leak surveys are conducted every 15 days. LDR (Leak Detection and Rectification) program has been designed for early detection of leakages of hazardous chemicals and to rectify leakages.
- Flange/Ferrule joints, pipelines, transfer lines, etc. Are checked on regular basis for maintenance purpose.
- Regular maintenance checkup are carried out for pumps, equipment, instruments handling toxic and corrosive chemicals.
- PPEs like Air mask, Berating canisters, SCBA sets, and On-line breathing apparatus are kept available at the places where there is possibility of presence of toxic chemicals.
- The ambient monitoring devices (portable) with alarm for leakage of hazardous chemicals are available.
- Third party environment monitoring is in practice.
- Portable detectors are available SO₂, Ammonia. HCl, Chlorine, H₂S etc.
- Explosion meter and Oxygen meter are also available.
- Noise meter is also available.
- There is volume level indication with alarm and trips for bulk toxic storages.
- The interlocks, alarms and trip systems are tested on quarterly basis.

7.7.7 WORK ZONE MONITORING ARRANGEMENTS FOR HAZARDOUS CHEMICALS

Work zone monitoring is carried out by independent competent third party every month. Records are kept in Form No. 37 as per Gujarat Factories Rules. Location for samplings shall be identified. Samples are analyzed for Air borne concentration of hazardous

chemicals in ppm. Following information is incorporated in the format for maintaining records of work zone monitoring:

- Location/Operation monitored
- Identified contaminant
- Sampling instrument used
- Number of Samples
- Range of contaminant concentration as measured in sample
- Average concentration
- TWA concentration of contaminant (As given in Second Schedule of Factories Act)
- Reference method used for analysis
- Number of workers exposed at the location being monitored
- Signature of the person taking samples
- Other relevant details

7.7.8 HEALTH STATUS EVALUATION OF WORKERS (EXPOSURE SPECIFIC)

1. It is proposed that management will device a plan to check and evaluate the exposure specific health status evaluation of workers.
2. Workers will be checked for physical fitness with special reference to the possible health hazards likely to be present, where he/she is being expected to work before being employed for that purpose. Basic examinations like Liver Function tests, chest X-ray, Audiometry, Spirometry Vision testing (Far & Near vision, color vision and any other ocular defect) ECG, etc. will be carried out. However, the parameters and frequency of such examination will be decided in consultation with Factory Medical Officer and Industrial Hygienists.
3. While in work, all the workers will be periodically examined for the health with specific reference to the hazards which they are likely to be exposed to during work. Health evaluation will be carried out considering the bodily functions likely to be affected during work. The parameters and frequency of such examination will be decided in consultation with Factory Medical Officer and Industrial Hygienists. Plan of monthly and yearly report of the health status of workers with special reference to Occupational Health and Safety, will be maintained.

Medical fitness certificate of employee (Form No. 33) and Worker health reports are attached as Annexure – XII.

7.7.9 ACTION PLAN FOR SAFE HANDLING & SAFETY SYSTEM

Action Plan For Safe Handling of Hazardous Chemicals:

1. Manual Handling is eliminated or replaced by fork lifts, cranes, hoists, pallet trucks, etc.
2. Appropriate PPEs are used.
3. Lifting tools & tackles are used, wherever required.
4. Do's and Don'ts for strengthening the safety system is being practiced.
5. SOPs, work instructions are followed.
6. Training is being provided to relevant staff, operators, workers for the risk associated with handling of hazardous chemicals, ways to overcome those risk, etc.

ACTION PLAN FOR SAFETY SYSTEM:

Following action plan for Safety System has been implemented:

SAFETY ORGANIZATION/COMMITTEE

Qualified and experienced safety officers are appointed together constitute a safety committee and meetings are held at least once in a quarter. Safety Saturday meeting is also organized every week to share the problem or suggestions, if any. The responsibilities of the committee include identification of the hazardous conditions and unsafe acts of workers and advice on corrective actions, conduct safety audit, organize training programs and provide professional expert advice on various issues related to occupational safety and health.

Safety organization is responsible to ensure compliance of Safety Rules/ Statutory Provisions. Safety Organization organizes Safety contests like Safety Slogan, Quiz, Safety Poster, safety Speech by individual, Safety Exhibition, etc. to educate the staff, workers, operators on safety aspects. Employees, contractor employees and their representatives are properly informed of their rights and process hazard analyses.

SAFETY CIRCLE

In order to fully develop the capabilities of the employees in identification of hazardous processes and improving safety and health, safety circle is also constituted. The circle would consist of about three to four employees. The circle normally meets for about an hour every week.

SAFETY TRAINING

Company has made a policy of identifying the Safety Training Needs at different positions/levels. Safety trainings are arranged by Safety department in consultation with the plant/area in-charge and the Occupier and some times external faculty is also deputed for the same. One day training on safety induction is arranged for contract employee & three day training is for Company employee.

In addition to regular employees, limited contract labors are also allowed to attend safety training. To create safety awareness, safety films are shown to workers and leaflets are distributed. Training programmes cover plant safety rules and hazard communication, safety aspects, BBS, etc. Bulletins on health awareness are circulated through mails. Visits to safety institutes / organizations are also arranged. The man days and man-hours used in safety training are recorded, also employee wise training hours record is maintained. Safety training calendar is devised for one year. It is also ensured that the given training works in the proper safe direction.

7.7.11 PLAN AND FUND ALLOCATION TO ENSURE THE OCCUPATIONAL HEALTH & SAFETY OF ALL CONTRACT AND CASUAL WORKERS

Company has prepared Safety Plan and implemented for the existing project activity. Also, management has allotted enough funds to ensure the occupational health & safety of all contract & casual workers and also allotted a special budget for employee's appreciation for proactive and rescue operations. The same shall be followed for the expansion facilities also. Details of the same are as follows:

- To allocate sufficient resources (like PPEs) to maintain safe and healthy conditions of work;
- To take steps to ensure that all known safety factors are taken into account in the design, construction, operation and maintenance of plants, machinery and equipment;
- Daily briefing/ safety instructions are given by security at main gate ,
- Daily checking of helmet and shoes is done by security at gate,
- Tool Box Talk by plant personnel before start up of work, like informing employees about materials, equipment or processes used in their work which are known to be potentially hazardous to health or safety;

- To keep all operations and methods of work under regular review for making necessary changes from the point of view of safety in the light of experience and up to date knowledge;
- To provide appropriate facilities for first aid and prompt treatment of injuries and illness at work;
- To provide appropriate instruction, training, retraining and supervision to employees in health and safety, first aid and to ensure that adequate publicity is given to these matters;
- To ensure proper implementation of fire prevention methods and an appropriate fire fighting service together with training facilities for personnel involved in this service;
- To organize collection, analysis and presentation of data on accident, sickness and incident involving people injury or injury to health with a view to take corrective, remedial and preventive action;
- To organize safety programs, celebrating safety week, safety competitions during safety week, etc.;
- To promote through the established machinery, joint consultation in health and safety matters to ensure effective participation by all employees;
- To publish/notify regulations, instructions and notices in the common language of employees;
- To prepare separate safety rules for each type of occupation/processes involved in a plant; and
- To ensure regular safety inspection by a competent person at suitable intervals of all buildings, equipments, work places and operations.

7.7.12 ARRANGEMENTS FOR ENSURING HEALTH AND SAFETY OF WORKERS ENGAGED IN HANDLING OF TOXIC MATERIALS

As discussed in previous clauses, company has made various plans & arrangements to ensure health and safety of workers engaged in handling of toxic materials. Summary of the same is as follows:

- Each workplace is being evaluated for the existing work conditions.
- Unsafe Act & Unsafe Practices are identified.
- Unsafe equipments, unsafe areas, etc., are identified.
- First Aid Injuries are minimised to zero

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- Environmental Incidents & Chemical exposures are minimised.
- Areas are checked for proper Ventilation and Illumination.
- Air-borne concentration of toxic chemicals is measured, mitigation measures are followed to keep them under PEL and the same is documented.
- Periodic Medical checkup & Health evaluation is being done.
- Adequate funds are allotted for the Safety Management System.

Medical fitness certificate of employee in the factory of hazardous process and operation as per Gujarat factory rules 88 T and 102 (F.N. 33) and copy of medical checkup are attached as Annexure XII.

7.7.13 MOCK DRILLS

To evaluate the effectiveness of emergency preparedness and to spread the awareness among employees mock drill is carried out at the interval of every three months.

After completion of the mock drill, summary report is made and corrections are made if any weakness has been observed.

FREQUENCY OF MOCK DRILLS:

- On-site emergency : Once every 6 months
- Off-site emergency : Once every year

CHAPTER -8

PROJECT BENEFITS

INTRODUCTION

Over the years, A-One Chemicals has focused on impacting rural education, water conservation, tribal welfare, agriculture, animal husbandry, health and hygiene, disaster relief and rehabilitation. A number of these projects were replicated by other companies, increasing their impact.

The company is committed for contribution of funds and provides the services for the upliftment of local community in the nearby villages and growth in the industrial sector creates new opportunities for employment and can also help diversify the economy. This is especially important given the high level of urbanization, growing levels of unemployment and poverty in many cities. Synergistic growth in the chemical industries could have positive spin-offs for the socioeconomic development. The use of chemical further leads to development in field of research and development. This chapter describes about benefits of the project on improvements in the physical infrastructure, social infrastructure and employment potential in the region.

8.1 CORPORATE SOCIAL RESPONSIBILITY ACTIVITIES

M/s. A-One Chemicals Industries Limited has carried out many CSR related activities such as:

TABLE: 8.1

BUDGETARY ALLOCATION FOR CSR ACTIVITIES

Sr. No.	Activity	Fund Earmarked For Activity	Time Schedule
1.	Training to unskilled workers.	Rs. 4 Lakhs	5 Years
2.	Girl child education enhancement project.	Rs. 4 Lakhs	5 Years
3.	Encouraging school children by way of rewards/scholarships & Sponsorship for Educational Institute's.	Rs. 4 Lakhs	5 Years
4.	Road side tree plantation and garden development.	Rs. 5 Lakhs	5 Years
5.	Swachh hata mission, Health awareness and support to needed people.	Rs. 4 Lakhs	5 Years

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Sr. No.	Activity	Fund Earmarked For Activity	Time Schedule
6.	Proper awareness campaign shall be organized by the project proponent for water conservation. Provision of sanitation (toilets) facility.	Rs. 4 Lakhs	5 Years
	TOTAL	25 Lakhs	5 Years

8.2 ECONOMIC DEVELOPMENT

This project will increase the economic activities around the area, creating avenues for direct/ indirect employment during operation phase of the project. There would be a wider economic impact in terms of generating opportunities for other business like workshops, marketing, repair and maintenance tasks etc.

- This project will enhance India's potential of supplying bulk drugs and intermediate to developing countries. Leading to step-up of India's position in global market sector and strengthening of Indian economy.
- The continuous inflow of people will require local transport systems like autos, taxis etc which would help economic boost.

8.3 EMPLOYMENT POTENTIAL

There will be increase in the employment facilities due to the upcoming project like

- There will be employment opportunity for local people during construction and operation phase.
- The Unit will use latest STATE OF ART technology. Thus man power will be exposed to new technology.
- There will be employment opportunity for local people during construction and operation phase.

8.4 ACTION PLAN FOR BUDGETARY ALLOCATION

The unit has planned to spend 5 % of the total cost of the proposed project i.e. 192 lacks over a period of five years towards CSR. So, as per the project cost Rs. 25 Lacks will be used in the CSR activities. The activities in which CSR fund will be used are covered under schedule VII of the companies' act 2013:

Apart from above mentioned initiatives, M/s. A-One Chemicals will also look forward to following activities:

- Eradicating hunger, poverty and malnutrition, promoting preventive health care and sanitation and making available safe drinking water;

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- Promoting education, including special education and employment enhancing vocation skills especially among children, women, elderly, and the differently abled and livelihood enhancement projects;
- Promoting gender equality, empowering women for reducing inequalities faced by socially and economically backward groups;
- Ensuring environmental sustainability, ecological balance, protection of flora and fauna, animal welfare, agroforestry, conservation of natural resources and maintaining quality of soil, air and water;
- Protection of national heritage, art and culture including restoration of buildings and sites of historical importance and works of art, setting up public libraries, promotion and development of traditional arts and handicrafts;
- Measures for the benefit of armed forces veterans, war widows and their dependents;
- Training to promote rural sports, nationally recognized sports, Paralympic sports and Olympic sports;
- Contribution to the Prime Ministers' National Relief Fund or any other fund set up by the Central Government for socio-economic development and relief and welfare of the Scheduled Castes, the Scheduled Tribes, other backward classes, minorities and women;
- Contributions or funds provided to technology incubators located within academic institution which are approved by the Central Government;
- Rural development projects.

CHAPTER -9**ENVIRONMENTAL COST BENEFIT ANALYSIS****INTRODUCTION**

Cost-benefit analysis (CBA) is an analytical way for society to make decisions about complicated issues such as education, health care, transportation, or the environment. Like most personal decisions, it involves a comparison of the costs of an action compared with considerations of the benefits of that action. However, for public policy it is formalized and quantitative. For instance, a public policy can be evaluated by calculating and weighing the benefits against the costs, once all factors have been given a common unit of measurement. When policymakers have to choose among various alternatives, they require a tool that will allow them to distinguish between the options. Decision makers can then choose the policy with the largest surplus, or overall net benefits.

Also, as per CER initiative we can see that the unit is going to contribute 2.0 % (i.e. 10 Lakh) of the project cost towards betterment of society in nearby villages in 10 KM vicinity area.

However the unit will explore further possibility after commencement of project and will carry out detailed environmental cost benefit analysis.

TABLE: 9.1**BUDGETARY ALLOCATION FOR CER ACTIVITIES**

BUDGETARY ALLOCATION FOR CER ACTIVITIES								
The unit has planned to spend <u>2</u> % of the total cost of the project over a period of five years towards CER activity. So, as per the project cost Rs. 10 Lakhs used in the CER activities. Budgetary allocation is given in below table.								
Sr. No.	Activity	Fund Earmarked For Activity in Lakhs						Time Schedule
		Total for 5 Years	Y1	Y2	Y3	Y4	Y5	
1	L.E.D Bulb and Solar light Facility provide to poor and medium level family. School uniform and sweaters distribution to students. Tree plantation with safety guard.	5	1	1	1	1	1	5 Years
2	Laying of power blocks on road sides.	5	1	1	1	1	1	
TOTAL		Rs. 10 Lakh						

CHAPTER - 10

ENVIRONMENTAL MANAGEMENT PLAN

10.1 INTRODUCTION

Environmental protection is an issue that no organization can neglect and hope to survive. The key to the success of the integrated approach to pollution prevention and control is the management and operation of the organization. Effective committed management delivers a successful industry. A total commitment to the environment, not just for compliance with legal or regulatory compliance will be the essence of environment management of an industry. Many companies have recognized the benefits of implementing an effective environmental management system.

10.2 AIM AND OBJECTIVE

The aim of environment management plan is to conserve natural resources and water, to prevent pollution of environment, to ensure effectiveness of control measures and monitoring program, to ensure safety, welfare and good health of worker, to minimize generation of waste.

The objectives of EMP are as under:

- Pollution will be prevented or reduced at the source,
- Pollution that cannot be prevented will be recycled in to the system,
- Pollution that cannot be prevented or recycled will be subjected for recovery of chemicals using best technologies,
- Pollution that cannot be prevented or recycled or recovered will be treated in environmentally safe manner, and
- Disposal and other releases into the environment will be used “only as a last resort” and will be conducted in an environmentally safe manner.

This report is also made in the overall frame work of the Environmental Impact Assessment (EIA) Notification dated 14th September 2006 (and subsequent amendments to the same) issued by the Ministry of Environment and Forests (MoEF), by providing required information with regards to the project as mentioned in the Terms of Reference issued by the SEIAA, Gujarat.

10.3 ENVIRONMENT, HEALTH AND SAFETY (EHS)

It is of utmost concern for a company to conduct its business in a manner that will promote the protection of the occupational Health & Safety; Welfare of its employees and others involved in or affected by its business operations and address the environmental concerns regarding sustainable development.

To be a responsive and responsible corporate citizen, we shall strive to achieve an organizational culture of safety, health and environmental excellence.

As an integral part of the company's business performance, the company shall declare full commitment to achieve high levels of performance in Health, Safety and Environment.

10.4 ENVIRONMENTAL MANAGEMENT PLAN

An Environmental Management Plan (EMP) is prepared to mitigate and manage various environmental impacts identified. The EMP presents the project specific guidelines on: Environmental management strategies.

Specialized engineering construction procedures in relation to environmental guidelines of the country.

- Spill prevention and control
- Management of wastes and hazardous chemicals
- Air, water and soil quality protection
- Noise control
- Soil erosion control and slope stabilization
- Vegetation, wildlife and habitat protection
- Socio-economic and welfare considerations
- Risk and disaster management plan
- To prepare a checklist for statutory compliance

Due to its complexity and implications, the implementation of the EMP must be executed utilizing a specific EMS framework. Once an EMP has been approved, it should provide the basis for environmental considerations of all the activities carried out on the site by the appointed personnel.

With respect to the various environmental impacts identified during the EIA stage, mitigation measures to prevent or minimize the impacts are suggested for all the environmental components.

The environmental management plan for the proposed project aims to mitigate the potentially detrimental impacts on the environment, both during construction and operation phases of the project. It is also necessary that continued compliance with existing environmental regulations is ensured. The construction and associated activities have been planned so as to minimize impacts on the physical, biological and socio-economic-cultural environments. Even though it would be naive to expect that all detrimental impacts can be avoided, it is apparent that most of the impacts will be localized and temporary in nature.

This is a new synthetic organic manufacturing unit in Ankleshwar. Environmental impacts during the construction phase can be attributed to the site preparation, excavation of trenches, erection & mechanical fabrication, construction activities, transportation etc. and provision of civic amenities to the construction workforce. The potential for environmental impact during construction phase on most of the environmental components are temporary and the environment returns back to its previous status on completion of the

construction. State of the art technology will be adopted for control of pollution during project execution phase, whenever and wherever applicable.

All construction activities generally cause disruptions to the pre project environmental quality. The following environmental protection measures should be incorporated as part of terms and conditions of contract for implementation by the contractor or the authority as appropriate. Recommendations made to minimize impacts during construction phase are delineated below:

10.4.1 CONSTRUCTION PHASE

The proposed construction related to new project will be carried out at Plot No. A-1/4701 & 4702, GIDC Ankleshwar, Dist:-Bharuch, Gujarat and AnkleshwarGIDC has well developed road. However M/s. A-One Chemicals will ensure to keep the pollution potential level in the construction phase to a minimum. The task will be assigned to security people and supervised by qualified supervisor. The control measures proposed by the unit to minimize the pollution during construction phase are as under Table no.10.1.

TABLE: 10.1

CONTROL MEASURES FOR CONSTRUCTION PHASE

Sr. No.	Source	Waste type/ Pollution	Control measures
(A) Site Preparation			
1.	Uplift of dust during the excavation, leveling operations etc.	Dust	Sprinkling of water over land, and provision of enclosure.
(B) Sanitation			
1.	Sanitation facilities.	Sewage	Sewage will be sent to Soak pit.
(C) Noise			
1.	Movement of vehicles like truck, Dozer, Cranes	Noise pollution	Restrict movement of vehicle between 10 p.m. to 6 a.m. All vehicles will be maintained in well condition.
2.	Construction activity	Noise pollution	Engineering control, Provide noise protection devices like earmuffs, ear plug to worker, Rotation of work to minimize exposure.
(D) Wastes from construction equipment			
1.	Dozer, Cranes	Waste oil	Avoid spillage, proper storage, disposal by selling to reprocessor.
2.	Painting	Empty containers of paints and oils	Proper storage, disposal by selling to authorized buyers/incineration.

Sr. No.	Source	Waste type/ Pollution	Control measures
3.	Construction	Construction waste	Use for leveling purpose within premises

10.4.2 OPERATIONAL PHASE

M/s. A-One Chemicals has proposed Environment Management Plan to keep the pollution potential to a minimum level in the operation phase.

10.4.3 AIR ENVIRONMENT

Flue Gas Emission:

The unit will use Coalin boilers and hot air generator. Unit has installed Multi cyclone Separator + Bag filter+ water scrubber as APCM with boilers and 3 stage water Scrubber and Multi Cyclone Separator as APCM with Hot Air generator. The unit will use natural gas in all thermopack. Unit have stack of adequate height to control emission. Unit have installed two D. G. Sets of adequate stack height. Anddiesel will be used in proposed DG sets.

Process Gas Emission:

There will be process emission (NH₃) from reactor. Unit has proposed 2 stage water scrub with each reactor followed by venture scrubber. There will be process emission (PM) from spray dryer. Unit has proposed bag filter as APCM.

Fugitive Emission:

There will be fugitive emission of VOC and acid mist during material handling, transferring and at storage area.

10.4.4 WATER ENVIRONMENT

Now, after proposed expansion, total water consumption will be 713 KL/day (343 fresh + 370 Recycle) after proposed expansion. Water required for the proposed project will be fulfilled by GIDC Ankleshwar water supply system. Water conservation measures will be taken to explore possibility of reuse/recycle of water. Process optimization, reduction, reuse and recycle of water will be carried out to minimize the impact. Record of water consumption will be maintained.

Pumps and reactors will be having mechanical seal, so there will be no leakages. The unit will provide connection system for possibility of leakages. Leakages will be collected in a small pit which will carry the leakages to effluent plant. Possible spillages will be from vessel washing, transfer of liquids, to avoid the spillage fixed pipeline will be provided. Vessel washing will be collected to effluent treatment plant.

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The unit will provide dedicated area made with RCC and HDPE lining so that the washing can be directly sent to ETP plant.

As per CCA, the wastewater generation is 254.5 KL/Day. After proposed expansion, total industrial effluent generation will be 709.5 KL/Day (Existing: 254.5 KL/Day E + Proposed: 438 KL/Day). Out of 709.5 KL (Process Effluent), 254.5 send in NCT after ETP treatment + 215 internal reuse + 219 will be send to MEE+ 11 Blow down reuse water scrubber followed in coal handling +10 washing water reuse in Process.

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10.4.5 NOISE ENVIRONMENT

The sources of noise generation will be transportation activities, D.G. set, cooling tower, plant machinery etc. The unit will take following measures to control noise pollution.

TABLE: 10.2

DETAILS OF CONTROL MEASURES FOR NOISE POLLUTION

Sr. No.	Source	Waste type/ pollution	Control measures
1.	Transportation activities	Noise pollution	Green belt, Restriction on transportation between 08 p.m. to 9 a.m., Maintain vehicle in good condition.
2.	D.G.set	Noise pollution	Acoustic enclose, Engineering control, Provision of PPE, Green belt,
3.	Plant/process area	Noise pollution	Maintain equipment & machines in good working condition. Isolated noisy area from other area by distance and if it is not possible than by physical separation or noise proof valve. Provide silencer to safety valve, relief valve Provision of PPE, Green belt, Record noise level monitoring of different places within and outside premises, Periodically Audio metric test, Rotation of work to minimize exposure.

10.4.6 LAND ENVIRONMENT

The management plan for this component of environment lays emphasis on development of greenbelt comprising of appropriately selected species of shrubs and trees. It is recommended that plantation be made on sites, road sides, around waste treatment units. Such a development of greenbelt and plantation of shrubs and trees will not only significantly reduce or mitigate adverse impacts due to aerosols and gaseous pollutants, noise, odour and nuisance etc., but also serve as shelter belts for avifauna, stabilize and improve soil permeability and aesthetic environment.

10.4.6.1 RAW MATERIAL & PRODUCT STORAGE AREA

The unit will take following control measures to prevent land contamination from raw material storage and handling.

- Raw materials will be stored in M.S tanks, S.S tank and HDPE Carboys, HDPE bags, etc in separate storage room.
- Separate collection system is provided for collection of spillage material. Impervious layer, RCC roads and flooring is provided to area, where the chemical storage and handling activities are involved.
- Hazardous flammable substances are separately stored within premises. Solvent transfer will be done by pumps. Reactor & solvent handling pump have mechanical seal.
- The acid tanks will be provided with dyke wall to control spread of leakages.

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10.4.7 GREEN BELT DEVELOPMENT

The main objective of green belt is to provide a barrier between source of pollution and surrounding area by filtering the air particulate and interacting with gaseous pollutants before it reaches to the ground. The company will be developing green belt area of 1350.45sq m. (approx. 24% of total plot area). The unit will plant trees like Babool (Vachellianilotica), Peepal (Ficus religiosa), Neem (Azadirachta indica), Asopalav (Polyalthia longifolia), Banyan, Kapok (Ceiba pentandra), Nilgiri (Eucalyptus), Gulmohar (Delonix regia), Pelta Farm, Kashid

TABLE 10.3

BUDGET FOR GREENBELT DEVELOPMENT

Work or Activity	1 st Year	2 nd Year	3 rd Year	4 th Year	5 th Year	Total
Plantation at Periphery of the Project Site						
Plantation Required	120	80	5	5	5	210 Trees
Amount (INR)	4,30,000	2,40,000	10,000	10,000	10,000	7,00,000 Rs.
Plantation of outside the plant						
Plantation Required	40	30	20	--	--	90 Trees
Amount (INR)	1,25,000	1,00,000	75,000	--	--	3,00,000 Rs.

Preparation of Greenbelt Plan

The proposed greenbelt development should be of a suitable width along the periphery of project site area including unit complex, space between the units located within the project, along the roads, storage areas, loading / unloading areas of products etc.

Criteria for Selection of Species for Greenbelt

The plant species suitable for green belt development should be selected based on characteristics.

- It should have thick canopy cover
- They should be perennial and evergreen
- They should have high sink potential for pollutants
- They should be efficient in absorbing pollutants if any without significantly affecting their growth.

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Guidelines for Plantation

The plant species identified for greenbelt development should be planted using pitting technique. The pit size should be either 45 cm × 45 cm × 45 cm or 60 cm × 60 cm × 60 cm. bigger pit size is prepared on marginal and poor quality soil. Soil used for filling the pit should be mixed with well decomposed farm yard manure for 45cm × 45 cm × 45 cm and 60 cm × 60 cm × 60 cm size pits respectively. The filling of soil should be completed at least 5-10 days before actual plantation. Healthy sapling of identified species should be planted in each pit.

Roadside Plantation

Roadside plantation plays a very important role for greening the area, increasing the shady area, increasing aesthetic value and for eco-development of the area. The approach roads to project site will be planted with flowering trees. Trees should be planted to increase aesthetic value as well as shady area along the roads.

Each plant shows different air pollution tolerance level depending upon number of factors. The trees should be tolerant to air pollutants present in the area & should be able to grow and thrive on soil of the area, be evergreen, inhabitant, having minimum of leaf fall. The trees should be tall in peripheral curtain plantation and with large and spreading canopy in primary and secondary attenuation zone. It is also recommended to plant few trees, which are sensitive to air pollution as air pollution indicator.

10.4.8VEHICULAR POLLUTION CONTROL

- All vehicles will be maintained in well condition by regular preventive maintenance to reduce the exhaust level.
- Drivers of all vehicles used in the transportation will be trained in transportation of Hazardous chemicals to prevent any accident. Fitness and training test certificate approved by R.T.O to be maintained on the vehicle at all times to ensure transport worthiness.

10.4.9SAFETY MEASURES TO PREVENT THE OCCUPATIONAL HEALTH HAZARDS

- All reasonably practical measures will be adopted by the unit to minimize the risk of accidents within a chemical manufacturing unit
- All building plans and installations will be as per relevant laws and approved by competent authority
- Training is imparted to all workers for all the hazardous process operations within the plant and will be supervised by experienced supervisors
- Suitable personnel protective equipment and fire extinguishers at strategic locations and suitable personal protective equipment will be provided

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- Flame proof electrical fittings, flame arrestors etc will be installed
- All the raw materials & solvents will be stored in designated storage area equipped with necessary safety features.
- Physical and chemical properties of raw materials and products as MSDS are provided as soft copy in CD.
- The solvent storage area will be restricted for unauthorized persons. Proper earthing will be provided in all electrical equipment whenever solvent handling is done. Flame arrester cum breather valve and flame proof fitting will be provided at tank farm.
- Periodic inspection & testing of pressure vessels, equipments, and machineries will be done.
- Good housekeeping will be ensured within the factory premises
- All designated staff & workers will be trained for the firefighting, work permit system, first aid and safe handballing of hazardous chemicals.
- Incident/accident reporting system will be developed and all the employees are made aware for the same.
- Suitable notices/boards will be displayed at designated locations indicating appropriate hazard warnings.
- Antidotes as well as MSDS for all the chemicals will be made available within the factory premises.
- Pre-employment medical checkup at the time of employment will be carried out. In order to safeguard the health of the employees, all the employees undergo periodic health checkup at every six months.

10.4.10 RAIN WATER HARVESTING SCHEME

Rainwater harvesting is a mechanism involved in collecting, storing and using rainwater when it is most needed. A rainwater harvesting system comprises of various stages – transporting rain water through pipes or drains, filtration, and storage in tanks for reuse or recharge. There are five components in a rainwater harvesting system namely catchment, conveyance, filtration, storage and recharge.

Advantages of Rain Water Harvesting

There are various advantages of Rain Water recharging from which some of those are listed below:

- Prevent evaporation and runoff of rain water and convey it to recharge groundwater especially in such areas where runoff is very high.
- Solution to water scarcity problems.
- Effective rise in ground water levels.

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- It's economical and energy saving as it prevents extraction of water from depleting ground water table.
- Easy operation and maintenance.

Design of Rain Water Harvesting

- Quantity of Rain water collected depends upon:
- (a) Average rainfall intensity (b) Catchment area (c) Run-off coefficient.
- The rain water from the Roof tops, Paved and Green Area will be collected through PVC pipes and then transferred to the proposed rainwater harvesting pits. Design calculations for these pits are discussed in subsequent section.
- Based on the long term IMD Data for Bharuch District
- Annual Rainfall intensity = 1165 mm (1.165 m)
- It will be collected in intermediate tank and stored in raw water tank for further usage.

10.4.11 STORM WATER MANAGEMENT

- The drains for storm water will be kept clean and dry in summer and winter. The storm water drains will be connected to holding tank. The rain water of the premises will be collected in this holding tank through storm water drains. The collected water will be analyzed for any contamination of pollutants for 1st and 2nd rain during monsoon. If analysis indicates any contamination, the collected water will be diverted to ETP plant. In case of no contamination, the collected water will be used in cooling tower and other applications.

10.5 ADDITIONAL MITIGATION MEASURES

In addition to the above suggested measures for management of air, water, soil, etc following additional measures shall be provided.

10.5.1 ENERGY CONSERVATION PROGRAMME

Energy conservation measures are often the easiest, quickest and cheapest way to reduce costs and be environmentally pro-active. Energy conservation will be one of the focuses during planning and operation stages. The conservation efforts would consist of the following:

a. Architectural design

- Public areas will be cooled by natural ventilation as opposed to air-conditioning.
- Maximize the use of natural lighting through design.

b. Energy Saving Practices

- Purchase of energy efficient appliances.
- Reducing energy consumption by installing Solar Panel in administrative office in near future.

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- Constant monitoring of energy consumption and defining targets for energy conservation.
- Adjusting the settings and illumination levels to ensure minimum energy used for desired comfort levels.
- Economizers will be provided to utilize heat.
- Condensate will be recovered and will send back to boiler.
- Proper temperature controls will be provided to reduce load on heating systems.
- Proper load factor will be maintained by the company.
- Company will adopt good maintenance practices and will maintain good housekeeping which will help in better illumination levels with least number of fixtures.
- On most of roofs transparent acrylic sheets will be provided to use day light and to stop use of lights during day time.
- LED lamps will be provided.
- To the extent possible and technically feasible, energy efficient equipment will be selected.
- Gravity flow will be preferred wherever possible to save pumping energy.
- Recycling of condensate water will be done.
- Variable frequency drive motors will be used. Energy efficient motors will be used.

c. Behavioral change on consumption

- Awareness on energy conservation.
- Training to staffs on methods of energy conservation.

10.5.2 WATER CONSERVATION PROGRAMME

Unit will reuse distillate water and washing water. However, water conservation shall be practiced to the extent possible by use of reclaimed water for all non-potable application like gardening, lawns and, flushing toilets etc.

(I) Minimizing Water Consumption

A combination of water saving appliances and water management measures will be planned in the plant. The message of water conservation shall be spread to all occupiers on site by way of awareness campaigns and circulars. Specific measures that will be implemented include the following:

(II) Management Measures

- Reduce toilet cistern volume in single flush models.
- Promote awareness on water conservation and reducing water wastage.
- Quick fixing of leaking taps pipes and toilet cisterns; Sweep with a broom and pan where possible, rather than hose down external areas.

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Minimize water use in gardens by the following measures:

- Drip irrigation system shall be used for the lawns and other green area which can save water between 15-40% of the water use, compared with other watering techniques.
- Plants with similar water requirements shall be grouped on common zones to match precipitation heads and emitters.
- Use of low-volume, low-angle sprinklers for lawn areas.
- Select controllers with adjustable watering schedules and moisture sensors to account for seasonal variations and calibrate them during commissioning.
- Selecting a drought resistant grass.

(III) Water Saving Investments

- Reduce water delivery in taps and showers, through the installation of low flow devices or aerators on showerheads.
- Spring-loaded taps;
- Installation of sub-meters on key areas of water use – monitoring water use is a precursor for management and Water Efficient Plumbing Fixtures

10.5.3MANAGEMENT OF TRAFFIC

Parking space for vehicles will be provided for loading and unloading products. Adequate roads to cater to two way traffic and to meet the fire regulations are planned in the complex.

- One gate for entry and exit will be provided with 7m wide approach roads.
- Convex mirror placed along all critical points for visibility.
- Adequate Ramp Feeds will be provided.
- Zebra crossings shall be provided on the existing road for pedestrian access.
- Entry and exit shall be managed by security personnel who will also regulate traffic.
- Thus the traffic management will be easily and smoothly monitored without any hindrances to the regular flow of traffic on the main road.

10.5.4SAFETY MEASURES TO PREVENT THE OCCUPATIONAL HEALTH HAZARDS

- All reasonably practical measures will be adopted by the unit to minimize the risk of accidents within a chemical manufacturing unit
- All building plans and installations will be as per relevant laws and will be approved by competent authority
- Training will be imparted to all workers for all the hazardous process operations within the plant and will be supervised by experienced supervisors

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- Suitable personnel protective equipments and fire extinguishers at strategic locations and suitable personal protective equipments will be provided
- Flame proof electrical fittings, flame arrestors etc will be installed
- All the raw materials will be stored in designated storage area equipped with necessary safety features
- Periodic inspection & testing of pressure vessels, equipments, and machineries will be done.
- Good housekeeping will be ensured within the factory premises
- All designated staff & workers will be trained for the fire-fighting, work permit system, first aid and safe handballing of hazardous chemicals.
- Incident/accident reporting system will be developed and all the employees will be made aware for the same.
- Suitable notices/boards will be displayed at designated locations indicating appropriate hazard warnings.
- Antidotes as well as MSDS for all the chemicals will be made available within the factory premises.
- Pre-employment medical checkup at the time of employment will be carried out. In order to safe guard the health of the employees, all the employees undergo periodic health checkup at every six month.

10.5.5 SOCIAL WELFARE MEASURES FOR FUTURE PLANNING

Providing materials and monetary aid to schools, primary health centers, hospitals, sports, clubs and places of worship.

- Planning to create residential, medical, educational and recreational facilities for our employees.
- Rural Development Programmers for up liftmen of people in the form of dead diction, self-help, vocational training and guidance etc.
- Contributed in any welfare society.
- Scholarship for girls in Schools.
- Training local unprivileged boys and girls for Housekeeping, Laundry etc and provide employment.
- Adoption of Local School / Slum for up liftmen of locals.

10.5.6 CLEANER PRODUCTION

- Discarded containers/bag will be sent back for raw material filling/selling to authorize recycler after decontamination.

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- The unit will be using green chemistry for manufacturing of organic chemicals, which will result in energy savings.
- Unit will use EE for recovery of water and cover water will be used within industry premises.
- Cleaner production options will be explored further.
- Housekeeping will be regularly maintained. Dedicated staff for the purpose will be employed.
- Products will be manufactured on campaign basis to reduce repeated cleaning of reactors.
- Whenever possible, extra filter cloths for centrifuges will be stocked to avoid/ minimize the washings.

10.6 FINDINGS

From the foregoing sections it is clear that environmental considerations are foremost during development of the project, at all the following levels:

(1) Project sitting (2) Planning and design (3) Project construction (4) Post project operations

The following findings are to be mentioned:

- The Project will have no significant environmental impacts during construction and operations.
- Project risks will be minimized through rigorous enforcement of national design and operational standards.
- The environmental and safety aspects of the Project are straightforward and well understood.
- A detailed environmental impact study is carried out and EMP. No further studies are required to elaborate these subjects.

The EMP also provides for establishing, and maintaining a system of environmental monitoring and auditing to ensure strict compliance of all the measures identified in the EMP, and minimize adverse environmental and social impacts.

10.7 LEAK DETECTION AND REPAIR (LDAR) PROGRAM

M/s. A-One Chemicals will follow LDAR program as mentioned below:

Leak Detection and Repair (LDAR) Program

Leak Detection and Repair (LDAR) is a program implemented to comply with environmental regulations for reducing the fugitive emissions of targeted chemicals into the environment. In addition to control fugitive emissions, LDAR Program also helps the industries to reduce unwanted losses of chemicals and thereby conserving energy & increasing their profitability.

Following steps shall be followed for effective implementation of LDAR Program:

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1. Identification of volatile chemicals which may contribute in VOCs:

In proposed plant, following are the list of chemicals which may contribute in VOCs.

- Ortho Nitro Toluene
- IBA/Xylene

2. Identification of all the probable sources of leakage; such as valves, pumps, and connectors.

List of the sources of probable leakage is as follows:

- Valves/Flanges
- Pump glands handling above chemicals
- Open vents from the tank top
- Pump seals
- Compressor seals
- Pressure relief devices
- Process drains
- LPDs (Low Point Drains)
- HPVs (High Point Vents)

A list of all such items shall be made and same shall be incorporated in the checklist for LDAR.

3. Selection of appropriate method for leak detection:

Considering the nature of the chemical; appropriate method shall be selected for leak detection of individual chemicals from the list given below:

- Visual Checks
- LEL meter
- VOC meter
- Gas Detector
- Chlorine Torch
- Ammonia torch
- Etc.

4. Scheduling and checklist for Leak Detection:

All points shall be checked as per the checklist given below.

5. Methods for rectification of identified leaks:

For all identified leaks, closure shall be ensured with the help of maintenance department and records for the same shall be maintained.

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Checklist for implementation of LDAR Program to reduce emissions of VOCs

Sr. No.	List of Source of leakage	Name of Chemical	Method of leak check	Frequency Weekly/Monthly/Quarterly	Checked on	Checked by	Observations / Remarks	Leak to be attended by (Repair to be done within 5 working days)	Leak attended on	Closure Note

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TABLE: 10.4

Leak Detection and Repair (LDAR) program

Sr. No.	Component	Frequency of monitoring	Repair Schedule
1	Valves/Flanges	Quarterly (semi-annual after two consecutive periods with <2% leaks and annual after 5 periods with <2% leaks)	Repair will be started within 5 working days and shall be completed within 15 working days after detection of leak for general organic chemicals. In case of toluene, the leak shall be attended immediately for repair.
2	Pump seals	Quarterly	-do-
3	Compressor seals	Quarterly	-do-
4	Pressure relief devices	Quarterly	-do-
5	Pressure relief devices (after venting)	Within 24 hours	-do-
6	Heat exchangers	Quarterly	-do-
7	Process drains	Annually	-do-
8	Components that are difficult to monitor	Annually	-do-
9	Pump seals with visible liquid dripping	Weekly	Immediately
10	Any component with visible leaks	Weekly	Immediately
11	Any component after repair/replacement	Within a week	--

8.8.1 SHOW CAUSE NOTICE/CLOSURE NOTICE DETAIL

Sr. No.	SCN/Closure	Under Act	Reason for SCN/Closure	Action taken	Remark
1.	GPCB/ANK/CCA-122(5)/ID-14845/402241	Water Act-1974	1. Over production 2. Smell of Ammonia 3. Bag Filter is not working attached	1. Unit had applied for EC. 2. Unit had stop the leakage, covered ETP and vent air was diverted to Scrubber. 3. During visit spin flash dryer	GPCB was satisfied by answer and no

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			with spin flash dryer. 4. Installation of wood fire boiler without CTE/CCA 5. Unit has not enough capacity for Ammonium Sulphate plant (3.5 MT/Day) 6. No installation of stream wise flow meter. 7. Unit had stored 225 MT ETP Sludge.	and bag filter was not in working. 4. Unit had coal fire boiler as per CCA used in case of breakdown of natural gas boiler. 5. Unit has adequate facility. 6. Unit had install flow meter at outlet. 7. Due to monsoon season, unit had stored ETP sludge. Unit was committed to send after monsoon season.	any action taken by GPCB.
2.	GPCB/RO-Ank/T-164/70/03/02/2016	Water Act-1974	Generating high Ammonical nitrogen effluent	Unit started practice of reuse water and reduction of effluent.	GPCB was satisfied by answer and no any action taken by GPCB.
3.	Closure Order No. 447376, dated: 12/03/2018	Water Act-1974	1. High COD, High Ammonical Nitrogen containing wastewater was flowing during monitoring team	The inspection and observation carried out by inspecting terms of NCT/ GEMI on 08/03/2018 at the outside of the our promises is contrary in terms of fact that. We feed that the matter is concieved by assuming and	GPCB had revoked closure and unit is working properly.

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			of NCT/GEMI. 2. One underground ghost connection out site the Ammonical Sulphate plant was found during excavation parallel to IIUS underground drainage connection line. 3. During excavation, brown/ blue colour water with smell of came out from hole of above pipeline. 4. M/s. A-One Chemicals is having official drainage connection near main gate, but their ghost connection is found outside their plant in north of Ammonium Sulphate Plant.	incorporating collected sample in absence of our representative. In fact, any unauthorised direct connection between our unit to IIUS pipeline was not found by the inspection team. Further, any discharge from our unit into the alleged pipeline was also not found. However, after visit of inspection team, we had investigated the cause of coloured water coming out from observed by the inspecting team during the process of manufacturing Ammonium Sulphate, we recover process condensate in receiver tank under vacuum. After batch process recovered condenser is collected in underground tank. This collected condensed reused in scrubber system. On investigation, we found that above mentioned underground tank had leakage from middle of its side wall. Hence, there is a possibility of seepage from the leakage which might have been reflected in the sample collected by the Inspection team. We look, immediate measures to	
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			5. Looking at the situation, it seems that you are discharging High COD, High Ammonical Nitrogen containing wastewater since long through ghost connection with IIUS pipeline.	repair the state leakage, now the tank is repaired and leakage stop. 2. We do not have any unauthorized connection to the drainage line. The exemptions based on the remarks made by the officers are incorrect. We have no knowledge of pipeline connection which was found during excavation outside our unit as mentioned in order. 3. Please refer our reply number 1 above. We would like to inform you that we have install a separate Ammonium Sulphate plant and we are regularly operating it. We have fully comply with the action plan of GPCB particular with respect to the highest COD and high Ammonical nitrogen stream and not discharging any such stream. Please be informed that we are discharging our waste water after treatment meeting the nouns described by GPCB and NCT. 4. We have a connection with drainage of GIDC near the main gate for disposal of our effluent which is converted to NCT for	
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				further treatment. Please be informed that we are discharging our waste water after treatment meeting with the norms prescribed by NCT and GPCB, we do not have any unauthorised connection to the drainage line as alleged. The assumption is made by officer are incorrect. We have no knowledge of pipeline connection which was found during excavation outside the our unit as mentioned in your order. 5. Please refer our reply as above. Will totally disagree with and deny the allegations based on assumptions. we have complied with action plan of GPCB with respect to the highest COD and high ammonia nitrogen stream. Please be informed that we are discharging our waste water after treatment meeting the non suicide by NCT and GPCB we do not have any unauthorised connection to the drainage line as alleged.	
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8.8.1 GPCB INSTRUCTION DETAIL

The unit has received instruction in last two years is attached as Annexure-26.

10.8 CONCLUSION

The project can cause minor impacts only during construction phase due to the various activities involved during that phase. However, strict adherence to the various mitigation measures as identified under the EMP, strengthened by adequate environmental monitoring using best available technology (BAT) and auditing and good construction practices, including the special construction methods as prescribed, will go a long way in effectively reducing the impacts as to negligible levels.

During operation phase of the project, none of the routine activities will cause any noticeable impact on any component of the environment, including the socio-economic component. Provision of green belt and energy conservation shall further facilitate in overall scenario management of Environment.

Thus, it can be concluded on a positive note that after the implementation of the mitigation measures and Environmental Management Plan, the proposed project shall have negligible impact on environment and will benefit the local people and economy.

CHAPTER-11

EXECUTIVE SUMMARY & CONCLUSION

11.1 INTRODUCTION

M/s. A- One Chemicals is located at Plot No. A-1/ 4701 & 4702, GIDC Estate, Ankleshwar, Dist:- Bharuch, Gujarat. Unit was established in 1987. Unit had got NOC vide ref No. GPCB/BRCH/NOC-3070 CCA (122)/16440, dated 7th June 2005 for manufacturing of CPC Blue, Alpha Blue and Beta Blue 350 MT/Month. Same quantity consent is continuing. The unit has valid CCA order AWH-90951, issue on dated 03/02/2018 for manufacturing of CPC Blue, Alpha Blue and Beta Blue. Total existing production capacity is 350 MT/Month. After expansion, total proposed production capacity will be 825 MT/Month. The proposed products by the unit fall in the Schedule attached to the EIA Notification, i.e. Project No. 5(f), Synthetic Organic Chemicals. It is classified as Category “B” project.

11.1.1 LOCATION

9.1.1 LOCATION

The project site is located at Plot No. 4701 & 4702, GIDC Estate, Ankleshwar-393002, Dist. Bharuch in the state of Gujarat. It is approximately 13 Km distance from Dist. Bharuch. Bharuch is the largest city in the State of Gujarat and is one of the focal points of industrial growth in western India.

Numerous major, medium and small scale industries are situated in this area. The nearest town, Ankleshwar is about approximately 3 Km.

The national highway 8 connecting Ahmadabad and Bharuch lies 2.8 km SN of the site is well connected by rail and road. Water is available from the GIDC water supply scheme.

The approximate geographical positioning of the project site is at Latitude: 20°21'12.24"N, Longitude: 72°56' 2.70" E. The unit is spread over in 5460 sq. m. area in GIDC Estate, Ankleshwar.

11.1.2 INVESTMENT

The total investment for proposed project will be in plant and machinery, building and environment protection and safety. The cost of proposed new project will be Rs. 500 lacs.

11.1.3 INFRASTRUCTURE FACILITIES

The plant is located in GIDC Ankleshwar, which is well-developed industrial zone. GIDC Ankleshwar is having all essential facilities such as internal roads, arrangement for supply of water and power to industries etc.

11.2 PROJECT DESCRIPTION

11.2.1 NEED FOR THE PROJECT

This unit is doing a development, manufacturing and marketing of dyes Intermediate. The products are used for reactive and synthetic dyes, pigments etc. They already have confirmed agreements with several traders for purchase of these Dyes Intermediates.

These dyes intermediates requirement is increasing day by day. Due to various applications of Dyes and pigments, they will always remain in demand. Looking towards progress of plastic and polymer industries, demand for pigments will also increase. The paints industries have also registered significant growth in recent past. All these sectors require pigments. They already have confirmed agreements with several traders for purchase of these Dyes Intermediates. Looking towards this background and continuous demand from existing customers of dyes industries, the promoters have decided to create additional facilities at same site.

11.2.2 PRODUCTION AND RAW MATERIAL

As per CCA, the existing production capacity is 350 MT/Month. After expansion, total proposed production capacity will be 825 MT/Month and the byproduct formation will be 3240 MT/month.

11.2.3 RESOURCE REQUIREMENT

LAND

The total plot area of the unit is 5,460 sq. m. The green belt area is 1350.45sq.m.

WATER REQUIREMENT

The Proposed fresh water requirement for domestic and industrial purpose will be met through GIDC Ankleshwar water supply. GIDC Ankleshwar has its own water reservoir and distribution network throughout the GIDC Ankleshwar. Now, after proposed expansion, total water consumption will be 713 KL/day (343 fresh + 370 Recycle) after proposed expansion

ENERGY REQUIREMENT

The connected load will be 1700 KVA. It will be met through Daxin Gujarat Vij Company Limited.

UTILITIES

The proposed utilities like boiler, Thermopack, Hot air generator and D. G. Set are adequate for proposed project.

11.2.4 POLLUTION POTENTIAL SCENARIO

WASTE WATER MANAGEMENT

As per CCA, the wastewater generation is 254.5 KL/Day. After proposed expansion, total industrial effluent generation will be 709.5 KL/Day (Existing: 254.5 KL/Day E + Proposed: 438 KL/Day). Out of 709.5 KL (Process Effluent), 254.5 send in NCT after ETP treatment + 215 internal reuse + 219 will be send to MEE+ 11 Blow down reuse water scrubber followed in coal handling +10 washing water reuse in Process.

GASEOUS EMISSION

FLUE GAS EMISSION

The unit will use Coalin boilers and hot air generator. Unit has installed Multi cyclone Separator + Bag filter+ water scrubber as APCM with boilers and 3 stage water Scrubber and Multi Cyclone Separator as APCM with Hot Air generator. The unit will use natural gas in all thermopack. Unit have stack of adequate height to control emission. Unit have installed two D. G. Sets of adequate stack height. And diesel will be used in proposed DG sets.

PROCESS GAS EMISSION

There will be process emission (NH₃) from reactor. Unit has proposed 2 stage water scrub with each reactor followed by venture scrubber. There will be process emission (PM) from spray dryer. Unit has proposed bag filter as APCM.

HAZARDOUS WASTE GENERATION

There will be generation of ETP sludge (2400 MT/Year), Discarded container (6125 MT/year), Used oil (0.12MT/Annum), SpentSulphuricAcid (10-15%) (3908 MT/Year), SpentSulphuricAcid (20-25%) (14900 MT/Year), Recoverable spent solvent (1481.76 MT/Year). Hazardous waste will be stored in dedicated closed areas. ETP sludge will be sent to TSDF site for disposal. Discarded containers will be sold to authorized dealers after proper decontamination. Used oil will be disposed to registered re-processors. Spent acid and recovered solvent will be reuse internally. Residue will be sent for Co-processing or incineration. The unit will first give preference to Co-processing over TSDF site for better environment management.

11.3 BASELINE ENVIRONMENT STATUS

11.3.1 STUDY AREA INCLUDED IN ENVIRONMENTAL SETTING

Studies were carried out in about 10 km radius area from the project site with respect to meteorology, flora, fauna, land and socio-economies of the area. Further sampling and analysis of air quality, water quality, noise level and soil quality were carried out. The base line data were monitored for study

period of December 2016 to February 2017. The study team conducted site surveys and field experiments to gathering the information on air quality, water quality, noise quality and soil quality.

11.3.2 CLIMATE OF THE STUDY AREA

Relative Humidity

The maximum relative humidity reported around 93% and minimum relative humidity is reported around 7% during period of December 2016 to February 2017.

Temperature

The maximum temperature is reported 43.5°C and the minimum temperature is reported 14°C during period of December 2016 to February 2017.

Rainfall

The maximum rain fall is reported zero and the minimum rain fall is reported is zero during period of March, 2018 to May, 2018.

Wind

It was observed that wind is blowing mainly towards the SW direction from NE. Average wind speed was 2.90 m/s with calm winds recorded to be 5.97%.

11.3.3 AMBIENT AIR QUALITY

Based on data obtained, it could be stated that, during the study period the values of PM₁₀ at monitored locations is ranged between 32 - 94 µg/m³ while the values PM_{2.5} fluctuates in the range of 23-43 µg/m³. The values of SO₂ and NO_x were observed to be in the range of 15 - 40 µg/m³ and 29-48 µg/m³ respectively. The values of VOC and HCl were observed to be in the range of 0.3 - 4.4 µg/m³ and 1-9 µg/m³ respectively. The value of H₂S, HBr, Br₂ and Cl₂ were observed below detectible limit. The value of CO were observed to be in the range of 0.2 - 0.8 µg/m³. The average concentration the results of AAQM is within the norms prescribed in NAAQS. These concentrations at all AAQM locations were primarily caused by local phenomena including vehicular movement and natural dusting due to human activities and wind movement.

11.3.4 WATER QUALITY

In view of the above mentioned chemical analysis of groundwater samples reveals that the pH varies from 7.02 to 8.15, Colour <5, TDS varies from 665-3325 mg/l, Total Hardness varies from 214 to 909 mg/l, Chloride varies from 79 to 627 mg/l, Calcium varies from 93 to 481 mg/l, Magnesium varies from 41 to 428 mg/l, Iron varies from 0.31 to 0.55 mg/l, Fluoride varies from 0.31 to 0.84 mg/l, Sodium varies from 43 to 488.2 mg/l, Potassium varies from 11 to 57.3 mg/l, Sulphate varies from 21 to 148 mg/l, Nitrate varies from 0 to 6.6 mg/l, Alkalinity varies from 100 to 765 mg/l, COD, BOD and Residual free chloride are not detected. MPN coliform varies from 0-23 MPN/100ml.

The heavy metal contents and TDS are found to be well within the limit. The physico-chemical and biological analysis revealed that all the parameters are well within the prescribed limits of IS: 10500-2012.

This water can be used for drinking purpose only after some preliminary treatment.

Analysis of collected samples reveals that rest of the parameters satisfy the permissible limits as per IS 10500:2012 specified for drinking water and hence are suitable for drinking, however it is suggested that the water may be disinfected by boiling or by use of chlorine tablets before use.

In view of the above mentioned chemical analysis of surface water samples reveals that the pH varies from 7.05 to 8.1, Colour remains <5 Pt.co.sc, Turbidity varies from <2 to 3 NTU, Total Hardness varies from 37 to 180 mg/l, Residual free chloride was not detected from any source, Fluoride varies from 0.12 to 0.47 mg/l, Chloride varies from 105 to 1825 mg/l, TDS varies from 221 to 932 mg/l, TSS varies from 4 to 25 mg/l, Calcium varies from 22 to 117 mg/l, magnesium varies from 16 to 110 mg/l, Iron varies from 0.008 to 0.65 mg/l, Sodium varies from 40 to 190 mg/l, Potassium varies from 19 to 80 mg/l, Sulphate varies from 19.2 to 65 mg/l, Nitrate varies from 0.6 to 0.8mg/l, Alkalinity varies from 140 to 179 mg/l, COD varies from <10 to 18 mg/l & BOD remains <10 mg/l, MPN coliform count varies from 0 to 59MPN/ 100 ml and E coli remains absent.

The heavy metal contents and TDS are found to be well within the limit. The physico-chemical and biological analysis revealed that all the parameters are well within the prescribed limits of IS: 10500-2012.

This water can be used for drinking purpose only after some preliminary treatment.

Analysis of collected samples reveals that rest of the parameters satisfy the permissible limits as per IS 10500:2012 specified for drinking water and hence are suitable for drinking, however it is suggested that the water may be disinfected by boiling or by use of chlorine tablets before use.

11.3.5 NOISE ENVIRONMENT

The noise levels during daytime varied from 48-53 dB (A) Leq to 53-72 dB (A) Leq in the study area.

The noise level in the study area is within the permissible Limits as per Noise rules 2000.

The night time noise level in the study area is in the range of 41-45 dB (A) Leq to 45-53 dB (A) Leq.

The night time noise was also within stipulated standards of CPCB.

11.3.6 SOIL

The composite soil sample was collected from project site and the villages within 10 km radius. The samples were collected to determine physical and chemical characteristic of soil.

11.3.7 LAND USE OF THE STUDY AREA

As per satellite imagery, major land use of study area of 10 km is covered by 5097.08 Hectares of open land, 4743.53 Hectares of Agricultural land, 5097.08 Hectares of open/barrel land, 8744.36 Hectares of Fallow land, 4562.30 Hectares of Buildup Area, 4000.62 Hectares of Scrub/degraded vegetation and 2862.2 Hectares of Sandy land.

11.3.8 BIOLOGICAL ENVIRONMENT

The study of the environmental components like flora and fauna is required to assess the biological diversity of the region. Flora and fauna can be used for biological surveillance in assessing the environmental status. The ecological interpretation is based on secondary sources of information.

Water is the basic and essential resource for the survival of flora and fauna. The flora being the primary producer influences the fauna of the region. The characteristic flora existing in a region depends upon the existing conditions such as intensity of sunlight, type of soil, quality of air, including the quality and quantity of water available, etc.

11.4 IDENTIFICATION & ASSESSMENT OF IMPACT

11.4.1 WATER ENVIRONMENT

As per CCA, the wastewater generation is 254.5 KL/Day. After proposed expansion, total industrial effluent generation will be 709.5 KL/Day (Existing: 254.5 KL/Day E + Proposed: 438 KL/Day). Out of 709.5 KL (Process Effluent), 254.5 send in NCT after ETP treatment + 215 internal reuse + 219 will be send to MEE+ 11 Blow down reuse +10 washing water reuse in Process.

11.4.2 AIR ENVIRONMENT

Flue Gas Emission:

The unit will use Coalin boilers and hot air generator. Unit has installed Multi cyclone Separator + Bag filter+ water scrubber as APCM with boilers and 3 stage water Scrubber and Multi Cyclone Separator as APCM with Hot Air generator. The unit will use natural gas in all thermopack. Unit have stack of adequate height to control emission. Unit have installed two D. G. Sets of adequate stack height. Anddiesel will be used in proposed DG sets.

Process Gas Emission:

There will be process emission (NH₃) from reactor. Unit has proposed 2 stage water scrub with each reactor followed by venture scrubber. There will be process emission (PM) from spray dryer. Unit has proposed bag filter as APCM.

Fugitive Emission:

There will be fugitive emission of VOC and acid mist during material handling, transferring and at storage area.

11.4.3 NOISE ENVIRONMENT

Adequate noise control measures such as mufflers, silencers at the air inlet/outlet, anti-vibration pad for equipment with high vibration etc. shall be provided. Housing/casing shall be provided for all noise generating machines. Job rotation will reduce exposure to some extent. Moreover, PPE like earmuff and ear plugs will be provided to the operators/worker exposed to high noise. The proposed green belt will further be helpful in reducing the ambient noise level.

11.4.4 LAND ENVIRONMENT

If the hazardous wastes are not handled properly, it can pose danger of land contamination and can affect land system adversely. Transportation is one of the most important areas of concern associated with handling Hazardous Waste, because the packaging and method of transporting of Hazardous waste will prevent the likelihood that an accident or spill would occur. Separate collection system will be provided for collection of spillage material. Impervious layer, RCC roads and flooring will be provided to area, where the chemical storage and handling activities will be involved. Hence, there will be no significant adverse impact on land environment.

11.4.5 ECOLOGICAL ENVIRONMENT

The project site is located in GIDC Ankleshwar area. The project site is at a far distance from the forest land, wild life sanctuaries and national parks. There will be not significant impact on crops & vegetation as the proposed APCM will take care of flue gas emission and process emission. The waste water generated from the process will be treated and treated waste water will be send to GIDC Pipeline. Sewage will be send to soak pit. There will be no impact on fisheries and aquatic life. Hence, no adverse impact on this account is anticipated.

11.4.6 SOCIO-ECONOMIC IMPACT

This will be a beneficial impact on the local socio-economic environment as increase in demand for essential utilities and employment during both construction and operational phase.

11.4.7 INFRA STRUCTURE AND SERVICES

This will be a beneficial impact on the local infrastructure services e.g. roads, post and telegraph, communication, medical facilities, education, housing will be improved in surrounding area.

11.5 ENVIRONMENT MONITORING PROGRAM

The unit will carry out quarterly monitoring of ambient air, process emission, fugitive emission, Noise, waste water and yearly monitoring of hazardous waste by external approved monitoring agency. Waste water will be monitored daily by in house facility for pH and COD.

11.6 RISK ASSESSMENT AND DISASTER MANAGEMENT PLAN

The chapter 7 includes objectives and methodology of risk assessment, details of storage of finish products and raw materials, details of safety measures, identification of hazards, consequence analysis, recommendations on the basis of risk assessment done, safety aspects to reduce risk in storage area and disaster management plan. Consequences analysis covers major five types of exposures to hazardous effect. Flash fire and explosions, Toxic effect from toxic materials or toxic combustion product.

11.7 PROJECT BENEFITS

The unit has planned to spend Rs. 25 lacs for period of five year towards CSR activity. There will be employment opportunity for local people during construction and operation phase. The CSR activity will be carried within 10 km affected villages.

11.8 ENVIRONMENTAL MANAGEMENT PLAN

11.8.1 ENVIRONMENT MANAGEMENT CELL

There shall be EHS department for overseeing all environment and safety responses to ensure the implementation of EMP mentioned during construction and operation phase including findings / recommendations of third party audits and monitoring results as mentioned in the EMP.

At least one permanent employee with adequate educational and professional qualification and experience to discharge responsibilities related to environmental management including statutory compliance, pollution prevention, environmental monitoring will be employed by company and will directly report to the Director of the organization operations.

11.8.2 ENVIRONMENTAL MANAGEMENT PLAN FOR UNIT

11.8.2.1 ENVIRONMENT MANAGEMENT PLAN FOR CONSTRUCTION PHASE

During construction it is necessary to control uplift of dust during the excavation, leveling and transportation by spraying water over the paths, land and along the temporary roads. The workers involved in the construction will be provided proper sanitation facilities. The construction workers on site will be provided with necessary noise protection devices like earmuffs whenever they have to work near the noise generating equipment/sources. The vehicles will be maintained properly so as to minimize the emissions from exhaust. The empty containers of paints shall be sold to authorized buyers/incineration. The construction wastes shall be used for leveling purpose.

11.8.2.2 ENVIRONMENT MANAGEMENT PLAN FOR OPERATIONAL PHASE

AIR

Flue Gas Emission:

The unit will use Coalin boilers and hot air generator. Unit has installed Multi cyclone Separator + Bag filter+ water scrubber as APCM with boilers and 3 stage water Scrubber and Multi Cyclone Separator as APCM with Hot Air generator. The unit will use natural gas in all thermopack. Unit have stack of adequate height to control emission. Unit have installed two D. G. Sets of adequate stack height. And diesel will be used in proposed DG sets.

Process Gas Emission:

There will be process emission (NH₃) from reactor. Unit has proposed 2 stage water scrub with each reactor followed by venturi scrubber. There will be process emission (PM) from spray dryer. Unit has proposed bag filter as APCM.

Fugitive Emission:

There will be fugitive emission of VOC and acid mist during material handling, transferring and at storage area.

WATER

As per CCA, the wastewater generation is 254.5 KL/Day. After proposed expansion, total industrial effluent generation will be 709.5 KL/Day (Existing: 254.5 KL/Day E + Proposed: 438 KL/Day). Out of 709.5 KL (Process Effluent), 254.5 send in NCT after ETP treatment + 215 internal reuse + 219 will be send to MEE+ 11 Blow down reuse water scrubber followed in coal handling +10 washing water reuse in Process.

Pumps and reactors will be having mechanical seal, so there will be no leakages. The unit will provide connection system for possibility of leakages. Leakages will be collected in a small pit which will carry the leakages to effluent plant.

Possible spillages will be from vessel washing, transfer of liquids, to avoid the spillage fixed pipeline will be provided. Vessel washing will be collected to effluent treatment plant. The unit will provide dedicated area made with RCC and HDPE lining so that the washing can be directly sent to ETP plant.

NOISE

Audio metric test should be conducted periodically for employees working close to the high noise sources. Adequate noise control measures such as mufflers, silencers at the air inlet/outlet, anti vibration pad for equipment with high vibration, earmuff and ear plugs to the operators, etc. shall be provided. Rotation of work will minimize exposure.

LAND

Raw materials will be stored in separate storage area. All the raw effluent storage tanks will be covered with RCC slab. Separate collection system will be provided for collection of spillage material. Impervious layer, RCC roads and flooring will be provided to area, where the chemical storage and handling activities will be involved. The acid tanks are provided with dyke wall to control spread of leakages.

There will be generation of ETP sludge (2400 MT/Year), Discarded container (6125 MT/year), Used oil (0.12MT/Annum), SpentSulphuricAcid (10-15%) (3908 MT/Year),SpentSulphuricAcid (20-25%) (14900 MT/Year), Recoverable spent solvent (1481.76 MT/Year). Hazardous waste will be stored in dedicated closed areas. ETP sludge will be sent to TSDF site for disposal. Discarded containers will be sold to authorized dealers after proper decontamination. Used oil will be disposed to registered re-processors. Spent acid and recovered solvent will be reuse internally. Residue will be sent for Co-

processing or incineration. The unit will first give preference to Co-processing over TSDF site for better environment management.

GREEN BELT

The plant layout has earmarked space for development of green belt of approximately 24% of total plant area. The total plot area of the unit is 5460Sq.m. The green belt area will be 1350.45 sq. m.

CLEANER PRODUCTION

- The plant is itself a product of cleaner production technology.
- Continuous loop reactor instead of batch conventional reaction.

Further cleaner production techniques will be carried out after successful trial of plant.

BUDGETARY PROVISION PROPOSED FOR ENVIRONMENT POLLUTION CONTROL MEASURES

The unit has proposed Rs. 100 Lakhs as capital cost and Rs. 75 Lacs as recurring cost for environment pollution control measures.

HEALTH & SAFETY

There will be provision of PPE, antidotes, periodic inspection & testing of pressure vessels, equipments, machineries, pre-employment medical checkup, periodic health checkup, training of fire fighting, work permits system, first aid, safe handling of hazardous chemicals and integrating safety. Hazardous processes will be operated by trained workers and will be looked after by qualified & experienced supervisors.

CONCLUSION

It can be concluded on positive note that after implementation of proper mitigation measures and environment management plan this project will have insignificant impact on environment and economic. M/s. A-One Chemicals, Ankleshwar GIDC is committed to provide better environment management infrastructure.

CHAPTER -12**DISCLOSURE OF CONSULTANT ENGAGED**

M/s. Jyoti Om Chemical Research Centre Pvt. Ltd. established in 1990 by woman entrepreneur Mrs. Hina C. Upasani, is well-equipped analytical laboratory for chemical analysis. It offers following services to various types of industries in general, and Chemical / Pharmaceutical, CETPS, solid waste sites, steel industries in particular.

The environment impact assessment report was carried out by the EIA team mentioned in table no. 12.1 with respective experience and qualification.

TABLE 12.1**EIA TEAM MEMBER**

Sr. No.	Name of Member	Qualification	Experience
1.	Dr. C. B. Upasani	M.Sc.-Chemistry, Ph. D.-(Applied Chemistry), C.Chem.	37 years
2.	Mrs. Hina C. Upasani	M.Sc.-Chemistry, Diploma- Environment Management	36 Years
3.	Mr. Kamlesh Patel	B.Sc.-Chemistry, Diploma-Environment Management	30 year
4.	Mr.Krunal Prajapati	B.E.- Chemical	8 Years
5.	Ms. Purna Shah	B.E.-Chemical, Certified Course of Industrial Environment Management	7 years
6.	Mr.Vikisha Patel	B.E.-Environment	5 Years
7.	Mr.Vikas Patel	B.E.-Environment	4 years
8.	Ms. Kashmira Shah	B.E.-Environment, Post Diploma in Industrial Safety	4 Years
9.	Mr.Anandkumar Pandey	B.E.-Environmental Science & Technology	3 Years
10.	Mr.Piyush Jamariya	B.E.- Chemical	3 Years
11.	Mr. Ramesh Tarbundiya	B.Sc. & M.Sc.- Biotechnology	3 Year
12.	Mr. Pranav Barad	B.E.- Environment	3 Years
13.	Ms. Riddhi Rathod	B.Sc. Chemistry	01 year
14.	Ms. Nimisha Rana	B.E.-Environment	01 year
15.	Mr. Bhavesh Vagh	B.E.-Environment	01 year
16.	Ms. Archana Vasava	M.sc Environment Science	01 year
17.	Ms. Artising Kushwaha	B.E.- Environment	3 Years

Our associate for Air Pollution Monitoring & Control, Air Quality modelling & prediction is Dr. Khyati Chanana, Enviro Technologies, Vadodara

Our associate for safety& risk assessment for, Health & Hygiene, Risk & Hazard is Mr. Nilesh Jugal, Jogi Safetech, Surat.

Our associate for soil conservation, Noise & Vibration, solid & hazardous waste management is Mr. Hitesh Gundaraniya.

12.1 SALIENT FEATURES

- Spread over 600 m² plot with about 350 m² built up area.
- 1000sq.feet office space purchased at Vadodara for carrying out Climate Change work.
- Well-equipped laboratory with instrument room, conference room, wet AnalysisLab room, microbiology laboratory, Air Analysis Laboratory, Library &Computer room etc.
- Experienced and qualified staff.
- Approved Testing House by Industries Commissioner, Gujarat Government.
- Recognized as Environment Auditor by Gujarat Pollution Control Board, Gandhinagar.
- ISO 9001-2015 Certified by TUV Austria.
- NABL ISO/IEC 17025:2005 accreditation for water and Air parameters.
- Trained for Cleaner Production Assessment by Department of Environment and Forest, Government of Gujarat under World Bank capacity building programme.
- Computerized testing facility.
- Consultant to Gujarat Cleaner Production Centre, Gandhinagar for Cleaner Product Assessment.
- Service provider to UNIDO, Vienna, Austria for Clean Technology Assessment.
- Consultancy for EIA reports.

12.2 SERVICES PROVIDED BY THE CENTRE

- Analysis of chemicals, dyes and dye intermediates
- Analysis of bulk drugs and intermediates
- Analysis of water and waste water
- Testing of environment samples – water, air, solid waste and soil
- Trace analysis of chemicals in waste water
- Environment auditing
- Cleaner Production Assessment
- Microbiological analysis of water
- Clean Technology Assessment
- Environment Technological Assessment (EnTA)
- Environment Impact Assessment
- Climate Change Consultancy

- Environment consultancy
- Environment clearance consultancy

12.3 OUTSTANDING ACHIVEMENTS

- 1) Received **Gujarat Cleaner Production Award** for CP work at M/s. The Ankleshwar Poly Dyestuff Pvt. Ltd. on 5th June, 2006 from Chief Minister Mr. Narendra Modi.
- 2) Received **contract from UNIDO**, Vienna, for writing PDD and developing new methodology for sulphuric acid project.
- 3) Established demonstration unit **FIRST TIME** in INDIA of **Plasma based hazardous waste destruction facility** in collaboration with M/s. PEAT International, USA. Got approval from Central Pollution Control Board, New Delhi.
- 4) Engaged in creating **cluster base recycling unit of spent sulphuric acid** to pure sulphuric acid.
- 5) UNIDO, VIENNA has also assigned work to find out **alternative Air oxidation technology** in place of nitric acid oxidation technology to reduce Green House gas emission.
- 6) Clean Technology tie up with following companies: (i) for recovery of sulphuric acid from spent sulphuric acid – M/S Aker Kvaerner Chemetics, Canada. (ii) Destruction of hazardous waste using Plasma Technology, PEAT International, USA.

(iii) Catalytic Air Oxidation in place of Nitric acid oxidation, M/S Buss Chem Tech AG, Switzerland
(iv) CDM consultancy , BSS, Switzerland
- 7) Received **contract from UNIDO**, Vienna, for writing PDD and developing new methodology for Air Oxidation Technology.
- 8) The organization wrote two methodologies and Project Development Document (PDD) and submitted to UNFCCC. The working committee of UNFCCC approved the methodologies. They are for recovery of sulphuric acid from spent sulphuric acid and substitution of incineration with Plasma Technology.

12.4 STATUS OF NABET ACCREDITATION

The organization has obtained stay order from the Honorable High Court of Gujarat. The copy of the stay order is attached as Annexure-XIV. The cases from various high courts of the countries are transferred to Hon. Supreme Court. It is further declared that at the time of submission of EIA report, the stay order is valid.

12.5 DECLARATION BY CONSULTANT:

An undertaking regarding the prescribed TOR have been complied with and data submitted in this EIA is factually correct is attached as Annexure-X. This is as per office memorandum of MoEF and CC dated 04/08/2009.