Pre Feasibility Report

Expansion of Agrochemical & Intermediates Manufacturing Plant

India Pesticides Limited
(An ISO 9001:2008 OHSAS 18001:2007; ISO 14001:2004; & A GMP Certified Company)

At

UPSIDC, Tehsil Sandila, Dist. Hardoi, Uttar Pradesh

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Prefeasibility Report

1 EXECUTIVE SUMMARY:

M/s India Pesticides Limited enhancing its production capacity of Agrochemicals and intermediates form 10TPD to 100 TPD (by addition of 90 TPD) at existing and proposed location at Plot no: K2 to K11 & D2 to D4, Phase-1, UPSIDC Industrial area, Village-Mahfona,Tehsil- Sandila, District- Hardoi,(U.P)

No National Parks, Wildlife Sanctuaries, Tiger/ Elephant Reserves, Wildlife Corridors etc. falls within 10 km radius from the plant site. Bahca Nadiis flowing at a distance of 6.73 km in NW direction.

Table : Salient Feature of the project

Project Status *(New/ Expansion/Amendment)*	Expansion
Product Capacity	Existing capacity - 10 TPD Expansion - 90TPD After expansion – 100TPD
Total cost of Proposed Project *(Rs. in lacs)*	2500
Plot area *(sq. meter)*	74200 m2
Green belt area,/Tree Plantation area *(sq. meter)*	24500 m2
Source of Water Supply	Ground water
Water consumption *(KL/day)*	Existing + Expansion=135+874
Waste water generation*(KL/day)*	Existing + Expansion=17+404
No. of Boilers/TFH/Furnaces/DG sets etc. with capacities	01 (8TPH-steam boiler)/0/0/2x1000KVA&1x1000KVA
Fuel	Rice husk, Light Diesel Oil (LDO)

2 INTRODUCTION

2.1 Brief Description of the Project

The existing unit is manufacturing agrochemicals and intermediates at the same existing and proposed location at Plot no: K2 to K11 & D2 to D4, Phase-1, UPSIDC Industrial area, Village-Mahfona, Tehsil- Sandila, District- Hardoi,(U.P).It is proposed to enhance the production capacity of Agrochemicals ingredients and intermediates form 10TPD to 100 TPD (by addition of 90 TPD).
Site is well-connected with SH-25 at a distance of 0.72 km (S). The project location map shown in Figure 1.1.

2.2 Need for the project and its importance to region:

The role of the pesticides in the well-being of human race needs no emphasis. Pesticide usage has be come essential in order to maximize agriculture production and reduce public health pestilence. The rapid changes in cropping patterns, increased fertilization and adoption of programs for high yielding varieties have all contributed to increased use of pesticides. Further, pest problems keep on changing with the changing environment. New physiological kinds evolve as a result of mutations to withstand new conditions in nature. Many pest species develop resistant strains when the same Pesticide is used far too often. The problems of pest resurgence and secondary pest out-breaks crop up with the indiscriminate use of pesticides. These associated problems offer a great scope for revolutionizing the use of pesticides. However, in India though the over call pesticide growth figures may appear impressive, the rate of consumption per hectare of cultivated and is very low in comparison per hectare of cultivated land is very low in comparison to other countries. India used 180 g of pesticides/ha as against 10,790g, 1870 g and 1490 g/ha used in Japan, Europe and U.S.A. respectively. India spent just Rs. 2.15/ha on pesticides while Japan and U.S.A spent Rs.110/ha and Rs.35/ha respectively during the same period. India consumed 12 gm. of pesticides per kg of fertilizer used against 146 gm in Japan and 19 gm in U.S.A. This is one of the major factors that can be attributed to low per hectare yields in our country since the crops and especially the high yielding varieties cannot manifest their production potential in absence of proper pest protection. That the production potential remains suppressed for want of protection can be exemplified by considering how in wheat, a crop comparatively resistant to insect pestilence, we have had a “revolution” where as in paddy which is one of the most heavily infested crops, we have had no break-through. In case of wheat, the per hectare yield in India rose from 827 kg to 1338 kg. Corresponding yields of paddy in India on the other hand was 1826kg as against 6185 kg 5326 kg , 5105 kg and 4000 kg. in Japan, Egypt, USA and USSR respectively.
Within the country itself, there is a great imbalance between different regions with regard to the use of pesticides. Of the total of approximately Rs.5000 million spent on pesticides in at the farm level, south contributed for about 45 per cent of the total consumption in the rest of the country.

2.3 Employment Generation (Direct and Indirect) due to the project

Plant would have an additional manpower of 200 which includes skilled -40; trained-70 and workers -90.

3 PROJECT DESCRIPTION

3.1 Type of Project including interlinked and interdependent projects,

The Proposed Project comes under 'Section 5(b)' Pesticides industry and pesticides specific intermediates (excluding formulation)

As per EIA notification dated 14th September 2006 and its amendment thereof proposed project comes under in category A.

No interlinked project.

3.2 Location (specific location and project boundary & project lay out) with coordinates

Proposed expansion project of Agrochemical ingredients and its intermediates shown in Figure 1.1.

Project Site

The land break of the proposed project marked in the following plot.

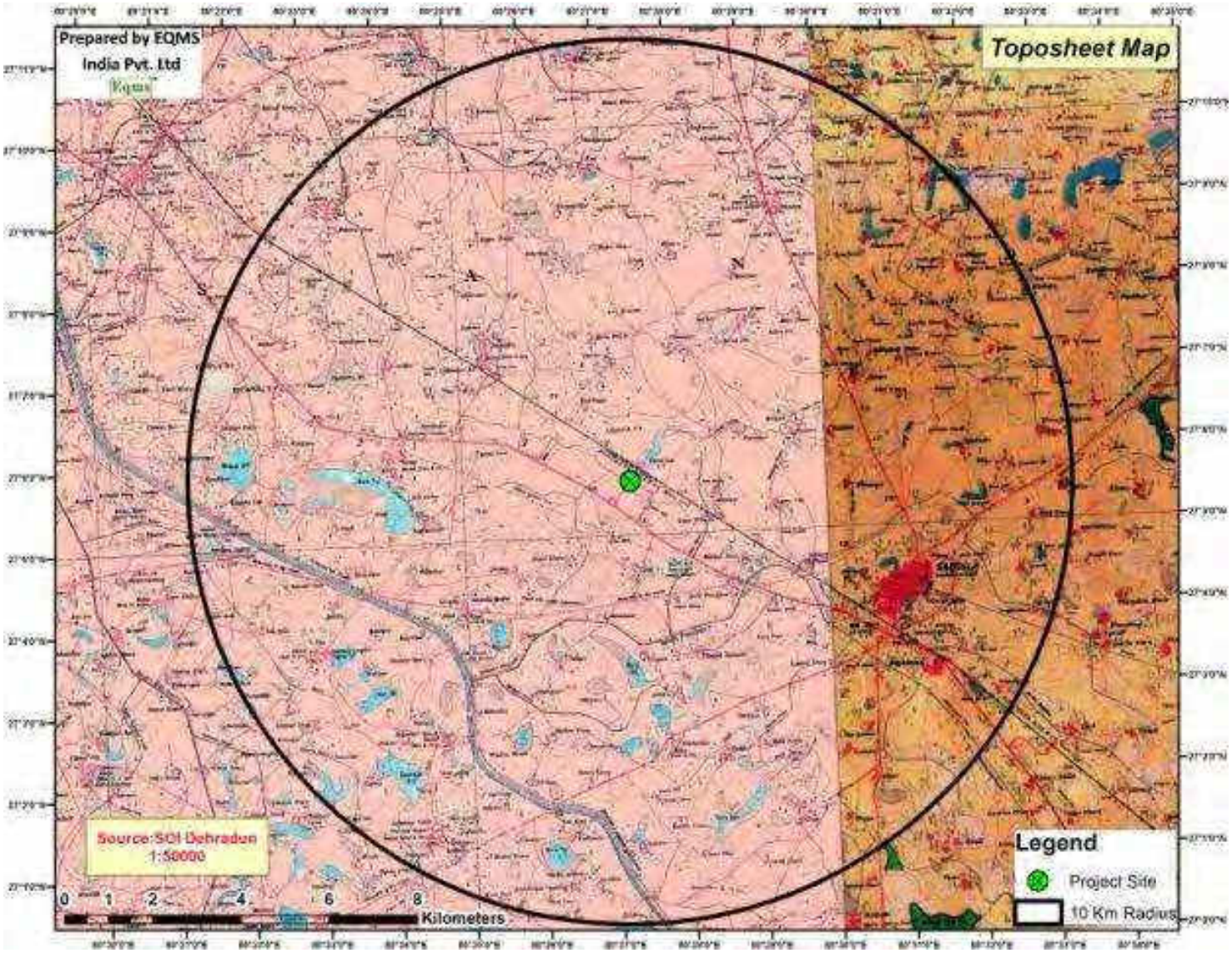


Figure 2.1 : Location map

Figure 2.2 : Plant Layout

3.3 Details of alternate sites considered and the basis of selecting the proposed site, particularly the environmental considerations considered should be highlighted

There is no interlinked project. This is expansion of existing plant and as such no alternative site consideration was needed.
Since the objective is to manufacture pesticides, a lush green & friendly environment is being selected for installing the plant. The existing site is located in notified industrial estate where all common environmental infrastructure facilities are available and also site is well connected to rail, road and port.
The project is not likely to cause any significant impact to the ecology of the area since adequate preventive measures will be adopted to control various pollutants within permissible limits. Green belt development around the area has been and shall be taken up as an effective pollution mitigative technique.

3.4 Existing and Proposed Products / Capacities:

Area Existing: 6 Acre
Total area after expansion: 18.4 acre (74200 m2)
Existing Capacity : 10 TPD

Capacity after Expansion

Existing	Proposed	Total After Expansion
10 TPD	90 TPD	100 TPD

Total production capacity of Agrochemicals and Intermediates after expansion is 100 TPD .
Only 5-6 products will be manufactured at a time.

Expanded capacities not to exceed 90 TPD. Total production to restrict to 100 TPD. List of the product are shown in below Table.

Product Proposed to be Expanded*			
			Additional
S.No	**Tag No**	**Product**	**Capacity(T/Month)**
	Fungicides		
1	**F-16**	Mancozeb (In Phase - I)	1200
		Mancozeb (In Phase - I I)	1200
2	**F-6**	Captan (In Phase - I)	200
Products Proposed to be Added#			
S.No	**Tag No**	**Product**	**Capacity(T/Month)**
1	**F-18**	Carboxin	100
2	**F-19**	Diafenthiuron	10
3	**F-20**	Propineb	50
4	**F-21**	Paclobutrazole	10
5	**F-22**	Zineb	50
6	**F-23**	Etridiazole	25

7	**F-24**	Tricyclazole	25
8	**F-25**	Chlorothalonil	100
9	**F-26**	Trichlopyr	20
10	**F-27**	difenoconazole	25
11	**F-28**	ipconazole	50
12	**F-29**	Dodine	30
13	**H-12**	Imazethapyr	10
14	**H-13**	Metribuzin	25
15	**H-14**	Bispyribac Sodium	30
16	**H-15**	Metolachlor	30
17	**H-16**	Diuron	30
18	**I-19**	Acequinocyl Tech	25
19	**I-20**	Pyriproxyfen	10
20	**I-21**	Novaluran	25
21	**I-22**	Propargite	100
22	**IN-3**	PTBSA(N-Phenyl-N-(Trichloromethyl)-Thio-benzensulfonamide	30
23	**IN-4**	Caprolactam Disulfide	15
24	**IN-5**	Propargile Alcohol	100
25	**IN-6**	Trichloro Methoxy Nitrobenzene	15
26	**FL-1**	Solid Formulation - WDG, WP	500
27	**FL-2**	Liquid Formulation -EC,SL	1000
28	**BP-1**	Sodium Sulphate	360
29	**BP-2**	Ammonium Sulphate	60
Note :			
*	**Expanded capacities not to exceed 90 TPD. Total production to restrict to 100 TPD**		
#	**Subject to total production not to be exceed 90 TPD**		

3.5 Technology and Process Description of New Products:

F-16 : Mancozeb

Process description:-

Step-1: In a SS reactor ethylene diamine and water are charged under stirring condition and temp. is raised to about 45-50°C.Now CS_2 is added slowly under reflux. Then, measured quantity of caustic lye addition is started slowly so that pH of the mass is maintained around 10. The mass is kept under these conditions for 6- 8 hours till the reactions is complete.

Step-2: In a SS reactor manganese sulphate is dissolved in water under stirring and mass temp. is raised to 30-35°C. Now the mass of step (1) is charged slowly within a period of one and a half hours. Then the mass is allowed to settle. The slurry is filtered under vacuum to get wet cake of Maneb.

Step-3: Maneb is reacted under stirring conditions with zinc sulphate (32%) solution at 30°C. After 30 mins interval, left over mass of step(1) i.e. NABAM is added and maintained for one hour. At the temp of 30°C, calculated amount of china clay is added to the slurry and stirred for half an hour . This slurry is filtered, washed under vacuum and dried in a dryer to get the product **MANCOZEB.**

Reactions:-

- Ethylene diamine + CS_2+ caustic lye + water → NABAM + Na_2SO_4

(mod. Temp & low vacuum)

- NABAM + $MnSO_4$ → Maneb
  (mod. Temp & low vacuum)
- Maneb + zinc sulphate+ NABAM → MANCOZEB
  (mod. Temp & low vacuum)

Production Capacity:- 40 tons/day
Batch time:- 30 hrs.

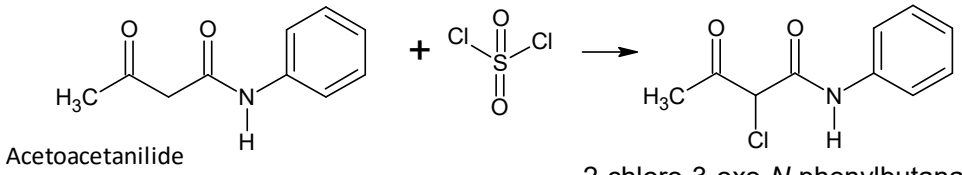
Environmental aspects:-
Emissions:-Lean vapours from reactor reflux are sucked out to plant scrubber system.
Liquid effluents:- Inorganic salts in water are sent to ETP.
Solid effluents:-Sodium sulfate is by-product for sale.

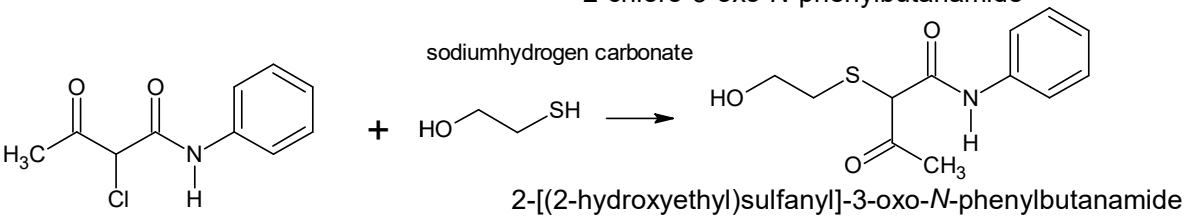
F-18: CARBOXIN TECH

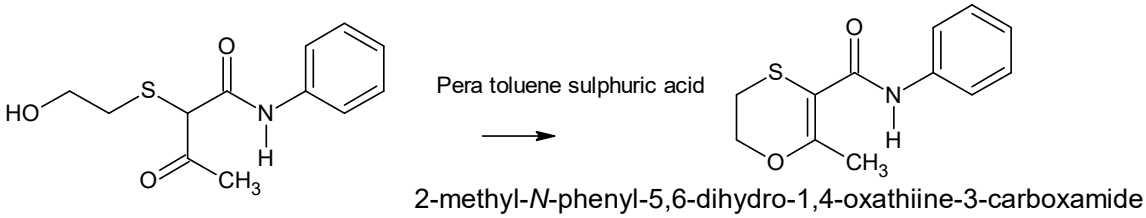
Process description:-

Carboxin is manufactured by reacting acetoacetanilide with sulfuryl chloride (SO2Cl2) to give 2-chloro-3-oxo-N-phenylbutanamide intermediate .

This intermediate is furtherreacted with 2-mercaptoethanol in presence of sodium hydrogencarbonate to give 2-(2-hydroxyethylthio)-3-oxo-N-phenylbutanamide . Finally it is cyclysed using PTSA to give carboxin crude and crystallised in methanol to give carboxin technical







Formula Weight: 235.3

Production Capacity :-4TPD.
Batch time:-24 hrs.

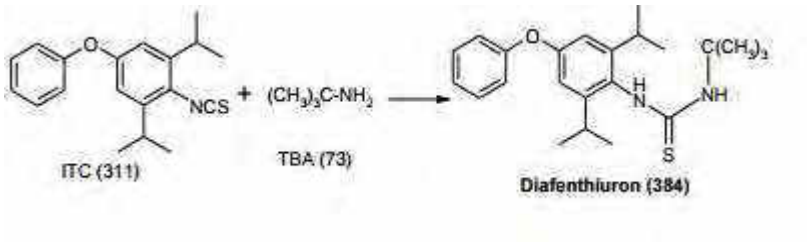
Environmental aspects:-

1. **Emission**: No
2. **Liquid effluents**: Aqueous effluent sent to Multiple effect evaporated system
3. **Solids**: Organic salts are sent to secured Land-fill system.
4. **Solvent recovery**: Solvent(methyl alcohol)is distilled and reused in the process.

F-19: Diafenthiuron

Process description:-
Diafenthiuron is prepared by condensation of 2,6-diisopropyl-4-phenoxyphenyl isothiocyanate with tert-butylamine in presence of isopropyl alcohol as solvent. The products is filtered and dried. Isopropyl alcohol is distilled and recycled.

Reactions:-
2,6-diisopropyl-4-phenoxyphenyl isothiocyanate + tert-butylamine
→ 1-tert Butyl-3-(2,6-diapropyl-4-phenoxyphenol thiourea)



Production Capacity :- **0.4** TPD.
Batch time:- **24** hrs.

Environmental aspects:-
1.**Emission**: No
2.**Liquid effluents**: No liquid effluent(aqueous or organic) is generated in the process.
3.**Solids**: Organic residues are sent to secured landfill system.
4.**Solvent recovery**: Solvent(isopropyl alcohol)is distilled and reused in the process.

F-20: Propineb

Process description:-
Step-1: Carbon disulphide and propylenediamine (PDA) are reacted under controlled conditions in a reactor to produce Propylene BisdithioCarbamic Acid. This acid is neutralized in the same reactor with Ammonia solution to get Ammonium salt.

The ammonium salt forms an aqueous medium and is a common ingredient for production of PROPINEB.

Step-2: The ammonium salt solution is reacted with Zinc sulfate solution to form Zinc salt of Propylene Bisdithiocarbamate . The Zinc salt is insoluble in aqueous medium and forms a slurry. Also Ammonium sulfate is formed as a byproduct.

Step-3: To improve purity of the product the slurry is filtered and washed to remove ammonium sulfate. The Zinc salt is obtained as a cake.

Step-4: The cake is re-slurried and additives like Sodium LignoSulphonate(Na-SLS) are added to make slurry process-able.

Step-5: The slurry is then Spray Dried to get Propineb powder with moisture content less then 1%.

Step-6: The powder is grounded to reduce particle size to specification.

Reactions:-

- CS_2+ PDA → Propylene BisdithioCarbamic Acid
- Propylene Bisdithio Carbamic Acid + ammonia sol. →ammonium salt of PBDC
- ammonium salt of PBDC + Zinc sulfate sol. →Zn-PBDC + $(NH_4)_2SO_4$ (propineb)

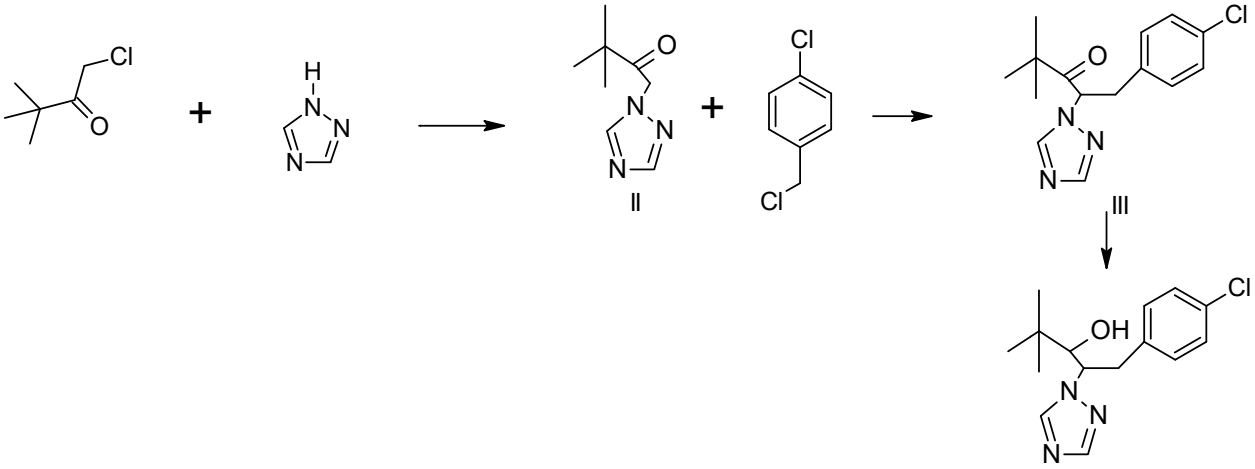
Production Capacity :- **2** tons/day.
Batch time:- **24** hrs.

Environmental aspects:-
Emissions: Ammoniais released and sucked to water scrubber system.

F:21 Paclobutrazol

(2RS,3RS)-1-p-Chlorophenyl-2-(1,2,4-triazol-1-yl)-4,4-dimethylpentan-3–ol

Process description :
α -Chloropinacolone was reacted with 1,2,4-triazole to produce a-triazolylpinacolone, which was further reacted with p-chlorobenzyl chloride and finally reduced by NaBH4 to yield Paclobutrazol



Production Capacity :- **0.4** tons/day.
Batch time:- **24** hr

Environmental aspects:-
1.**Emission**: No
2.**Liquid effluents**: aqueous effluent sent to Multiple effect evaporated system .
3.**Solids**: Organic residues are sent to secured landfill system.
4.**Solvent recovery**: Solvent(toluene)is distilled and reused in the process.

F-22: Zineb

Process description:-

Step-1: Carbon disulphide (CS_2) and Ethylene diamine (EDA) are reacted under controlled conditions in a reactor to produce Ethylene BisdithioCarbamic Acid. This acid is neutralized in the same reactor with Castic lye (NaOH) solution to get Sodium salt of Ethylene Bisdithiocarbamate(Na-EBDC).

The sodium salt forms an aqueous medium and is a common ingredient for production of ZINEB and MANCOZEB.

Step-2:- The Na-EBDC solution is reacted with Zinc chloride solution to form Zinc salt of Ethylene Bisdithiocarbamate (Zn-EBDC). The Zinc salt is insoluble in aqueous medium and forms a slurry. Also NaCl is formed as a byproduct.
Step-3:- To improve purity of the product the slurry is filtered and washed to remove NaCl. The Zinc salt is obtained as a cake.
Step-4:- The cake is re-slurried and additives like Sodium LignoSulphonate(Na-SLS) are added to make slurry process-able.
Step-5:- The slurry is then Spray Dried to get Zineb powder with moisture content less then 1%.
Step-6:- The powder is grounded to reduce particle size to specification.
Step-7:- The powder is then adjusted for Active ingredient by addition of filters in a Blender.

Reactions:-

- CS_2+ EDA → Ethylene BisdithioCarbamic Acid
- Ethylene BisdithioCarbamic Acid + Castic lye (NaOH) → Na-EBDC
- Na-EBDC + Zinc chloride → Zn-EBDC + NaCl
  (zineb)

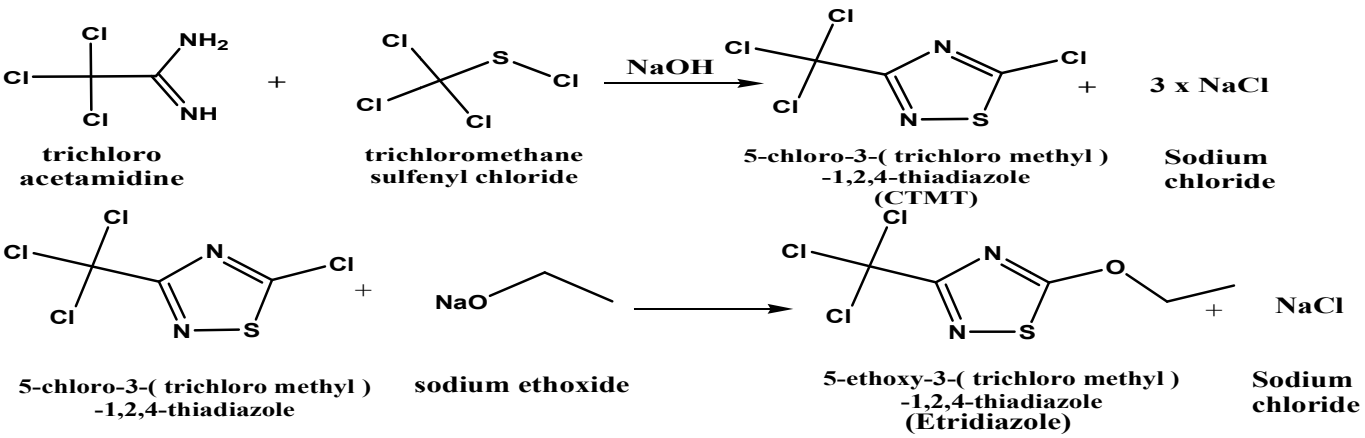
Production Capacity :- **2** tons/day
Batch time:- **24** hr

Environmental aspects:-
Emissions:-No emissions.
Liquid effluents:- Inorganic salts in water are sent to ETP.

F-23: ETRIDIAZOLE

Process description:-
Etridiazole is prepared by the reaction of trichloroacetamidine with trichloro methane sulfenylchloride in the presence of solvent ethylene dichloride followed by hydrolysis with aqueous sodium hydroxide solution. This intermediate is allowed to react with sodium ethoxide to get etridiazole. The product is filtered, washed and dried. EDC is distilled and recycled.

Reactions:-



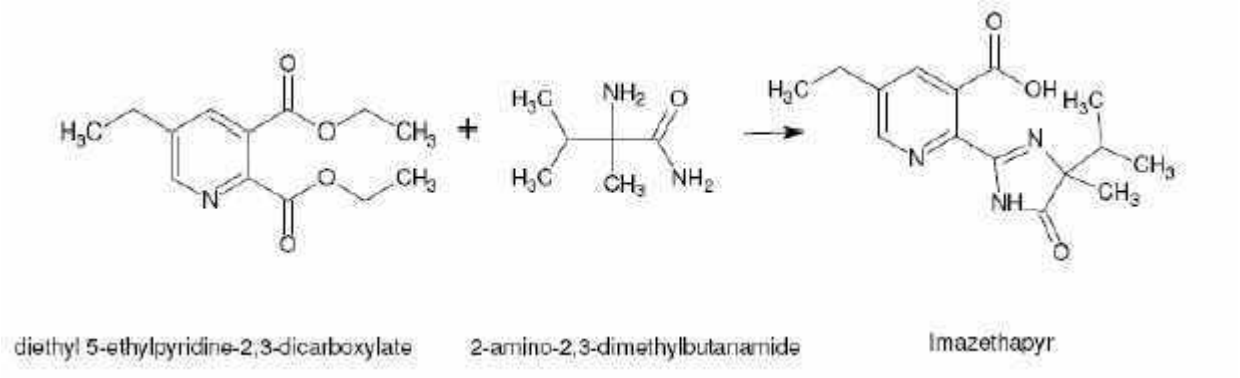
Production Capacity :- 0.2 TPD
Batch time:- 24 hr

Environmental aspects:-
1.**Emission**: No
2.**Liquid effluents**: Aqueous effluent is generated in the process was treated in PTRO and MEE. Treated water is reuse.
3.**Solvent recovery**: Solvent(EDC)is distilled and reused in the process.

H-12: Imazethapyr

Process description:-
Step 1:- Charge 2 Amino 2,3 Di methyl Butane amide, Ethyl 5 Ethyl Pyridine Dicarboxylate and sodium ethoxide in Toluene.
Step 2:- Heat the reaction mass to 50^{o}C and distill ethanol from reaction mixture.
Step 3:- Raise and maintain the temp. at 110^{o}C for few hours.
Step 4:- On completion of reaction,charge water to reaction mass and maintain pH 3.5 with HCl.
Step 5:- Cool the reaction mass to 30^{o}C.Fill the crude imazethapyrand crystallize in ethanol.

Reactions:



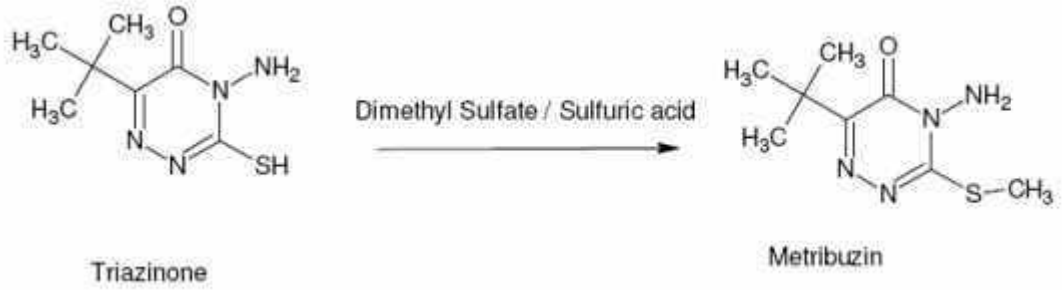
Production Capacity :-0.4 TPD
Batch time:-24 hr

Environmental aspects:-
1.**Emission**: No
2.**Liquid effluents**: Washed Water.
3.**Solids**: Organic salts are sent to secured landfill system

H-13: Metribuzin

Process description:-
Triazinoneis charged slowly in sulphuric acid in 4 hours. Temperature is raised to 45 C and Dimethyl sulfate is charged. Maintain temp for 10 hours.When reaction shows completion of methylation ,quench in 20% Soda ash solution.Finally adjust pH 10 with NaOH lye. Filter, centrifuge and dry the wet cake to obtain the product.

Reactions:



Production Capacity :- 1 TPD
Batch time :- 24 hrs.

Environmental aspects:-
1.**Emission:** No
2.**Liquid effluents**: Washed water
3**. Solids**: Organic salts are sent to secured landfill system.

I-19: ACEQUINOCYL TECH

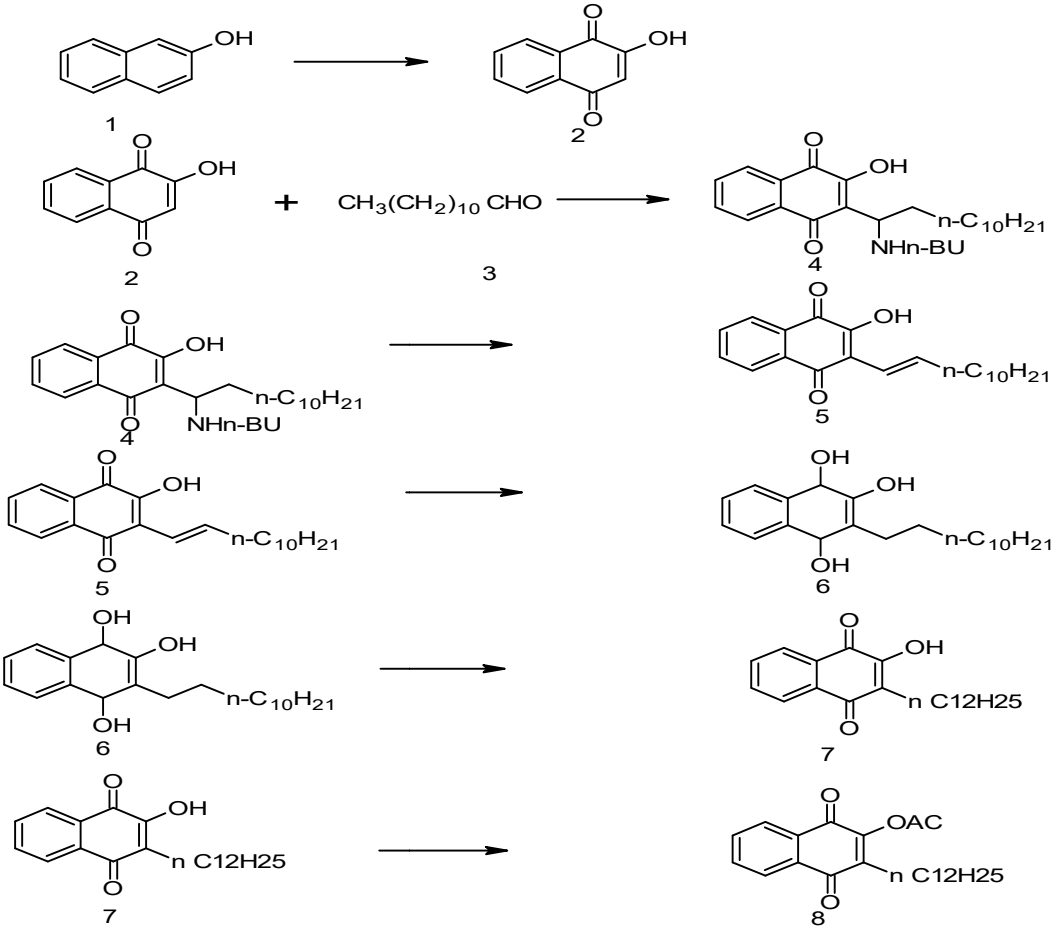
Process involves following steps

1.0: Oxidation
2.0 :Condensation and deamination
3.0 :Hydrogenation.
4.0 Oxidation
5.0 Acylation

Process Descriptions:

2-napthol (1) is oxidized with a mixture peroxide to give intermediate 2-hydroxy-1,4-naphthaquinone (2)
Intermediate 2-hydroxy-1,4-naphthaquinone (2) is condensed with dodecanal (3) in the presence of base to give 3- (1-butylaminododecyl) - 2-hydroxy-1,4-naphthaquinone (4) which is deaminated to give the dodecenyl derivative(5)
The dodecenyl derivative (5) is then hydrogenated (6) and air oxidized to give 2-dodecyl-3-hydroxy-1,4-naphthaqiunone,(7) which is acetylated to give Acequinocyl (8).

Reactions:-



Production Capacity :- 1 TPD
Batch time:- 36 hrs.

Environmental aspects:-

1. **Emission**: No
2. **Liquid effluents**: aqueous effluents sent to Multiple effect evaporator system .
3. **Solids**: Organic residues are sent to secured landfill system .
4. **Solvent recovery**: Solvent (o-xylene) is distilled and reused in the process

IN-3 :PTBSA (Phenyl-N-trichloromethylsulfanyl-benzene sulfonamide):-

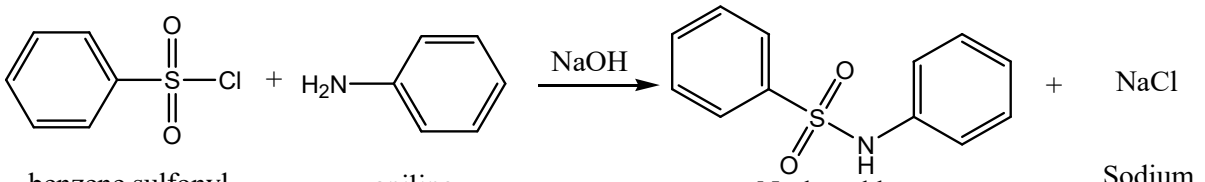
Process description:

Step1:- Mixture of aniline and sodium hydroxide is added to Benzene sulfonyl chloride at the temp. of 10 C. After reaction, maintenance is done for 1 hr. Filtration of reaction mass slurry is done. Wet cake of N-phenyl benzene sulfonamide is received.

Step-2:-Wet cake is fed to sod.hydroxide solution under stirring. Trichloromethanesulfenyl chloride (TCMS)is added at particular temp.. Maintenance is done for 1 hr. followed by filtration and drying.

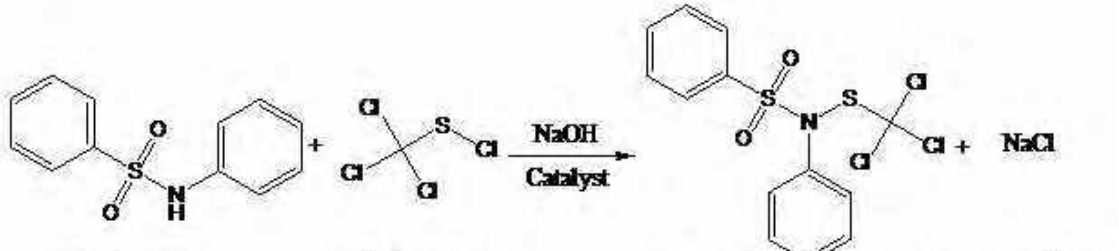
Process for the manufacture of PTBSA was carried out in two steps.

Ist Step: Preparation of N-Phenyl benzene sulfonamide:



benzene sulfonyl chloride | aniline | N-phenyl benzene sulfonamide | Sodium chloride

IInd Step:- Preparation of N-Phenyl-N-trichloromethylsulfanyl-benzenesulfonamide (PTBSA)



N-phenyl benzene sulfonamide | trichloromethane sulfenyl chloride(TCMS) | N-Phenyl-N-trichloromethyl sulfanyl-benzenesulfonamide (PTBSA) | Sodium chloride

Production Capacity :- **1.2** tons/day.
Batch time:- **24** hrs.

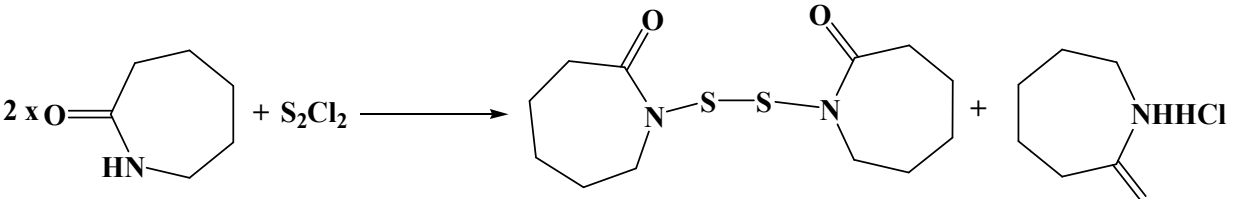
Environmental aspects:-
1.**Emission**: Nil
2.**Liquid effluents**: Aqueous layer containing sodium chloride.
3.**Solids**: Nil

IN-4: Dicaprolactamdisulfide :

Process description:-

Caprolactam was reacted with sulfur chloride in the presence of solvent, dicaprolactam disulfide produced was filtered, washed and dried. Solvent was recycled in further batches.

Reactions:-



caprolactam **Dicaprolactam disulfide** **Caprolactan HCl**

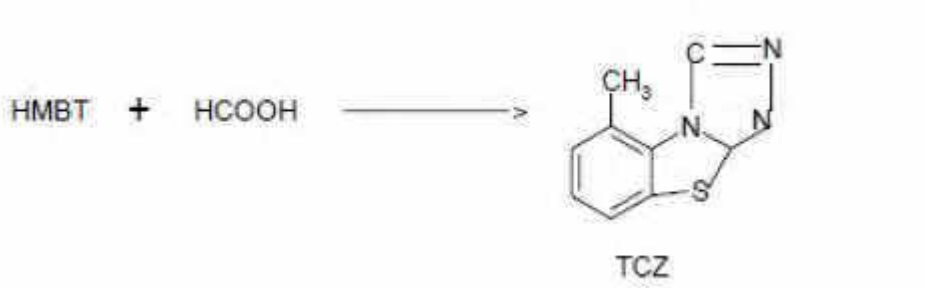
Production Capacity :- **500**kg / day
Batch time:- **20** hrs.

Environmental aspects:-
1.**Emission**: Hydrochloric acid scrubbed in water
2.**Liquid effluents**: acidic effluent generated in the process is sent to ETP.
3.**Solids**: Inorganic residue sent to secured land fill system.

F-24 :Tricyclazole

Process description :
2-hydrazo-4-methyl-henzothiazole (HMBT) is reacted with formic acid (HCOOH) followed by filtration. The wet cake obtained is directed for drying to get the final product Tricyclazole.

Reaction:



2-hydrazo-4-methyl- Formic acid Tricyclazole

henzothiazole

Production Capacity : 1 TPD
Batch time: 24 hrs

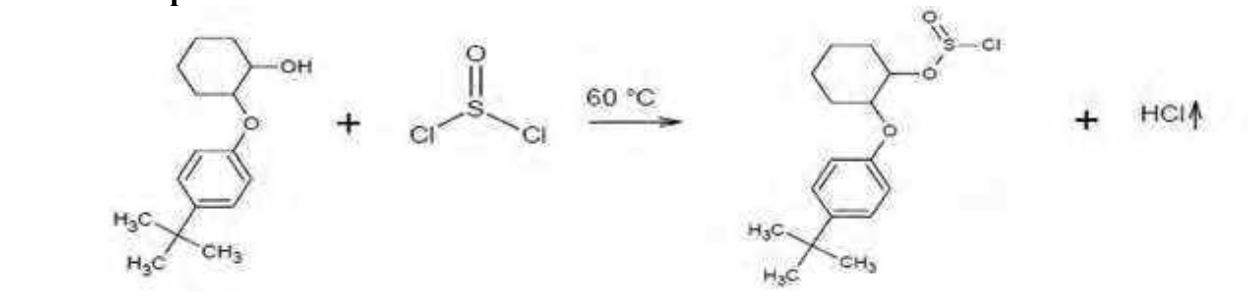
Environmental aspects:

Emissions: No emissions.
Liquid effluents: Nil
Solid effluents: Nil
Solvent recovery: Formic acid and xylene are recovered for the process.

I-22: Propargite

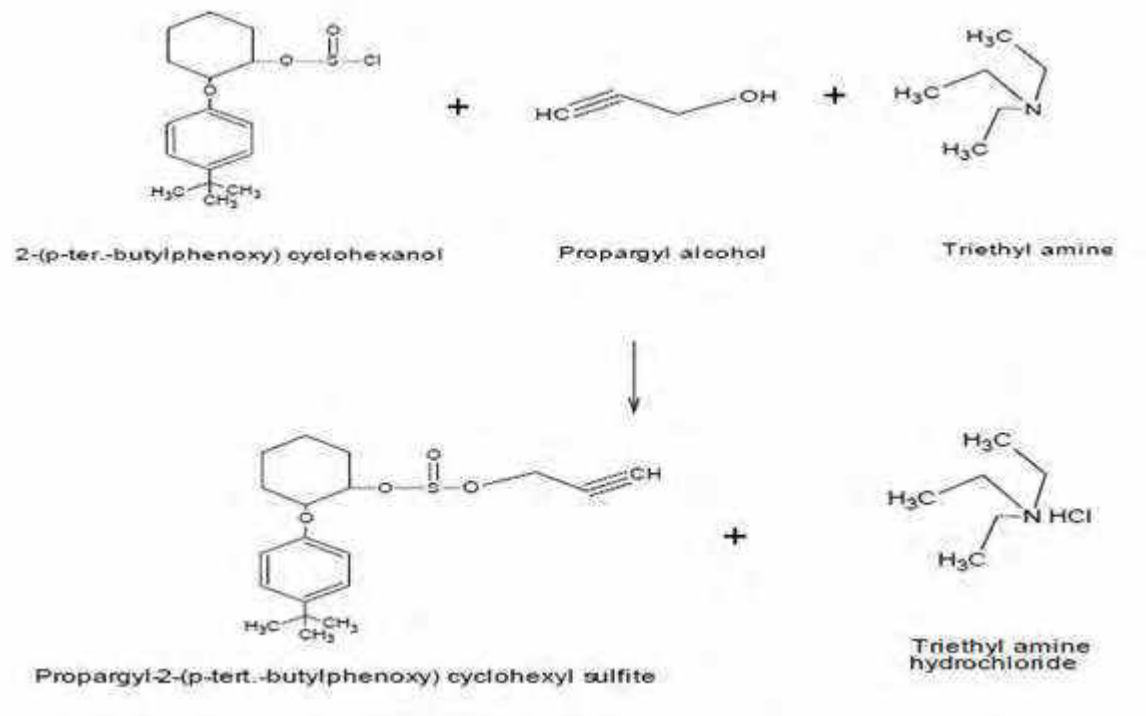
Process description :
Propargite technical is manufactured in two steps. In first step intermediate chlorosufinate is prepared by reaction of p-tert-butyl phenoxycyclohexanol and Thionyl chloride at a particular temperature. Reaction mass is stirred for a period & further reacted with Propargyl alcohol in presence of Triethylamine at a specified temperature for some time to get Propargite technical.

STEP I - Preparation of Chlorosufinate



2-(p-ter.-butylphenoxy) cyclohexanol | Thionyl chloride | 2-(p-ter.-butylphenoxy) cyclohexyl chlorosulfinate

STEP II - Preparation of Propargite Technical :-



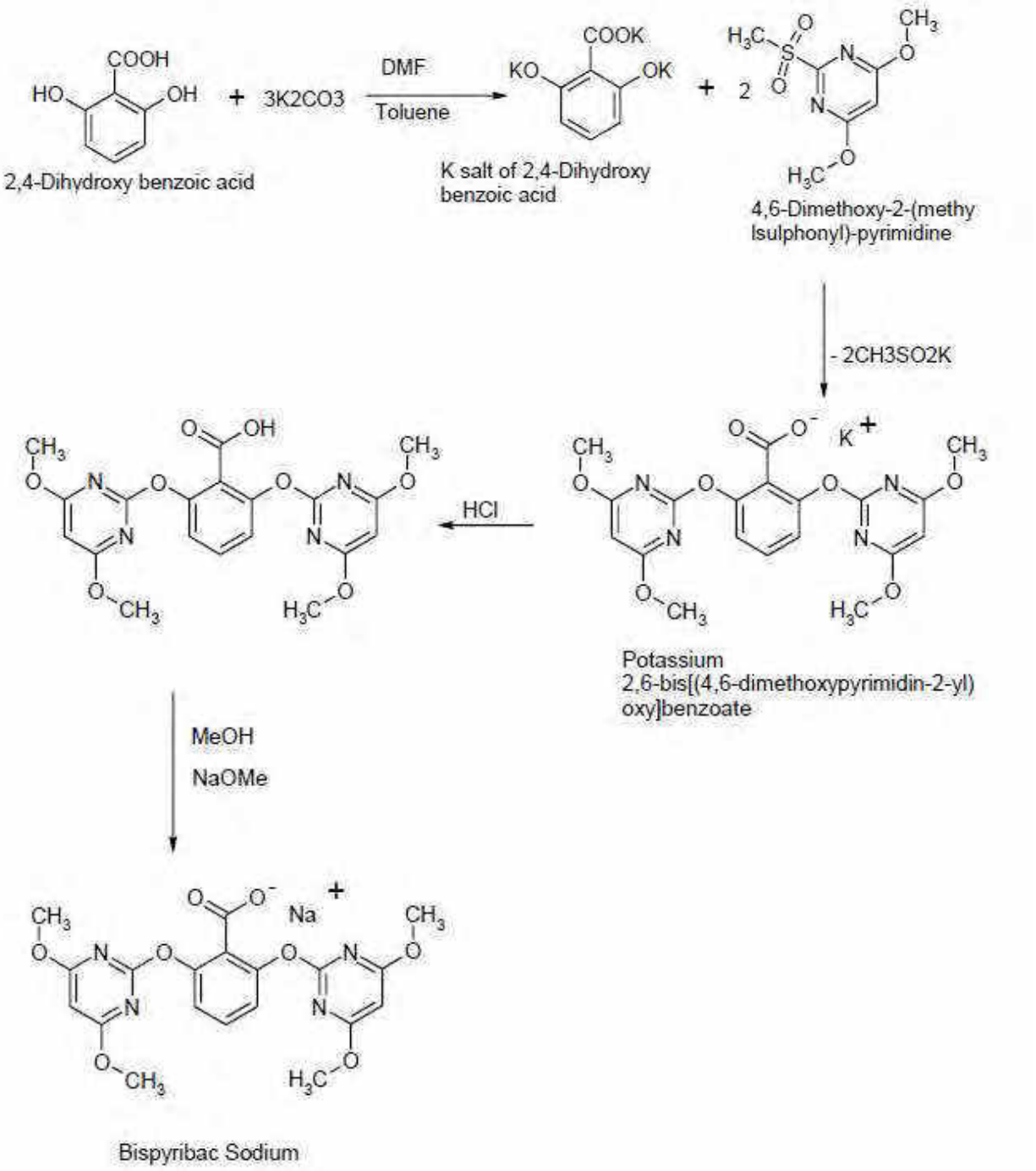
Production Capacity : 4 TPD
Batch time: 24 hrs

Environmental aspects:

Emissions: No emissions.
Liquid effluents: Nil
Solid effluents : Nil
Solvent recovery: Toluene is recovered, purified and recycled.

H-14: Bispyribac Sodium

Process description:
2,6-Dihydroxy Benzoic Acid is treated with potassium carbonate in presence of toluene to produce potassium salt of 2,6-Dihydroxy Benzoic Acid .The K-salt produced is reacted with 4,6-Dimethoxy-2-methylsulfonylpyrimidine, at a high range of temperature, with help of steam then acidified and purified, may be crystallised to give Bispyribac-Sodium.



Production Capacity : 1 TPD
Batch time: 24 hrs

Environmental aspects:

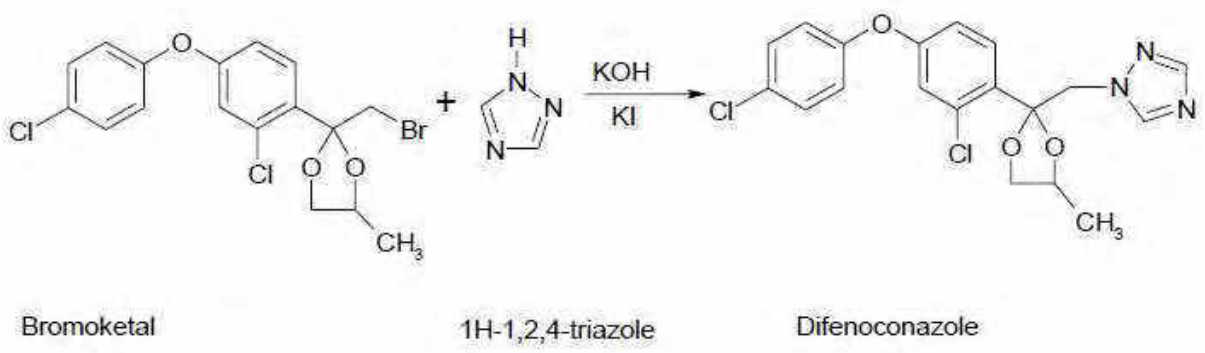
Emissions: No emissions.
Liquid effluents: Nil
Solid effluents : Nil

F-27: Difenoconazole

Process Description:
It is a single-step process. The potassium salt of 1H-1,2,4-triazole is reacted with 2-(Bromomethyl)-2-[4-(4-chlorophenoxy)-2- chlorophenyl]-2-methyl-1,3-dioxolane (Bromoketal) in N,N-dimethyl formamide in presence of catalytic quantity of potassium iodide at a particular high temperature to give Difenoconzole technical.

After completion of the reaction, DMF is distilled out & the reaction is quenched with water. It is extracted with toluene & the organic layer is washed successively with water, HCl solution & water. The solvent toluene is distilled out & product is crystallized from DMF-water system to get light beige coloured crystalline solid product. It is centrifuged & dried to get pure Difenoconazole technical.

Reaction:



Production Capacity : 1 TPD
Batch time: 24 hrs

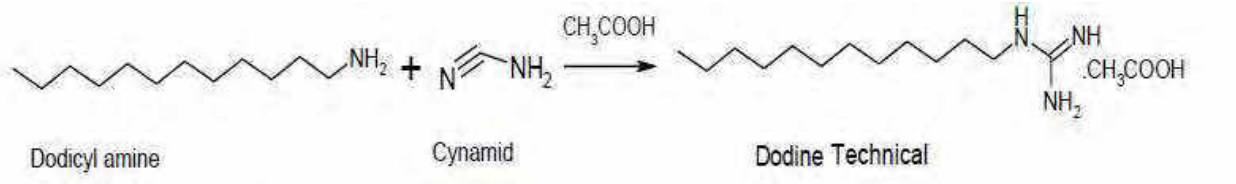
Environmental aspects:

Emissions: No emissions.
Liquid effluents: Nil
Solid effluents : Nil
Solvent recovery: Toluene is recovered.

F-29 :Dodine

Process Description:
Dodine technical is manufactured in a single step. In this single step molten Dodecilamine is reacted with cynamide in presence of acetic acid at high range of temperature which gives Dodine technical.

Reaction:



Production Capacity : 1 TPD
Batch time: 24 hrs

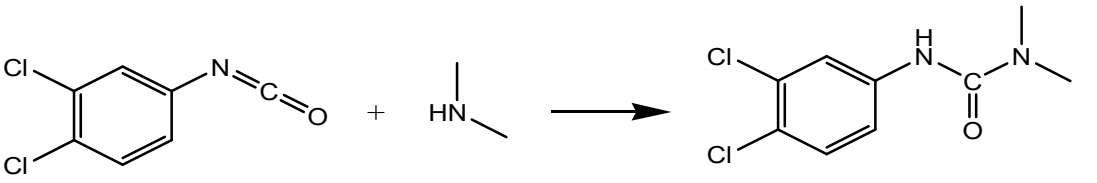
Environmental aspects:

Emissions: No emission.
Liquid effluents: Washed effluents.
Solid effluents : Nil
Solvent recovery: Mother liquor is recovered for reuse in process.

H-16: Diuron

Process Description:
3, 4-Dichlorophenyl isocyanate and xylene are charged and to this reaction mass, dimethylamine is introduced. After the reaction is complete, the reaction mass is cooled, filtered and dried to get Diuron.

Reaction:



3, 4-Dichlorophenylisocyanate Dimethylamine 3-(3, 4-Dichlorophenyl)-1, 1-dimethylurea

(DIURON)

Production Capacity : 1 TPD
Batch time: 24 hrs

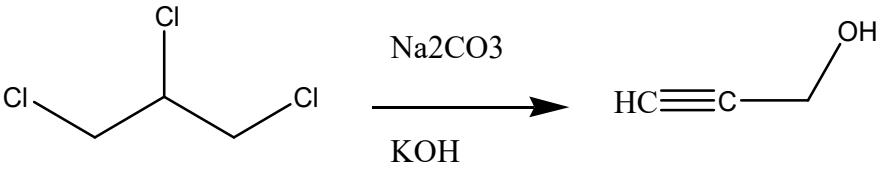
Environmental aspects:

Emissions: NA
Liquid effluents: NA
Solid effluents : Organic residues sent to secured land fill system.
Solvent recovery: Solvent (xylene) is recovered and reused in the process

IN-5: Propargyl Alcohol

Process Description:
1, 2, 3-Trichloropropane, sodium carbonate, a catalyst and water are heated in an autoclave. The resulting reaction mixture is then reacted with potassium hydroxide to get propargyl alcohol. The product is isolated after workup and distillation.

Reaction:



1,2,3-Trichloropropane Propargyl alcohol

Production Capacity : 4 TPD
Batch time: 24 hrs

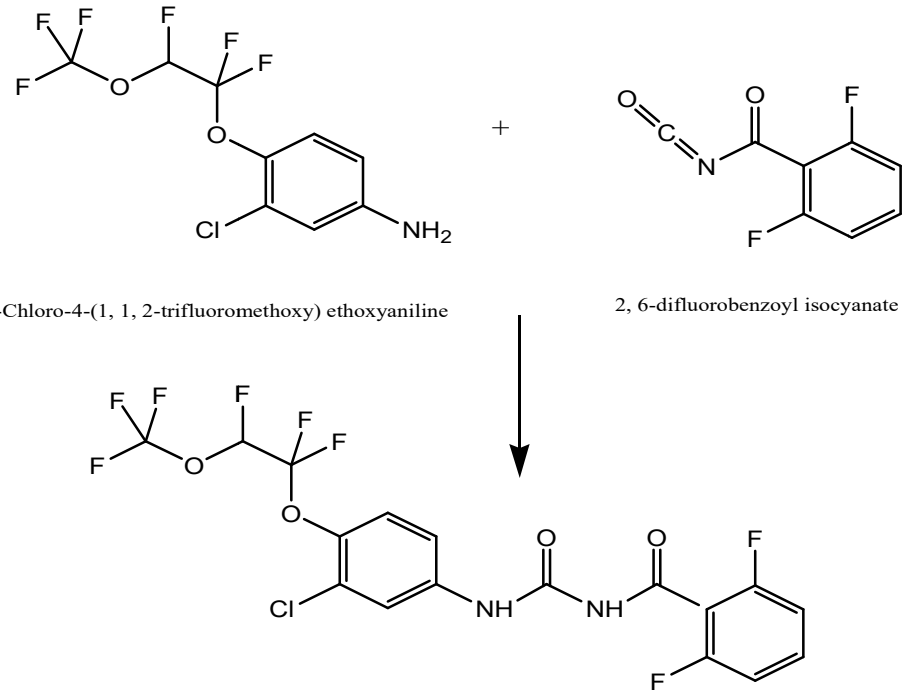
Environment Aspects:

1. **Emission:** NA
2. **Liquid effluents**: Aqueous effluent containing inorganic salts to be treated in PTRO and MEE.
3. **Solids**: NA
4. **Solvent recovery**: Solvent (Dichloroethane) is recovered and reused in the process.

I-21: Novaluran

Process Description:
To a solution of 3-Chloro-4-(1, 1, 2-trifluoromethoxy) ethoxyaniline in dichloroethane is added a solution of 2, 6-difluorobenzoyl isocyanate. After the reaction is complete mass is filtered and washed with dichloroethane and dried to give Novaluron.

Reaction:



3-Chloro-4-(1, 1, 2-trifluoromethoxy) ethoxyaniline

2, 6-difluorobenzoyl isocyanate

NOVALURON

Production Capacity : 1 TPD
Batch time: 24 hrs

Environment Aspects:

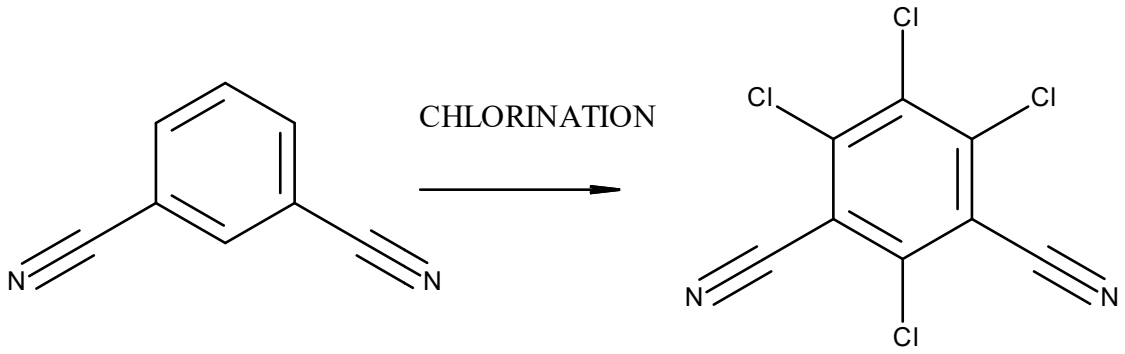
1. **Emission**: No
2. **Liquid effluents**: No
3. **Solids**: Organic residues are sent to secured landfill system
4. **Solvent recovery**: Solvent (dichloroethane) is distilled and reused in the process.

F-25: Chlorothalonil

Process Description:

Chlorothalonil is produced by the chlorination of isophthalonitrile

Reaction:



isophthalonitrile

2,4,5,6-Tetrachloro-isophthalonitrile

chlorothalonil

Production Capacity : 4 TPD
Batch time: 24 hrs

Environment Aspects:

1. Emission: No
2. Liquid effluents: No
3. Solids: Organic residues are sent to secured landfill system
4. Solvent recovery: Solvent(methyl alcohol)is distilled and reused in the process.

F-26 : TBEE (TRICHLOPYR BUTOXY ETHYL ESTER)

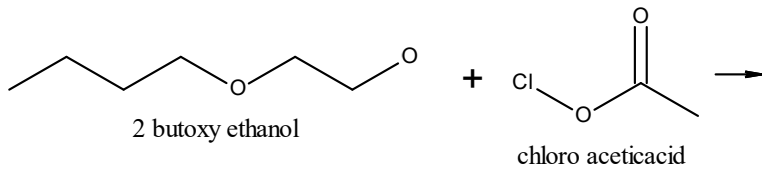
Process Description:
Preparation of ChloroButoxy Ethyl Acetate:

2-Butoxyethanol and Monochloroacetic Acid are reacted in the presence of a Catalyst p-toluenesulfonicacid to get ChloroButoxy Ethyl Acetate.

Preparation of TriclopyrButoxy Ethyl Ester (TBEE):

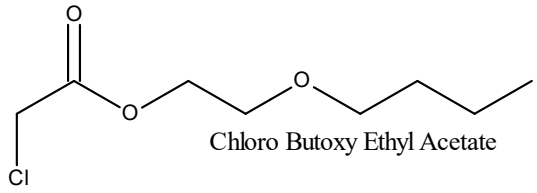
ChloroButoxy Ethyl Acetate obtained from the earlier step is reacted with Sodium salt of Trichloro
Pyridinol in the presence of a Catalyst p-toluenesulfonicacid to obtain TrichlopyrButoxyEthyl Ester.

Reaction:

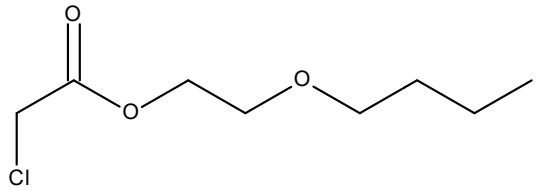


2 butoxy ethanol

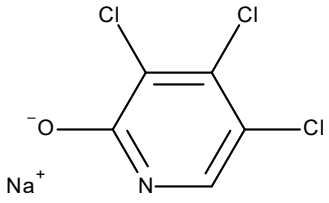
chloro aceticacid



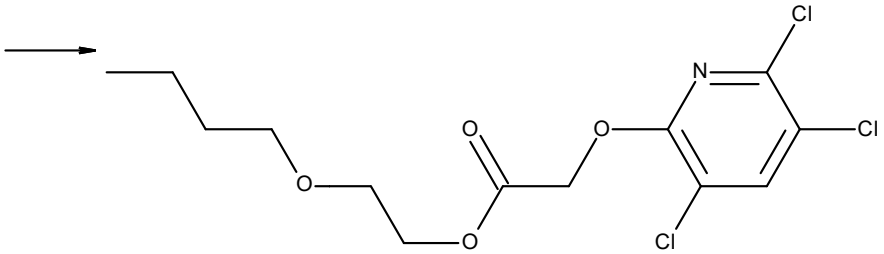
Chloro Butoxy Ethyl Acetate



Chloro Butoxy Ethyl Acetate



Sodium salt of TrichloroPyridinol



Triclopyr, butoxyethyl ester

Production Capacity :- 1 TPD
Batch time:- 24hrs.

Environmental aspects:-

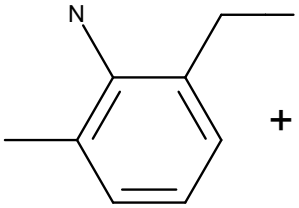
1**. Emission**: No
2.**Liquid effluents**: No
3.**Solids**: Organic residues are sent to secured landfill system
4.**Solvent recovery**: Solvent(methyl alcohol)is distilled and reused in the process

H-15 :METOLACHLOR

Process Description:

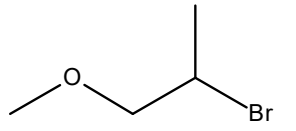
2-ethyl-6-methylaniline ,2-bromo-1-methoxypropane is heated at reduced pressure to obtain pure 2-ethyl-6-methyl-N-[1'-methoxy-prop-2'-yl]-aniline then treated with chloroacetyl chloride in presence of triethylamine to yields 2-ethyl-6-methyl-N-[1'-methoxy-prop-2'-yl]-chloroacetanilide.

Reaction:



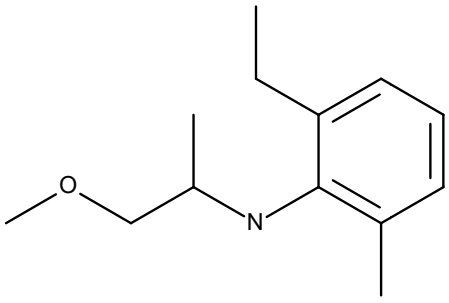
2-ethyl-6-methylaniline

+

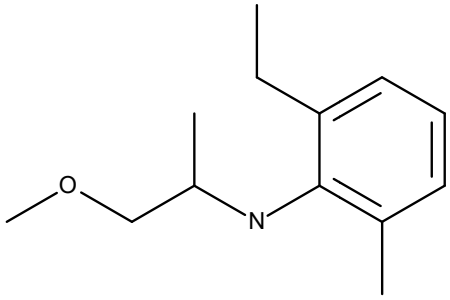


2-bromo-1-methoxypropane

→

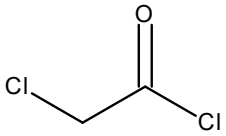


2-ethyl-6-methyl-N-[1'-methoxy-prop-2'-yl]-aniline



2-ethyl-6-methyl-N-[1'-methoxy-prop-2'-yl]-aniline

+



chloroacetyl chloride

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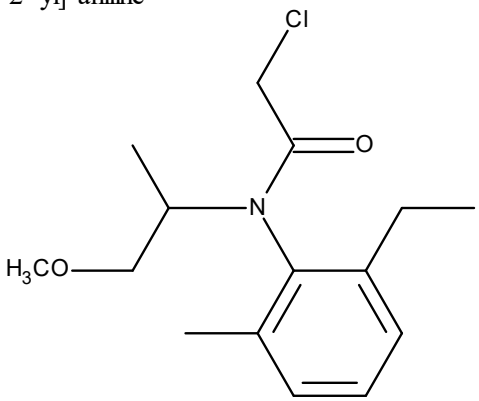


2-Chloro- *N*-(2-ethyl-6-methyl-phenyl)- *N*-(2-methoxy-1-methyl-ethyl)-acetamide

Production Capacity :- 1 TPD
Batch time:-24 hrs.

Environmental aspects:-

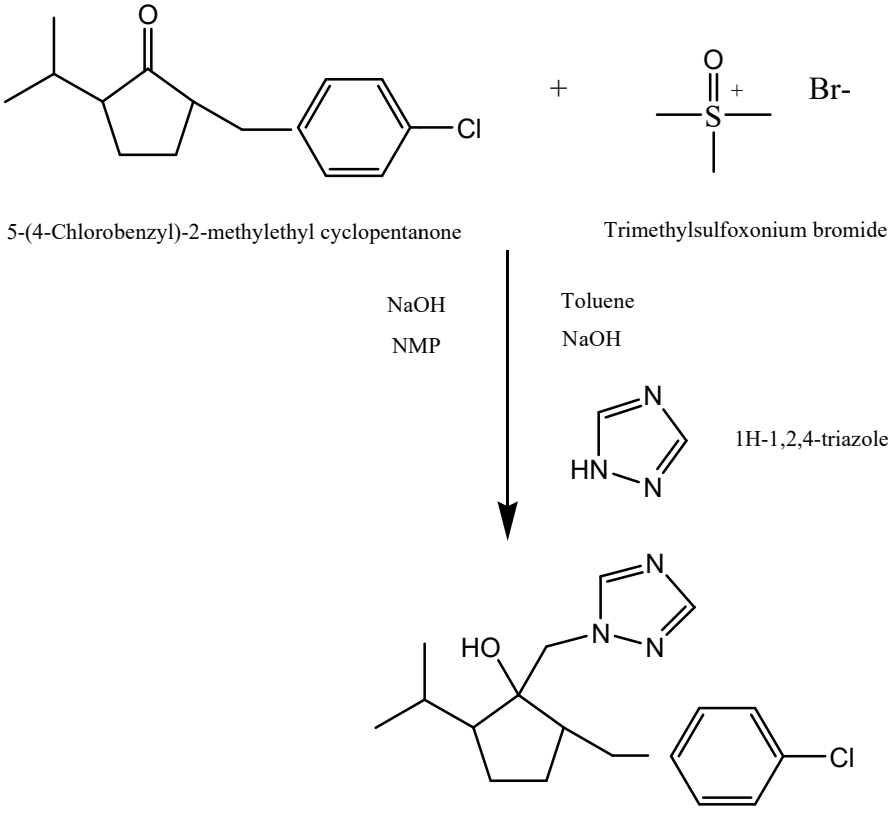
1**. Emission**: No

2**. Liquid effluents**: No
3**. Solids**: Organic residues are sent to secured landfill system
4. **Solvent recovery**: Solvent (methyl alcohol) is distilled and reused in the process.

F-28 :IPCONAZOLE

Process Description:
5-(4-Chlorobenzyl)-2-isopropyl cyclopentanone, DMF, trimethylsulfoxonium bromide are stirred and to this mixture 60% sodium hydride is added. Reaction mass is then poured in water and extracted with toluene. Toluene is distilled to give the methylide intermediate.
Methylide intermediate is added to a mixture of 1,2,4-1H triazole, NaOH and DMF. After the reaction is over, reaction mass is quenched in water and extracted with cyclohexane. On cooling the product is crystallized which is filtered, washed and dried.

Reaction:



5-(4-Chlorobenzyl)-2-methylethyl cyclopentanone

Trimethylsulfoxonium bromide

IPCONAZOLE

Production Capacity :-2 TPD
Batch time:-24 hrs.

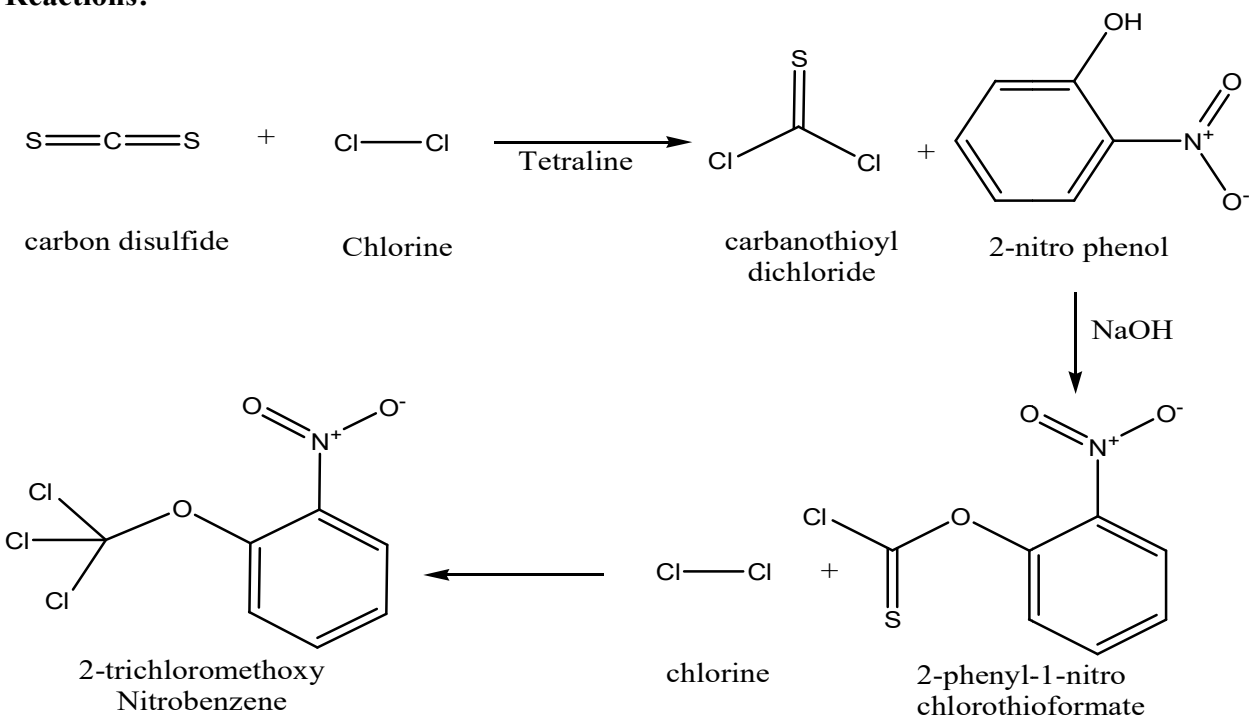
Environment Aspects:

1. **Emission**: NA

2. **Liquid effluents**: Aqueous effluent with high TDS and COD to be treated in PTRO and MEE.
3. **Solids**: Organic residues are sent to secured landfill system
4. **Solvent recovery**: Solvents to be recovered and reused.

IN-6 : 2-Trichloro methoxy nitro benzene(TCMNB)

Process description :-
Step 1: Carbanothioyl dichloride is prepared by chlorination of carbon disulfide followed by reduction with tetralinein solvent chloroform.
Step 2:Intermediate 2-phenyl-1-nitro chlorothioformate formed was washed with dilute NaOH solution followed by water.
Step 3: The intermediate organic layer is purified by partial distillation and chlorination to get crude 2-trichloro methoxy nitrobenzenewhich is purified by distillation of solvent and impurities under vacuums to get pure 2-trichloro methoxy nitrobenzene(TCMNB)
Reactions:-



Production Capacity :-0.5 TPD
Batch time:-20hrs.

Environmental aspects:-

1. **Emission**: No
2. **Liquid effluents**: Aqueous effluent is generated in the process was treated in PTRO and MEE. Treated water is reused.
3.**SolidEffluents** : Solid residues are sent to secured land fill system.
4.**Solvent recovery**: Solvent chloroform are distilled and reused in the process.

3.6 Raw Materials:

S.No	List of Existing Raw materials	List of Proposed Raw materials
1	Sulphuric Acid	Ethylene diamine
2	Hydrochloric Acid	Manganese sulphate
3	Sodium hydroxide flakes	Zinc Sulphate
4	Potassium Carbonate	Acetoacetanilide
5	Ammonium Thiocynate	Sulfuryl Chloride
6	Benzyl Chloride	2-Mercaptoethanol
7	Propoyl Ethyl Amines	PTSA
8	Toulene	Sodium bicarbonate
9	Xylene	2,6-diisopropyl-4-phenoxyphenyl isothiocyanate
10	Isopropyl Alcohols	Tert-butylamine
11	Thionyl Chloride	Propylenediamine
12	Chlorine	α -Chloropinacolone
13	Hydroxy –PhenoxyPropanoic Acid	Para-chlorobenzyl chloride
14	Di-FluoroChloropyridine	Sodium tetrahydridoborate
15	Acetonitrile	Trichloro acetamidine
16	Propargyl Chloride	Trichloro methane sulfenyl chloride
17	n-Hexane	Ethylene dichloride
18	Ethyl Bromide	2-Amino 2,3-Di methyl Butanamide
19	4-methoxy Benzyl Chloride	Sodium Ethoxide
20	Para Chloro Benzyl Chloride	Diethyl-5- Ethyl Pyridine Dicarboxylate
21	Di-methyl Carbonate	Triazinone
22	Ortho-Phenol	Dimethyl sulphate
23	Para-formaldehyde	2-naphthaol
24	Tri-azole	Hydrogen peroxide
25	Pthalimide	4-phenoxy phenol
26	Pthalic anhydride	2-methyl oxirane
27	Ortho-Cresol	2-chloropyridine
28	Thioxy chloride	Aniline
29	2-cyano-phenol	Benzene sulfonyl chloride
30	Dimethyl formamide	Sulfur Chloride
31	Acetic acid	2-hydrazo-4-methyl-henzothiazole
32	Cyano-acetyl ethyl urea	Formic acid
33	THPA	p-tert-butyl phenoxy cyclohexanol
34	Methanol	Triethylamine
35	Ammonia	2,6-Dihydroxy Benzoic Acid
36	Yellow Phosphorus	4,6-Dimethoxy-2-methylsulfonylpyrimidine
37	Liquid Bromine	Bromoketal
38	Carbon di sulphide	Potassium Iodide

39	Phosphorous penta oxide	Dodecilamine
40	Di ethyl thio phosphoryl chloride (DETC)	Cynamide
41	Mono methyl amine (MMA)	3, 4-Dichlorophenyl isocyanate
42	Acetic anhydride	1, 2, 3-Trichloropropane
43	Sodium cyanide	Sodium carbonate
44	Zinc chloride	Potassium hydroxide
45	Copper sulphate	3-Chloro-4-(1, 1, 2-trifluoromethoxy) ethoxyaniline
46	Oxodiazene	2, 6-difluorobenzoyl isocyanate
47	Oxirane	Isophthalonitrile
48	Chloral	2-Butoxyethanol
49		Monochloroacetic Acid
50		Trichloro pyridinol
51		2-ethyl-6-methylaniline
52		2-bromo-1-methoxypropane
53		Chloroacetyl chloride
54		5-(4-Chlorobenzyl)-2-isopropyl cyclopentanone
55		Trimethylsulfoxonium bromide
56		Sodium hydride
57		Cyclohexane

3.7 Additives and Chemicals

No

3.8 Raw material required along with estimated quantity, likely source, marketing area of final products, mode of transport of raw material and finished product.

The transportation of raw materials will be done by road complying with all safety requirements as per MSIHCrule.

3.9 Availability of water its source, energy/power requirement and source should be given

Water: Total water required after expansion shall be 874 KLD source through ground water.

S.NO	PARTICULARS	WATER CONSUMPTION IN KLD		
		EXISTING	ADDITIONAL PROPOSED	TOTAL AFTER FULL COMMISSIONING @100TPD
A	Domestic	5	10	**15**
B	Industrial			
1	Process	25	286	**311**
2	Washing	15	30	**45**
3	Boiler	30	80	**110**
4	Cooling Tower	50	438	**488**
C	Miscellaneous	10	30	**40**
	TOTAL (A+B+C)	**135**	**874**	**1009**

	Waste Water Generation			
S.NO	PARTICULARS	WASTE WATER GENERATION IN KLD		
		EXISTING	ADDITIONAL PROPOSED	TOTAL -AFTER FULL COMMISSIONING @ 100 TPD
A	Domestic	2	4	**6**
B	Industrial			
1	Process	15	360	**375**
2	Washing	10	28	**38**
3	Boiler	5	17	**22**
4	Cooling Tower	20	101	**121**
C	Miscellaneous	8	24	**32**
	TOTAL (A+B+C)	**60**	**534**	**594**
D	Recycle of treated waste water	43	130	173
E	Net waste water generation	**17**	**404**	**421**

Power:
Existing plant requires 1000 KVA of power. Plant after complete expansion would require 3000 KVA.

3.9.1 Fuel

Rice husk, Light Diesel Oil (LDO)

3.9.2 Quantity of waste to be generated (liquid and solid) and scheme for their management /disposal

Hazardous Waste Generation and disposal Details

List of Hazardous Wastes with Disposal facilities			
S. No	**Type of Waste**	**CPCB disposal guidelines**	**IPL disposal methodology**
1	Used / Spent oil	To be given to CPCB registered recycler	Will be adopted
2	Waste Oil	do	do
3	Phenolic Waste Water	To HW incinerator	Incinerator facility at TSDF site, Ramky ,Kanpur
4	Distillation residue	do	do
5	Pesticide Waste / Residue	do	do

6	Inorganic chemical sludge from ETP	Any use only after testing and proving the same is not hazardous waste. If proved hazardous then for Secured land- filling	TSDF site of RAMKY Group at Kanpur Dehat
7	Date expired / off speci. Products	Incinerator	The same will be adopted
8	Chemical sludge from decontamination	To HW incinerator	Incinerator facility at TSDF site Ramky,Kanpur
9	Discarded drums/ liner	Wash water treated in ETP & decontaminated drums for recycling.	do
10	Contaminated filters / liners	To HW incinerator	do
11	Spent carbon	To HW incinerator	do
12	Sludge from wet scrubber	Incineration after ETP treatment	TSDF site of RAMKY Group at Kanpur Dehat

4 SITE ANALYSIS

4.1 Connectivity

Plot No.	Plot no: K2 to K11 & D2 to D4, Phase-1,
Location	UPSIDC Sandila, Village Mahfona, Tehsil-Sandila,Hardoi, Uttar Pradesh.
Latitude	27° 05' 30.67" N
Longitude	80° 27' 14.97" E
Nearest State Highway	SH-25 (Adjacent to Site – S)
Nearest Railway Station	Sandila (4 km – W)
Nearest Airport	Amausi (70 km)
Nearest Town	Sandila Town (6 km)
Project Site is located within the Notified Industrial Area of UPSIDC	

4.2 Temperature:

The climate of the region is hot. The year can be divided into three main seasons as follows:

Winter Season : December to February

Summer Season : March to May

Monsoon Season: June to September, and

Post-monsoon Season : September to November.

The average temperatures during summer and average temperature during winter are reported to be around 40°C and 8° C respectively with maximum temperature recorded 48° C in May and 3° C in December.

Rainfall

The place receives rainfall from June to August. July is the rainiest month having rainfall up to 237 mm. The annual rainfall in Sandila for the year 2009-2010 was observed to be 906 mm.

5 PROPOSED INFRASTRUCTURE

5.1 Industrial Area (processing area)

Not Applicable

5.2 Residential Area (non-processing area)

Not Applicable

5.3 Green belt

33% of total plot area will be developed as greenbelt.

5.4 Drinking water management (source & supply of water)

Water is sourced from ground water

5.5 Industrial waste management

Generated waste has been categorized in below categories

- Domestic waste&Industrial waste:
- Solid waste (Non hazardous)
- Hazardous waste

Domestic and Industrial waste:

Solid waste (Non hazardous)

There is no solid waste generated in the conventional manufacturing process.

Hazardous waste :

Different categories of hazardous waste will be generated as per Hazardous Wastes (Management, Handling and Trasboundry Movement Rules), 2008 is mentioned in below table along with mode of disposal.

The site has no incinerator facility. The hazardous wastes are sent for secured land-filling to TSDF site at RAMKY, Kanpur.

6 REHABILITATION AND RESETTLEMENTS (R& R) PLAN

6.1 Policy to be adopted (central/state) in respect of the project affected persons including home oustees, land oustees and landless labourers (a brief outline to be given)

Not Applicable

7 PROJECT SCHEDULE & COST ESTIMATES

7.1 Likely date of start of construction and likely date of completion (Time schedule for the project to be given).

We shall start construction of the project after getting EC & CTE.

7.2 Estimated Project cost along with analysis in terms of economic viability of the project.

Total Project Cost for proposed project activity is Rs 25 Crores.

8 ANALYSIS OF PROPOSAL (FINAL RECOMMENDATIONS)

8.1 Financial and social benefits with special emphasis on the benefit to be local people including tribal population, if any, in the area.

• Employment would be as per prevailing norms of state government for skilled and unskilled people for the proposed project.

• Social Welfare shall be done.

• Cordial relation with the industry shall be established and representation shall be made to villagers for help for creation of facilities related to health, education, etc.