Sandhya Group
PHOSPHORUS CHEMISTRY

SANDHYA ORGANIC CHEMICALS PVT. LTD. - UNIT II

Admn & Sales Office : 101-104, Sangam CHS Ltd., 1st Floor, A Wing, S. V. Road, Santacruz (W), Mumbai - 400054.
Tel.: +91-22-61565555 / 26104202 / 26151500 • Fax : +91-22-26104201
Redg. Office & Factory : Plot No.1249 & 1250, G.I.D.C., Sarigam - 396 155, Tal - Umbergam, Dist - Valsad, Gujarat, India.
Tel.: +91-9725260270 / 9537756084 / 9377014296
E-mail : socpl@vsnl.com • Website : www.sandhya-group.com
(An ISO 9001:2015, ISO 14001:2015 & OHSAS 18001:2007 Certified Company)

August 31, 2020 **BY HAND DELIVERY/RPAD**

To,
The Member Secretary (Industry-II)
Ministry of Environment and Forest,
Government of India,
Indira Paryavaran Bhavan,
Aliganj, Jor Bagh Road,
New Delhi – 110 003

SUB: **ADDITIONAL DETAIL FOR EC FOR PROPOSED PESTICIDE TECHNICAL, PESTICIDE INTERMEDIATES MANUFACTURING PLANT AT PLOT NO: 1249 & 1250 G.I.D.C. SARIGAM, TALUKA: UMBERGAON DIST: VALSAD– 396155 (GUJARAT) FOR M/S. SANDHYA ORGANIC CHEMICAL PVT LTD, (UNIT-2)**

CATEGORY: **A-5 (b), UNIT IS LOCATED INSIDE OF NOTIFIED INDUSTRIAL AREA**
REF: **TOR LETTER NO.IA-J-11011/342/2019-IA-II(I) vide dated -20/12/2019**
PROPOSAL NO: **IA/GJ/IND2/125353/2019**

Dear Sir,
This has reference of the above subject matter; we are submitting herewith additional information as required by you for proposed pesticide technical, pesticide intermediates manufacturing plant at plot no: 1249 & 1250 G.I.D.C. sarigam, taluka: umbergaon dist: valsad– 396155 (gujarat) for M/s. Sandhya Organic Chemical Pvt Ltd, (Unit-2)
[Industrial Sector Project-Category: A-5 (b).

We hope you would find the same in order and request your kind self to guide us for further procedure and oblige.

Thanking you

Yours faithfully,

For Sandhya Organic Chemicals Pvt Ltd – Unit-2

R. J. Shah
General Manager- Works

SANDHYA ORGANIC CHEMICALS PVT. LTD. SARIGAM

Sr. No.	Query Raised	Query Reply Given	Page No.
1.	Submit revised water balance by reducing fresh water requirement and Effluent treatment mechanism with plan for Zero Liquid Discharge.	Submit revised water balance is attached as **Annexure-1.**	3-18
2.	Solvent recovery plan needs to be submitted	Solvent recovery plan needs to be submitted is attached as **Annexure-2.**	19-22
3.	PP needs to submit the following details on the Risk associated with the hazardous chemicals proposed to be used as a raw material; • Risk need to be carried out for medium and Catastrophic ruptures/leak even for Methanol, Bromine including Hydrochloric acid, Sulphuric acid and Benzoyl Chloride etc. • Frequency/Probability of leak per year as done for any risk analysis. • Individual risk contours and societal risk F-N curves to assess against risk acceptance criteria using advanced 3D modeling. • Disaster management plan	We have given for detail study of 3D Risk CFD Modelling & Consequence Analysis Study and it is almost ready. We will be submitted it as we received. PO is attached as **Annexure-3**.	23-24
4.	Status of TSDF membership needs to be submitted.	TSDF membership is attached as **Annexure-4**.	25

Annexure-1

Submit revised water balance by reducing fresh water requirement and Effluent treatment mechanism with plan for Zero Liquid Discharge.

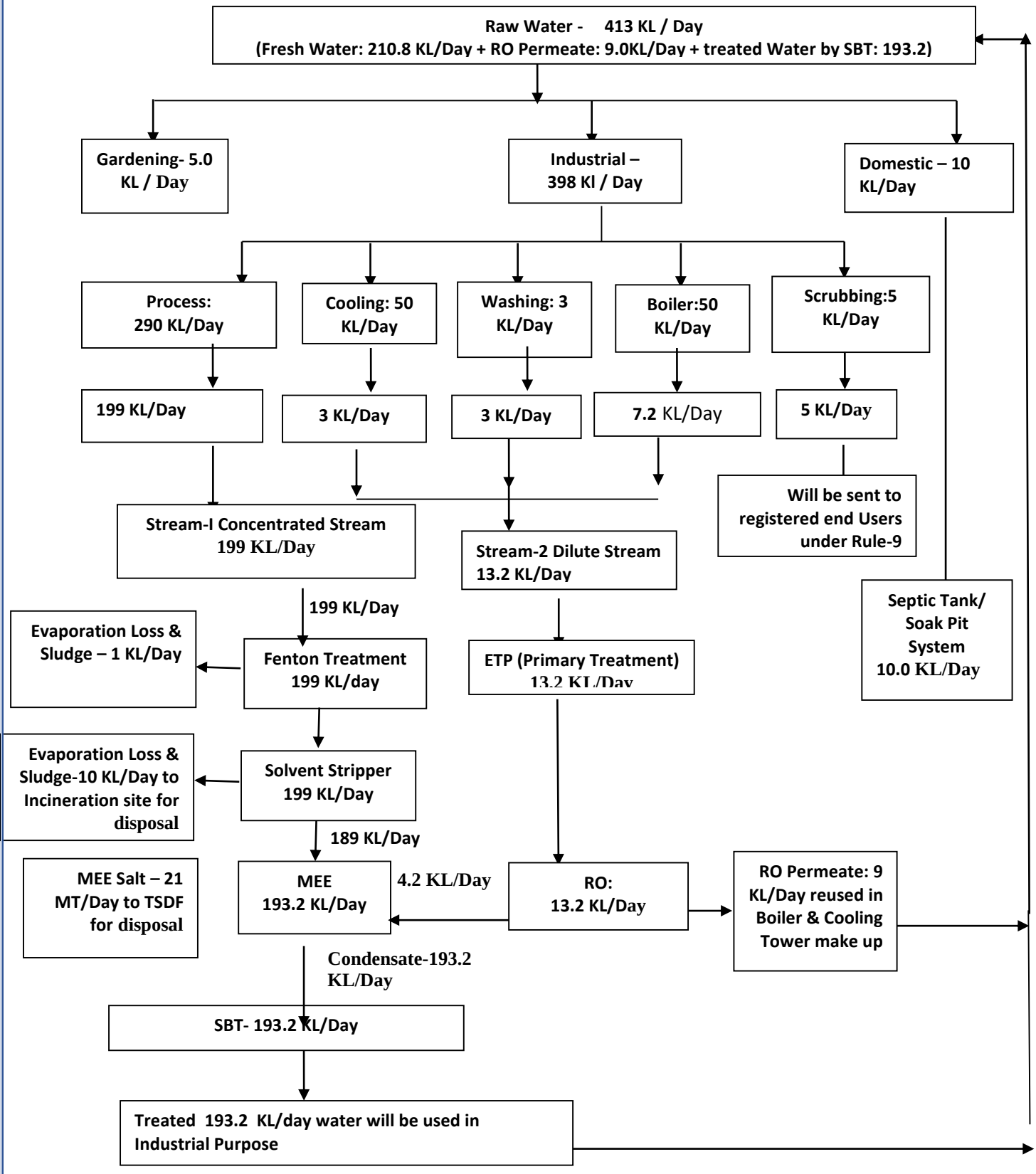
Revised Water and Wastewater Detail Having ZLD Plan:

- Total water requirement will be 413.0 KL/day (Fresh Water: 210.8 KL/Day + RO Permeate: 9.0KL/Day + treated Water by SBT: 193.2) which will be met through GIDC water supply. The wastewater generation will be 227.2 KL/day from proposed project.
- Stream I - Concentrated Wastewater Steam (mainly from process): 199.0 KL/Day will be treated at Fenton treatment System & through candle filter it is forwarded to Solvent Stripper System, followed by MEE. 199.0 KL/Day Distillate of Solvent Stripper appx 10.0 KL/ Day which is mainly of mix Solvent & other Low volatile organics is collected separately & finally sent to registered Incineration Site for Incineration site whereas concentrated (bottom) 189.0 KL/ Day effluent from Stripper Column shall be forwarded to Multiple Effect Evaporator System (MEE).
- Stream II – Dilute Steam 13.2 KL/ Day (From Washing, Blow-down of Boiler & Cooling Tower): This is reach in TDS & low of COD so this effluent will be treated in ETP (Primary treatment) and sent to Reverse Osmosis System (RO). 9.0 KL / Day R O Permeate which is free of TDS will be recycled back to Boiler & Cooling Tower make up quantity. 4.2 KL / Day R O Reject which is reach of TDS will be forwarded to MEE for further treatment.
- Total 193.2 Kl/ Day (189.0 KL/ Day from Process + 4.2 KL / Day from R O Reject) treated in MEE where MEE Condensate 193.2 KL/ Day will be sent to SBT based Bio Reactors Treatment System for policing treatment and recycled back to ceratin industrial purposes. Total 193.2 KL/day effluent will be treated under SBT process and then treated 193.2 KL/Day effluent will be recycled back to certain Industrial Purposes i.e. Process, Boiler, Cooling Tower & Scrubbing System.
- Stream III –Scrubbing media- 5.0 KL / Day is mainly in Solution form from respective gases i.e. 30 % HCl, 20 % Sodium Sulphite, 35 % HBr Solution etc. which shall be Sale to registered End Users who possesses Valid CC & A from State Level Pollution Board & registered under Rule- 9.
- 10.0 KL/Day of Domestic wastewater will be disposed through Septic Tank & Soak Pit.
- Thus the this Industry shall be treated as ZLD (Zero Liquid Discharge) unit.

WATER CONSUMPTION & WASTE WATER GENERATION

Sr. No.	Category	Water Consumption (KL/Day)	Waste Water Generation (KL/Day)
1.	Domestic	10	10
2.	Gardening	5	0
3.	**Industrial**		
	Process	290	199
	Washing	3	3
	Boiler	50	7.2
	Cooling	50	3
	Scrubbing	5	5
Total Industrial		**398**	**217.2**
Grand Total		**413**	**227.2**

WATER BALANCE DIAGRAM:



DETAILS OF EFFLUENT TREATMENT PLANT

M/s. Sandhya Organic Chemical Pvt. Ltd. (Unit-2) shall have an Effluent treatment plant consisting of primary& secondary & advance treatment units. The details of ETP are as follows.

First all non-toxic and biodegradable streams (low & medium COD) of wastewater shall be collected in Collection cum Equalization Tank (CET-01) where the continuous addition and stirring of Sodium Hypo solution is done for Fenton Treatment from Sodium Hypo Dosing Tanks (SHDT-01) as per requirement by gravity before pass to Neutralization Tank. Pipe grid is provided at bottom of the CET-01 to keep all suspended solids in suspension and to provide proper mixing. 2 nos. of Air Blowers (B-01) shall supply air through diffusers to pipe grid.

In Neutralization Tank (NT-01) the continuous addition and stirring of Lime solution is done (to maintain neutral pH of wastewater) from Lime Dosing Tank (LDT-01) as per requirement by gravity. Then after, neutralized wastewater shall go to Flash Mixer (FM-01). Alum shall be dosed from Alum Dosing Tank by gravity into FM to carry out coagulation by using a Flash Mixer. Then effluent shall be sent to Primary Clarifier (PCL-01) where Polyelectrolyte shall be dosed from Polyelectrolyte Dosing Tank (PEDT-01).Then after, coagulated wastewater shall be settled in PCL-01 and Clear supernatant shall be in Holding Tank (HT-01). Then effluent shall be pumped to Stripper (ST-01) for removal of solvent. After that effluent shall collected in MEE Feed Tank (MFT-01) where RO reject water shall be mixed with it.

Then effluent shall be sent to Multiple Effect Evaporator (MEE-01) for further treatment followed by Agitated Thin Film Dryer (ATFD-01) for solids dewatering. Condensate from MEE & ATFD shall collect in Condensate Storage Tank (CST-01) before sent to SBT for further treatment. Solids from ATFD-01 shall be collected and stored in HWSA for disposal in TSDF. Sludge settled in PCL-01 shall be collected in Sludge Sump (SS-01) where mixer is provided to prevent and settling. Then sludge shall be send to Filter Press (FP-01) for dewatering. Then dry cake shall be stored in HWSA before final disposal to TSDF. Leachate from Filter Press shall be sent back to ENT-01 for further treatment.

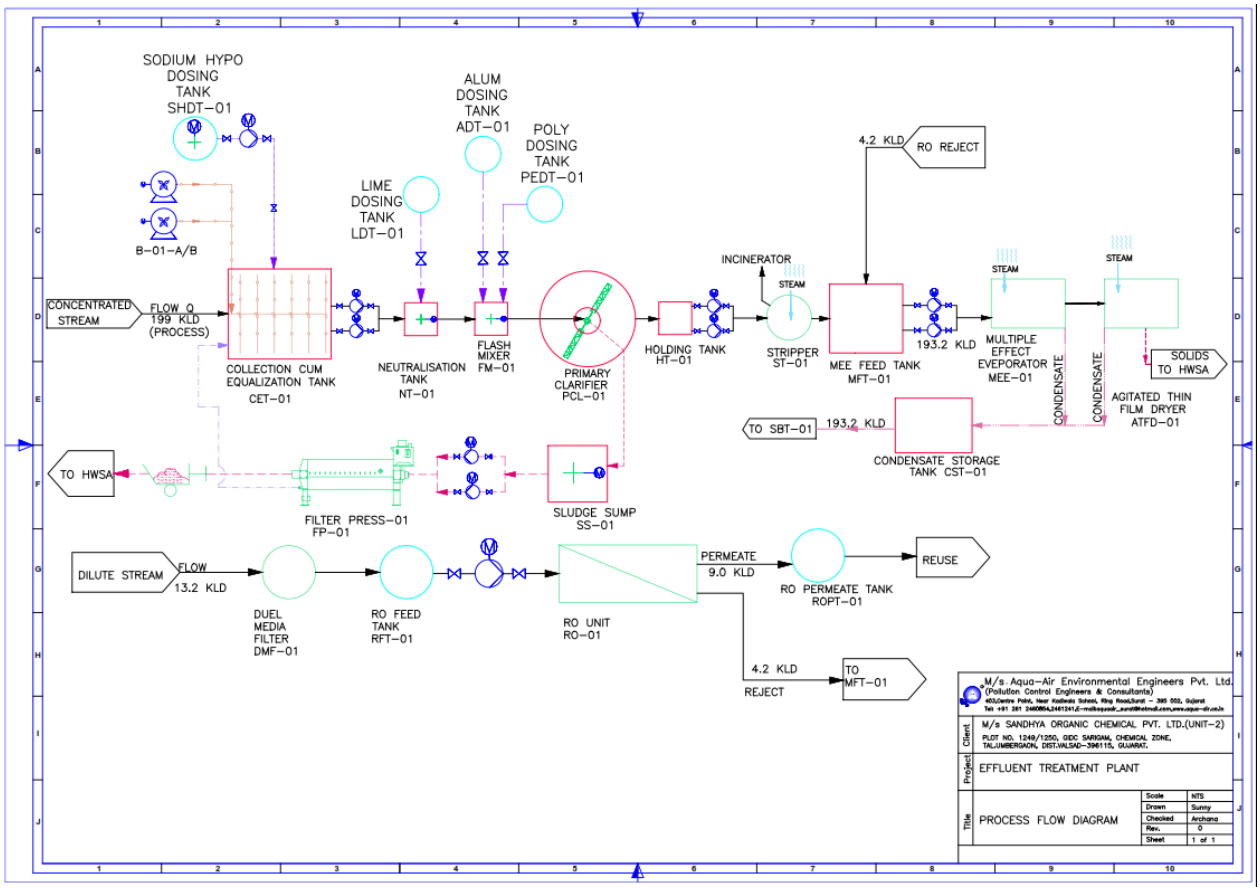
Treatment of Dilute Stream (13.2 KLD)

The low COD streams from the manufacturing process plants and utilities effluent shall be passed through Duel Media Filter (DMF-01) to remove suspended solids from effluent and polishing treatment. Then clear effluent shall be collected in RO Feed Tank (ROFT-01) before sent to RO Unit-1 for advance treatment. RO-01 reject will be sent to MEE Feed Tank for further treatment and RO permeate shall be collected in RO Permeate Storage Tank before reuse in plant.

SIZE OF TANKS

S.N.	Name of unit	Capacity	No.	MOC/ Remark
Stream-I (LOW COD) [Flow 199 KL + 4.2 MEE Condensate]				
1	Collection cum Equalization tank (CET-01)	7.0 x 3.5 (4.0+0.5)	1	RCC M25+A/A Bk. Lining
	Neutralization Tank (NT-01)	2.0 x 2.0 (2.0+0.5)	1	RCC M25
2	Flash Mixer (FM-01)	2.0 x 2.0 (2.0+0.5)	1	RCC M25
3	Primary Clarifier (PCL-01)	4.6 Dia (3.0 +0.5)	1	MSEP
4	Holding Tank (HT-1)	4.0 x 4.0 (3.0+0.5)	1	RCC M25
5	Stripper (ST-01)	199 M^3/D	1	SS
6	MEE Feed Tank (MFT-01)	6.5 x 6.5 (5.0+0.5)	1	RCC M25
7	Multi Effect Evaporator (MEE-01) with Solid Dryer (SD-01)	193 M^3/D	1	SS
8	Condensate Storage Tank (CST-01)	7.0 x 5.0 (5.0+0.5)	1	RCC M25
9	Sludge Sump (SS-01)	3.0 x 3.0 (3.0+0.5)	1	RCC M25
10	Filter Press (FP-01)	33 m^3/D	1	SS
11	Lime Dosing Tank (LDT-01)	5000 Lit	1	HDPE
12	Alum Dosing Tank (ADT-01)	5000 Lit	1	HDPE
13	Poly Dosing Tank (PEDT-01)	2500 Lit	1	HDPE
14	Sodium Hypo Dosing Tank (SHDT-01)	2000 Lit	1	HDPE
Stream-II(Dilute Stream) Flow 13.2 KLD				
1	Duel Media Filter (DMF-01)	1 m3/hr	1	MSEP
2	RO Feed Tank (ROFT-01)	10 KL	1	HDPE
3	RO Unit-1	13 m3/D	1	As per Requirement
4	RO Permeate Tank (ROPT-01)	5 KL	1	HDPE

ETP Diagram:


SODIUM HYPO DOSING TANK SHDT–01
B–01–A/B
LIME DOSING TANK LDT–01
ALUM DOSING TANK ADT–01
POLY DOSING TANK PEDT–01
CONCENTRATED STREAM
FLOW 199 KLD (PROCESS)
COLLECTION CUM EQUALIZATION TANK CET–01
NEUTRALISATION TANK NT–01
FLASH MIXER FM–01
PRIMARY CLARIFIER PCL–01
HOLDING TANK HT–01
INCINERATOR
STEAM
STRIPPER ST–01
MEE FEED TANK MFT–01
4.2 KLD
RO REJECT
193.2 KLD
MULTIPLE EFFECT EVEPORATOR MEE–01
CONDENSATE
CONDENSATE
AGITATED THIN FILM DRYER ATFD–01
SOLIDS TO HWSA
TO SBT–01
193.2 KLD
CONDENSATE STORAGE TANK CST–01
TO HWSA
FILTER PRESS–01 FP–01
SLUDGE SUMP SS–01
DILUTE STREAM
FLOW 13.2 KLD
DUEL MEDIA FILTER DMF–01
RO FEED TANK RFT–01
RO UNIT RO–01
PERMEATE 9.0 KLD
RO PERMEATE TANK ROPT–01
REUSE
4.2 KLD REJECT
TO MFT–01
M/s. Aqua–Air Environmental Engineers Pvt. Ltd.
(Pollution Control Engineers & Consultants)
Client
M/s SANDHYA ORGANIC CHEMICAL PVT. LTD.(UNIT–2)
PLOT NO. 1249/1250, GIDC SARIGAM, CHEMICAL ZONE, TAL.UMBERGAON, DIST.VALSAD–396115, GUJARAT.
Project
EFFLUENT TREATMENT PLANT
Title
PROCESS FLOW DIAGRAM
Scale NTS
Drawn Sunny
Checked Archana
Rev. 0
Sheet 1 of 1

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Detail Of Fenton Treatment and Neutralization

Concentrated effluent from the various stages of process shall be collected in underground collection-cum-reaction tank. Two such underground tanks shall be provided, having holding capacity of about one day effluent. Once one of the tanks is full, effluent is diverted to the other tank. Here, first effluent pH is adjusted to 4-4.5 by addition of Acid (if required). After adjustment of acidic pH effluent is subjected to Fenton treatment by addition of first FeSO4 as catalyst. Then H2O2 solution is added for destruction of phenolic compound. This reaction takes about 6-8 hrs. For thorough mixing, air is provided through twin lobe air blower. After reaction is complete treated effluent is neutralized by addition of lime powder/soda ash. Neutral effluent is then pumped to through filter press for removal for sludge. Clear filtrate from filter press shall be subjected to MEE.

The dewatered sludge is collected and packed in HDPE/plastic bags and stored in a proper sludge storage area.

2. DESCRIPTION OF MEE:

Industry has proposed to install Multi Effect Evaporator for the treatment of industrial effluent having capacity of 200 KL/Day.

Neutral effluent from Primary Treatment Plant is passed through 4 - Stages Evaporator System and the evaporated water shall be collected in a Collection Tank and then forwarded to SBT plant along with Primary treated dilute effluent.

Multi stage evaporator (4 - stages) is a long tube forced circulation type evaporators where in the first effect high pressure steam of 7.0 kg/cm2 is used to evaporate waste water. The evaporated water in the form of steam at 2.0 kg/cm pressure is used for evaporating the effluent in the second stage at atmospheric pressure. Evaporated water from the second stage is used for evaporating waste water in the third stage under vacuum of 650- 720 mmHg.

Finally evaporated water from the third stage is condensed in the steam condenser using cooling water on other side. Condensate from all the three stages is collected in condensate receiving tanks.

Concentrated mass is directly forwarded to ATFD system whereby the remaining water is evaporated and salt is isolated. This salt is disposed off at Common TSDF site.

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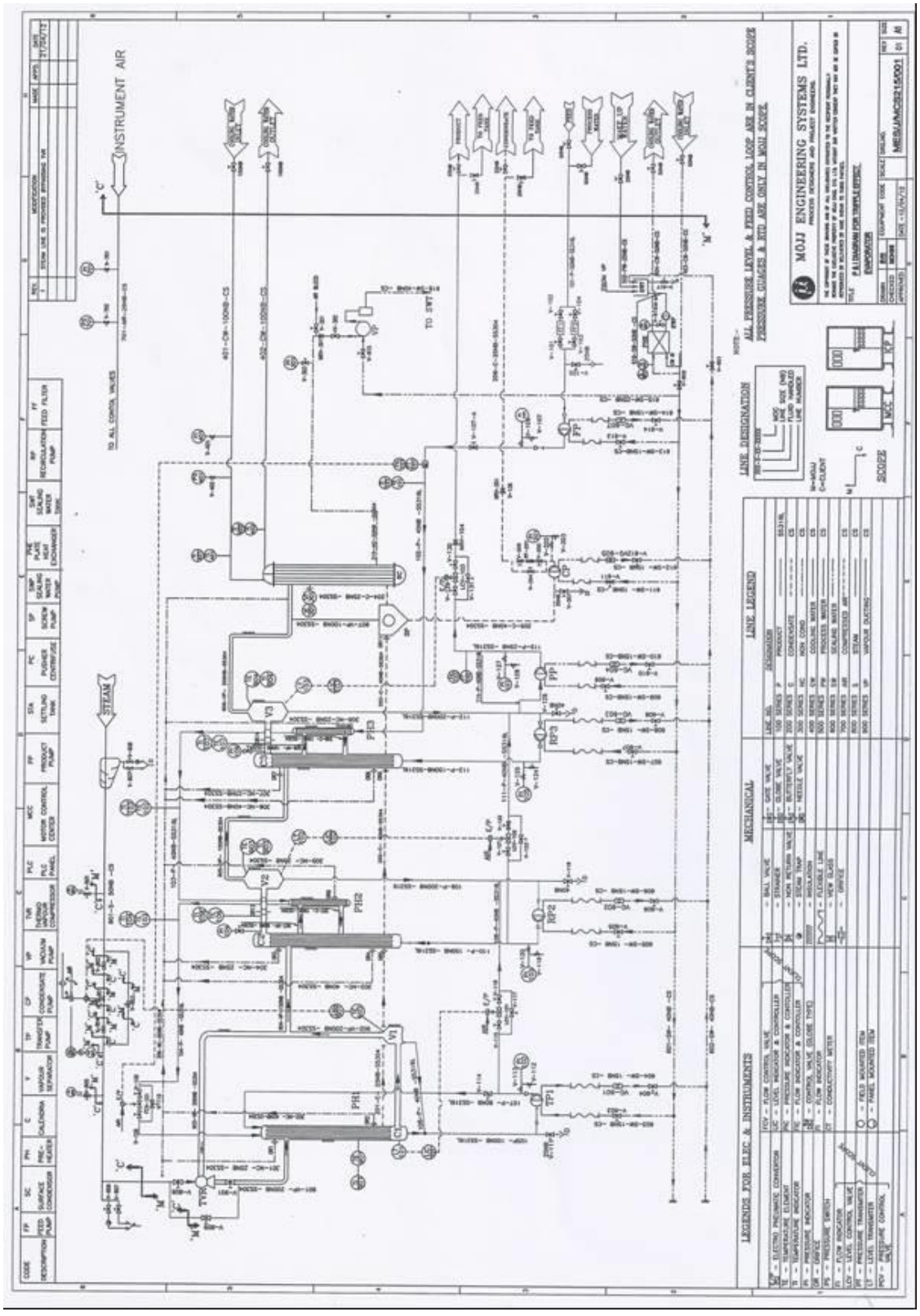
Design of MEE (1 Nos.):

Basic of Design:

Nos.ofEffects	4Effects–(2FallingFilm+2ForceCirculation)
WasteCapacity	200KLD
FeedRate	12000Kg/Hr(20workinghoursperday)
FeedConcentration	10%TDS
FeedTemperature	35°C
ProductRate	3000Kg/Hr
Productconcentration	40%
ProductTemperature	55°C
Waterevaporation	7500Kg/Hr

Flow Diagram of MEE:



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PROCESS DESCRIPTION - AGITATED THIN FILM DRYER (ATFD)

The plant is vertical agitated thin film dryer (ATFD).
Description of the plant is as below.

ATFD consists of a vertical cylindrical body shell with rotor inside it. Rotor is equipped with rows of scrapper blades over its full length. Rotor will have integrated liquid distributor plate at top and rotor is supported at the bottom in a bearing hub. Jacket is provided outside the shell for the inlet of heating media.

Feed enters into ATFD at top on distributor plate through feed pump. Liquid distributor uniformly distributes the feed on wall surface. Steam is supplied at the jacket. The scrapper blades provided continuously spreads this feed over the heated surface and maintains the liquid layer on wall surface. The close clearance provided between blade and wall defines the thickness of the layer. First feed gains heat and reaches to its boiling point. Due to the higher tip speed of blades agitation and turbulence is created at rotor blades and evaporation of liquid starts and solids starts forming. The concentration of solids increases while it travels down due to continuous evaporation of liquid. At this stage solids starts to form agglomerates which are crushed by blades. Now at the bottom surface moisture content of the solids is further removed and thus the drying process is completed. Finally powder is collected at bottom at the discharge valve and sent for disposal.

The evaporated vapors moves through the ATFD in a counter-current fashion to the liquid flow and is taken to the surface condenser through vapor duct wherein same is condensed at tube side by circulating cooling water at shell side. Evaporative condensate will be collected in condensate pot from which it is taken out by condensate pump.

Non condensable are pulled out by blower.

MCC cum ICP control panel with necessary push buttons, instruments and interlocks is provided for entire operation of the plant.

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SCOPE OF SUPPLY – ATFD

	Feed balance tank with Agitator - 01 no.		
	The Feed Tank provided for collection of concentrate from MEE.		
	Type	:	Vertical Cylindrical with conical bottom.
	Capacity	:	1000 Lit.
	Material of Construction	:	Stainless Steel 316L For Liquid contact parts
		:	M.S For Liquid Non-contact parts
	Accessories	:	Equipped with adequate nozzles
	CIP tank - 01 no. (Client's Scope)		
	The CIP Tank provided for preparation of CIP solution.		
	Type	:	Vertical Cylindrical with conical bottom.
	Capacity	:	1000 Lit.
	Material of Construction	:	Stainless Steel 304 For Liquid contact parts
		:	M.S For Liquid Non-contact parts
	Accessories	:	Equipped with adequate nozzles
	ATFD with V/F drive – 01 no.		
	ATFD of adequate heat transfer area 17 m2 is provided.		
	Steam is supplied to the jacket of ATFD		
	Rotor with specially designed liquid distributor & scrapping blades are provided. Rotor is driven by gear box through motor. V/F drive is provided for Motor of Rotor.		
	Adequate nozzles for feed in, powder out, vapour out, Steam, non-condensable out, condensate out, CIP are provided.		
	Liquid Contact Parts: SS 316L Shell & Rotor blades - SS 316L Rotor body, Top Dish & distributor, Bottom cone - SS 316L Liquid Non-Contact parts: SS 304L Top – Bottom shaft assembly, Bottom bush assembly etc Other Liquid Non-Contact parts: MS (Steam Jacket , Supports, Top stool, Body flanges)		

	Vertical Surface Condenser – 01 no.		
	The vertical fixed Tube sheet type heat exchanger will be used. Vapors are given on shell side and cooling water is provided on tube side.		
	Material of Construction		
	Shell	:	Stainless Steel – 316
	Tubes	:	Stainless Steel – 316
	Tube Sheets	:	Stainless Steel – 316
	Dish End	:	Stainless Steel – 304
	Supports, External parts	:	M.S Anticorrosive painted
	Accessories	:	Nozzle for CW Inlet, Outlet. Nozzles for Vapor in, condensate. As per requirement nozzles will be provided.
	Feed Pump with motor & V/F drive – 01 No.		
	Screw pump is provided for pumping the feed from feed balance tank to ATFD.		
	Type	:	Positive displacement screw type. (Motor is coupled to pump shaft through belt & pulley arrangement)
	Material of Construction		
	Product contact parts	:	Stainless Steel 316L
	Product non contact parts	:	M.S
	Condensate Pump – 01 no.		
	A Centrifugal Pump is provided for taking out process condensate from ATFD.		
	Type	:	L- Type (Pump assembly is coupled to motor shaft through coupling.) Total assembly is mounted on common base frame. Pump is of reputed make.
	Material of Construction		
	Product contact parts	:	Stainless Steel 304
	Product non contact parts	:	M.S

	Centrifugal Bower - 01 no.		
	A Centrifugal blower is provided for taking out non-condensable gases form ATFD.		
	Type	:	Centrifugal direct driven
	Material of Construction		
	Impeller	:	SS - 304
	Body & Internals	:	SS - 304
	Product non contact parts	:	M.S
	Condensate tank - 01 no.		
	The Condensate Tank is provided for collection of process condensate.		
	Type	:	Vertical Cylindrical with conical bottom.
	Capacity	:	500 Lit.
	Material of Construction	:	Stainless Steel 304 For Liquid contact parts
		:	M.S For Liquid Non-contact parts
	Accessories	:	Equipped with adequate nozzles
	Piping		
	Necessary piping for plant shall be provided as per plant layout.		
	Material of construction	:	
	Feed & Product	:	Stainless Steel 316
	Process Condensate	:	Stainless Steel 304
	Non-condensate	:	Stainless Steel 304
	Steam	:	C.S, I.B.R (Client's scope)
	Cooling water, Process water, sealing water, instrument air		M.S (Client's scope)
	Hardware, Flanges, Gasket		M.S , CAF

INSTRUMENTS & CONTROL SECTION

MCC cum ICP Control panel is provided

Vertical stand alone localized floor mounted instrument control panel with mimic diagram is provided. Control panel is pre- wired complete with necessary electrical like relays, fuses, push buttons to start motors, indicating lamps & interlocks etc. Entire operation of the plant is monitored through this control panel.

- **Panel Mounted Instruments**

1 no.	Mimic Diagram
1 no.	Alarm Annunciator + Hooter
1 no.	Feed flow meter magnetic type
1 no.	Condensate flow glass tube rotameter
1 no.	Steam pressure transmitter
1 no.	Temp. Scanner for indication of required temperatures
1 no.	V/F drive for ATFD rotor
1 no.	V/F drive for feed pump
1 lot	Required Ammeter, Voltmeter, Interlock-bypass switch

- **Locally Mounted instruments are**

1 Set.	Vacuum / Pressure Gauge, Pressure switches
1 Set	Temperature Sensors

- **Audio Visual Alarm**

Temperatures	:	High –Low
Motors(All)	:	Overload Trip

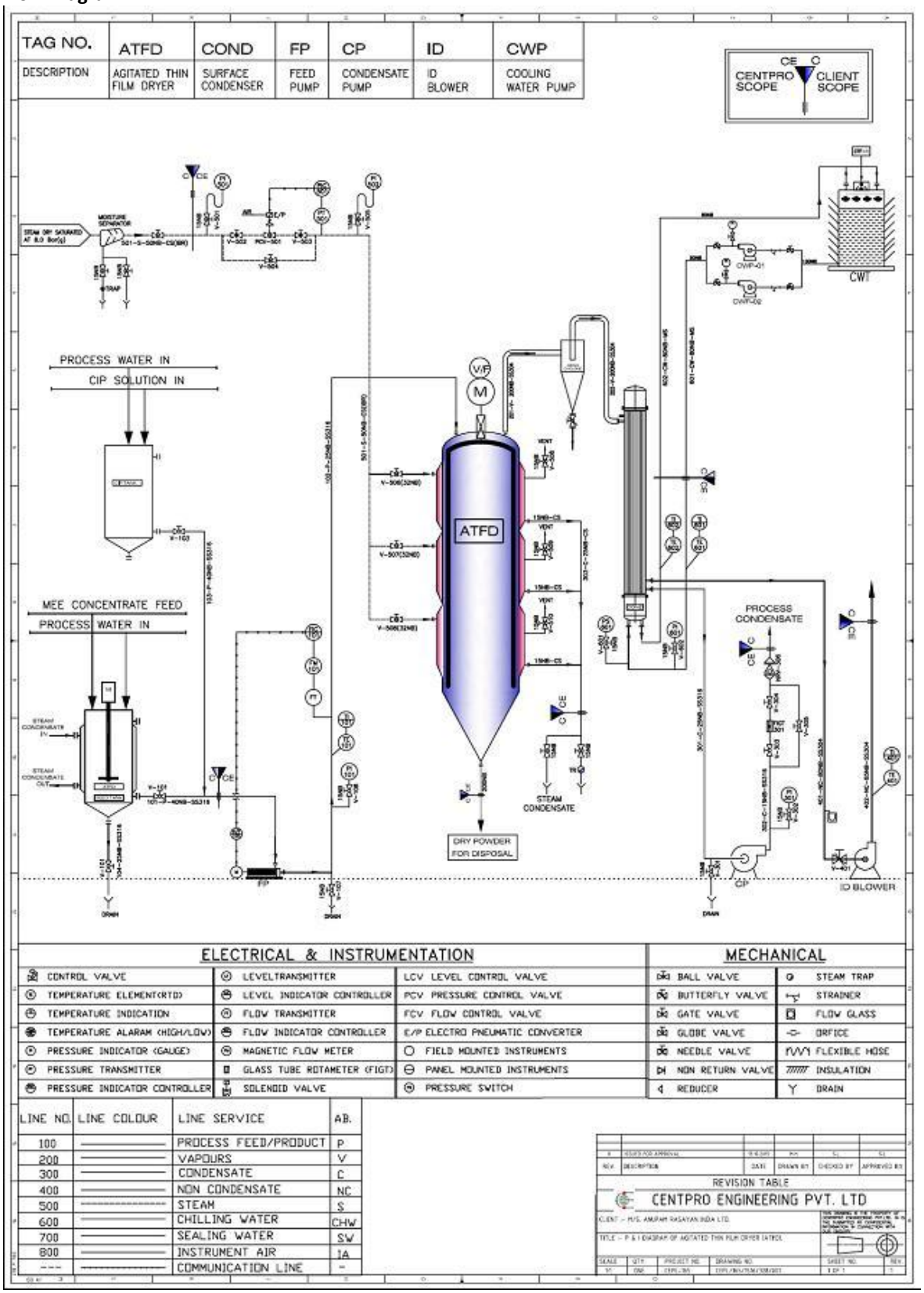
- **Auto Control Loop**

For feed flow control through V/F drive

Auto steam pressure control loop

All necessary interlocks in the panel will be provided

Flow Diagram:



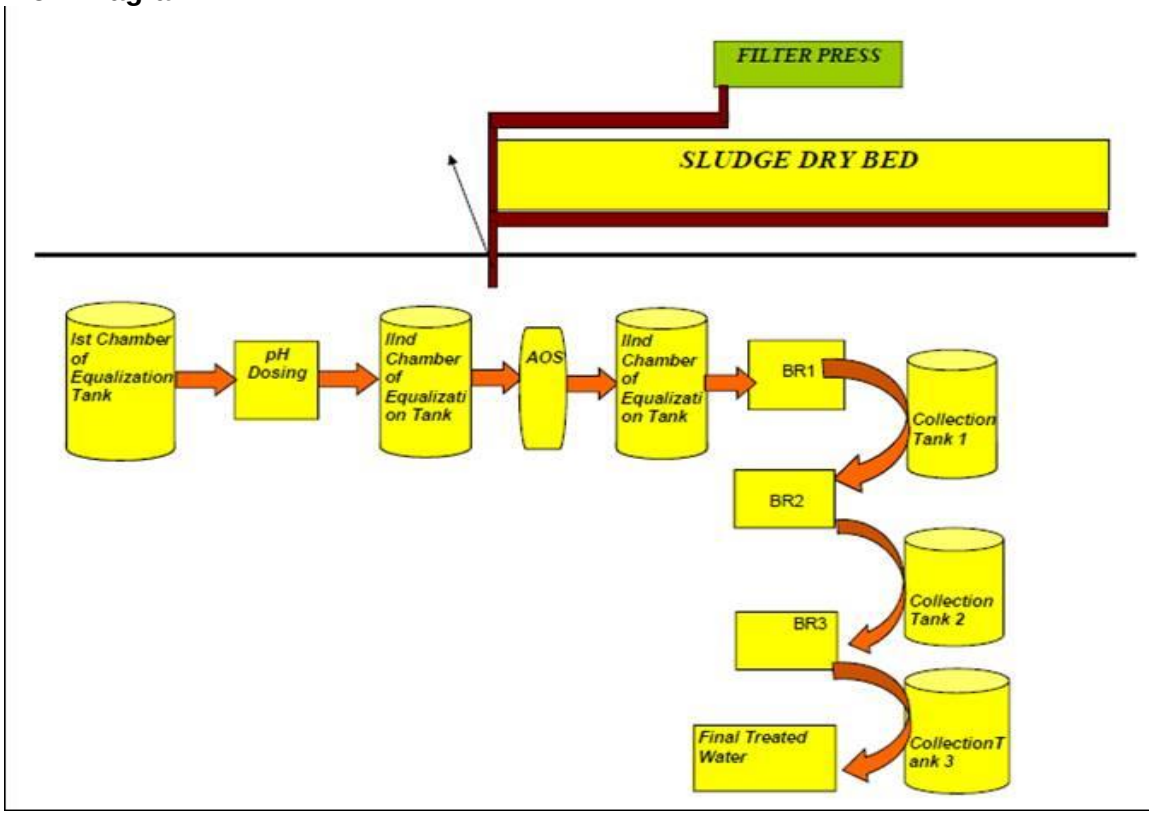
3. Details of SBT:

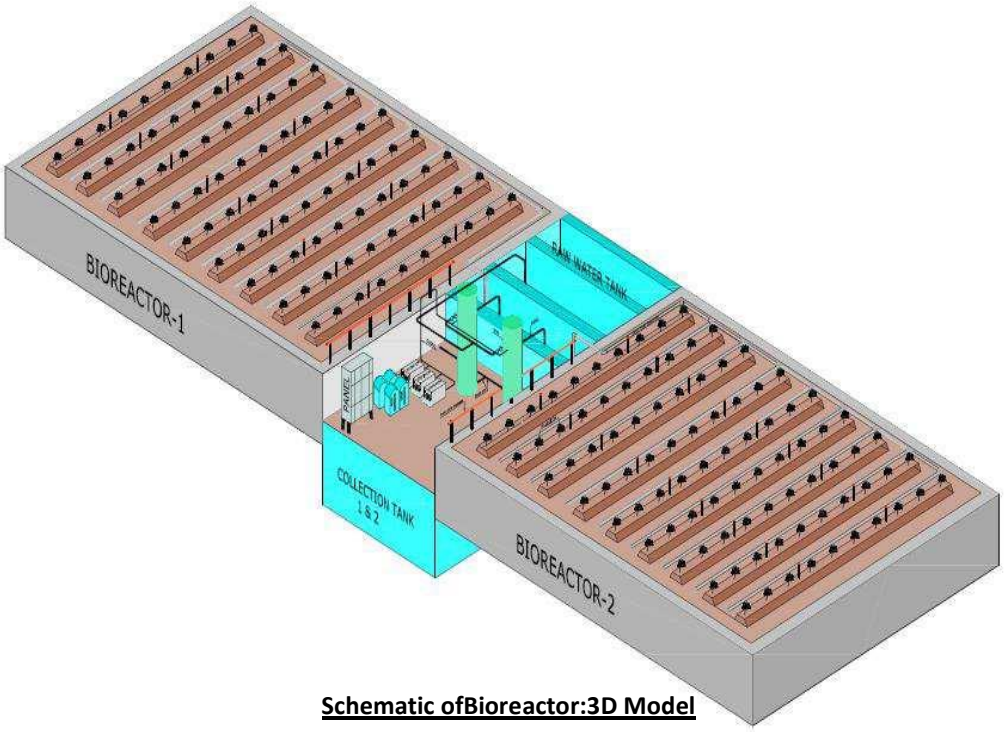
Process Description

Incoming pH isintherangeof6.0-7.0 and has to be adjusted with lime treatment before taking to the filter. Catalytic Advance Oxygen System is given as pre-treatment. The process is a batch processes in which wastewater is pumped and applied onto the top surface of the Bioreactor as shown in Figure. The design has suitable provision for manual removal of suspended solids from the bio-filter surface. Distribution of waste water over the media is achieved via pumping, piping and distribution arrangements Separate distribution lines are provided for raw wastewater as well as recycle water. There are two modes of suspended solids handing. In one types, suspended solids can be applied on the surface directly and can be scrapped out manually may be once in a month. The top 2 inch layer can be replaced with the additive material which is easily available in the local open market. The suspended solids are filtered out which includes additives that combine with organic of waste to produce manure. In the second mode, solids can be retained in the settling tank and then can be removed mechanically. Water first percolates through the bioreactor media which inhousescultured media in 40-60 min and gets collected into the collection tank. It can then be pumped onto the media again(recycling) in order to achieve maximum solid liquid contact. There circulation mode is provided for further polishing of the effluent .Dissolved organic and inorganic are oxidized and the water is purified further.

This treated water will be meeting the discharge norms of M/s. Sarigam Clean Initiative,C-ETP, Sarigam and hence will be discharged to common effluent drainage system of Sarigam Clean Initiative C- ETP leads to Marine discharge into Arabian sea near Tadgam point.

Flow Diagram:





Schematic ofBioreactor:3D Model

Annexure-2

Solvent recovery plan needs to be submitted.

Solvent recovery plan

- All the solvents shall be directly distilled from product mixes and; if required shall be purified in packed column with the help of reflux.
- The solvent distillation system shall be designed so as to achieve minimum 95.0 % recovery of solvent.
- All the pumps shall be mechanical seal type to avoid any leakage of solvent.
- All necessary fire fighting systems shall be provided with alarm system. Flame proof wiring and flame proof electrical accessories shall be provided to avoid any mishap.
- All the distillation column vents are also connected to cooling water/ chilled brine condensers for maximum possible recovery of the solvents.
- All the vents will be connected to a common carbon Adsorber for removing traces of solvent from vent gases.
- Residue generated from the distillation will be sent to BEIL incinerator site.
- Two condenser will install with cooling water and chilled brine to recover the solvent.
- Primary Condenser HE-01: Cooling water or Chilled water (at 10^0C) will be used to condense the solvents depend on the vapor pressure at its operating conditions and the non condensed vapors will be condensed in a Secondary Condenser
- VOC Trap Condenser HE-02: Chilled Brine at -05 0C will be used to trap any traces of Solvent which is slipped from Secondary condense

Figure SOLVENT MANAGEMENT PLAN

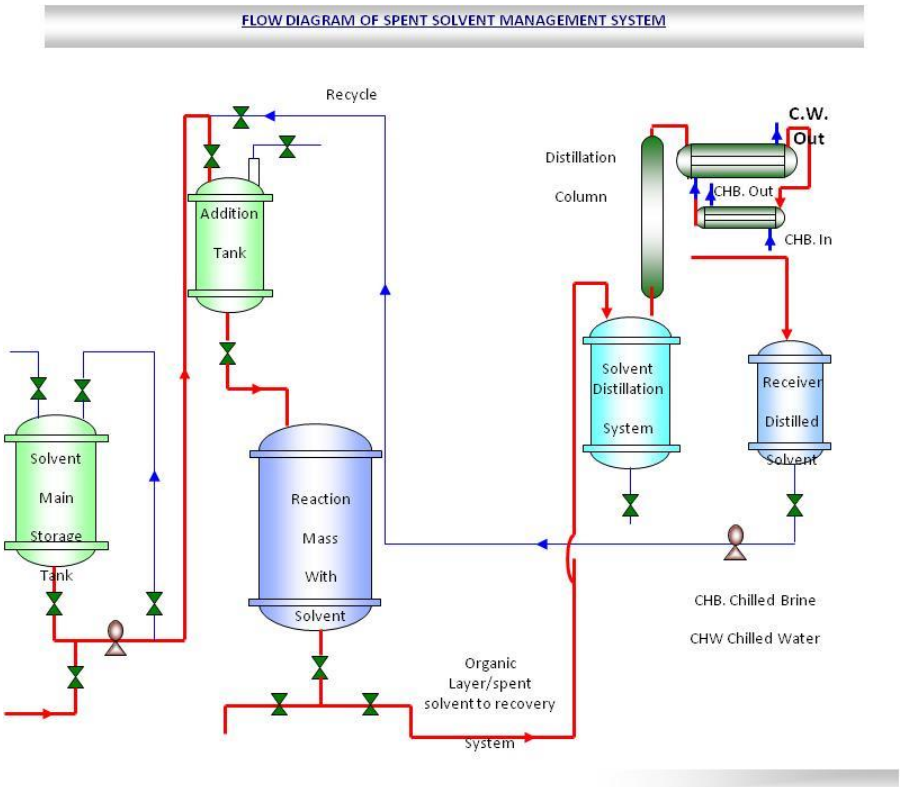


TABLE: SOLVENT RECOVERY TABLE

Solvent	Boiling Point (0c)	Vapor Pressure	Input (MT/Month)	Output (MT/month)	Loss	% Recovery	% Loss
Carbon Tetra Chloride	76	121 mbar @ 20 °C	393.0	375.0	18.0	95.42	4.58
Acetonitrile	82	97 Hpa (20 °C)	796.0	756.2	39.8	95.00	5.00
Tri Ethyl Amine (TEA)	88.8	51.75 Mmhg (20 °C)	378.1	360.0	18.1	95.21	4.79
n-Hexane	65	151 Mm Hg @ 25 °C	4593.7	4365.0	228.7	95.02	4.98
Ethylene Dichloride (EDC)	83.47	100 Mm Hg @ 300c	1194.0	1142.3	51.7	95.67	4.33
Mono Ethylene Glycol (MEG)	196 - 199 760 mm Hg	0.007 kPa @ 20 °c	154.0	149.0	5.0	96.75	3.25
Toluene	111	22 Mm Hg @ 200c	2656.6	2525.0	131.6	95.05	4.95
MDC	40	350 Mm Hg @ 20c	1580.0	1520.0	60.0	96.20	3.80
DMF	153	3.7 Mm Hg @ 250c	2351.6	2258.0	93.6	96.02	3.98
Benzene	80.1	75 mm Hg @ 20 deg C	1000.0	957.0	43.0	95.70	4.30
Iso Propyl Alcohol (IPA)	88	33 Mm Hg @ 2	1282.2	1220.3	61.9	95.17	4.83
Methanol	64.5	128 Hpa @ 200c	735.3	720.6	14.7	98.00	2.00

LEAK DETECTION AND REPAIR (LDAR)

To prevent losses of these solvents in atmosphere, following infrastructure shall be used in addition to LDAR program

- Leak Free Pumps for transfer of solvents
- MSW Gaskets in solvent pipelines to prevent leakage from flanges
- Minimum number of flanges, joints and valves in pipelines.
- To eliminate chances of leakages from glands of pumps, mechanical seal will be provided at all solvent pumps.
- All the rotating equipments like pumps will be installed with Mechanical Seals to arrest any sort of emissions.
- Condenser and scrubber post Reactor with cooling arrangement
- Enclosures to chemical storage area, collection of emission from loading of raw materials in particular solvents through hoods and ducts by induced draft, and control by scrubber / dust collector to be ensured.
- In case the small spillage or leakage observed, first pour the china clay (vermiculate) on material and collect the contaminated china clay (vermiculate) and send to ETP.
- If the spillage is of inflammable liquid, switch off all the power supply in the area to prevent Electric Spark.
- Flanges will be sealed so less loss will be there.

- Two condensers will install with cooling water and chilled brine to get more recovery of the solvent. Temperature of the condensers will be decreased than the normal temperature, so less loss of solvent & more recovery can be made possible.
- **Primary Condenser HE-01:** Cooling Tower water or Chilled water (at 5^0C) will be used to condense the solvents depend on the vapor pressure at its operating conditions and the non condensed vapors will be condensed in a Secondary Condenser
- **VOC Trap Condenser HE-02:** Chilled Brine at -15 ^{0}C will be used to trap any traces of Solvent which is slipped from Secondary condenser
- Hence, there is possibility of 1% - 2% more recovery of the solvents & 1% - 2% less loss of the solvents.
-

SOLVENT RECOVERY TABLE AFTER LDAR SYSTEM IS INSTALLED

Name of Solvent	Boiling Point (°C)	Vapor Pressure (mmHg@ 25oC)	Total Solvent Input (Kg)	Qty of Solvent Recovered (Kg)	Qty of Losses (Kg)	% Recovery	% Loss
Carbon Tetra Chloride	76	121 mbar @ 20 °C	393.0	377.0	16.00	95.93	4.07
Acetonitrile	82	97 Hpa (20 °C)	796.0	770.6	25.47	96.80	3.20
Tri Ethyl Amine (TEA)	88.8	51.75 Mmhg (20 °C)	378.1	366.0	12.11	96.80	3.20
n-Hexane	65	151 Mm Hg @ 25 °C	4593.7	4419.1	174.62	96.20	3.80
Ethylene Dichloride (EDC)	83.47	100 Mm Hg @ 300c	1194.0	1160.0	34.03	97.15	2.85
Mono Ethylene Glycol (MEG)	196 - 199 760 mm Hg	0.007 kPa @ 20 °c	154.0	149.5	4.50	97.08	2.92
Toluene	111	22 Mm Hg @ 200c	2656.6	2607.5	49.07	98.15	1.85
MDC	40	350 Mm Hg @ 20c	1580.0	1525.0	55.00	96.52	3.48
DMF	153	3.7 Mm Hg @ 250c	2351.6	2262.0	89.63	96.19	3.81
Benzene	80.1	75 mm Hg @ 20 deg C	1000.0	965.5	34.50	96.55	3.45
Iso Propyl Alcohol (IPA)	88	33 Mm Hg @ 2	1282.2	1246.3	35.88	97.20	2.80
Methanol	64.5	128 Hpa @ 200c	735.3	722.0	13.29	98.19	1.81

Immediate Repair of devices in case of Leakages

- A regular preventive maintenance schedule will be in place to replace or rectify all gaskets and joints etc to ensure no fugitive emissions shall take place.
- Plant shall also maintain adequate number of spares and consumables required to repair the leaking device
- Plant shall also have competent contractor team to handle Leakages and can repair the same immediately
- Standby equipments like Pumps, valves etc shall be kept basis the criticality and usage
- Plant shall also have access equipments like Boom lift to handle leakages at height immediately

Monitoring of Solvent Losses

- In warding, storage and consumption of solvents in various products shall be measured through Level Transmitters and Load cells weighing systems resp. The quantity at each stage shall be reconciled periodically to arrive at Losses.
- Periodic monitoring of work area will be carried out to check the fugitive emission.
- VOC detectors will be installed at various places to detect leak.

Preventive Maintenance to prevent Leakages

In order to prevent leakage from Pump, Seals, Valves etc, preventive maintenance shall be carried out periodically as per plan. Regular maintenance of valves, pumps, flanges, joints and other equipment will be done to prevent leakages and thus minimizing the fugitive emissions of VOCs.

S. no	Component	Preventive Maintenance schedule
1	Pump seals with visible liquid dripping	Daily
2	Valves/flanges	Quarterly
3	Compressor seals	Quarterly
4	Pressure relief devices	Yearly
5	Pipeline Thickness Testing	Yearly

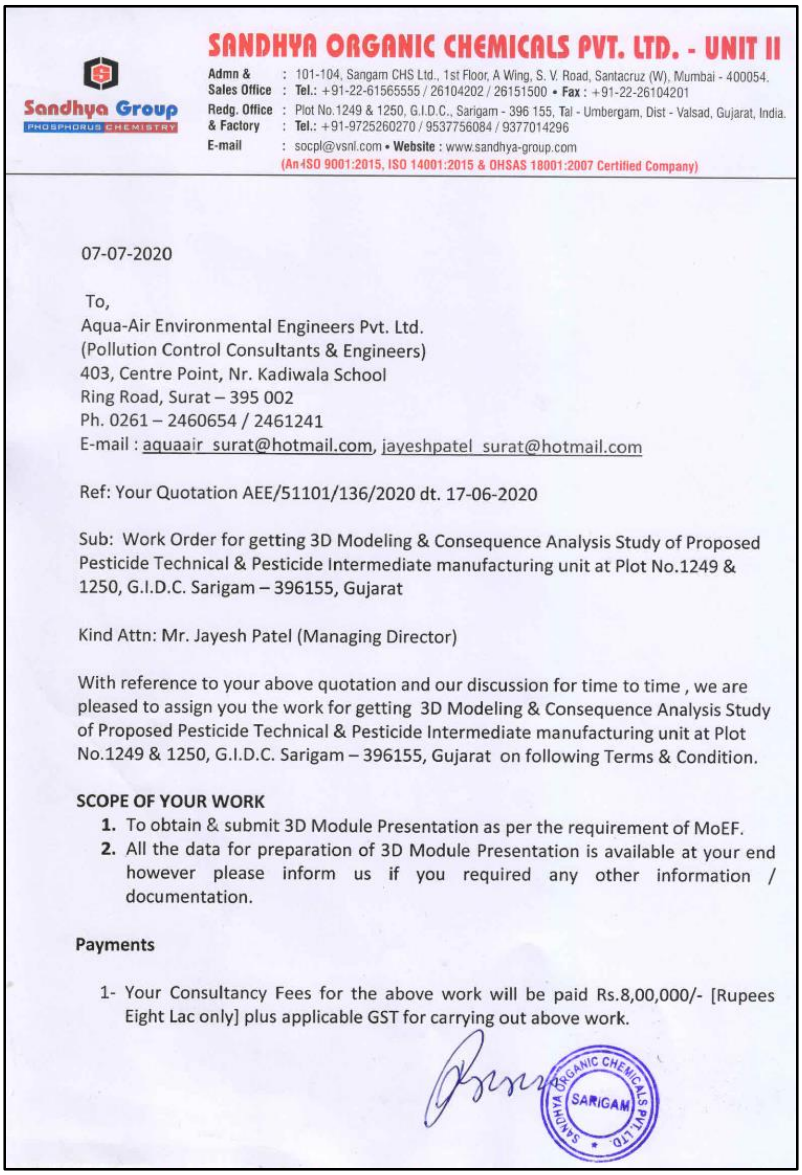
Annexure-3

PP needs to submit the following details on the Risk associated with the hazardous chemicals proposed to be used as a raw material;

- **Risk need to be carried out for medium and Catastrophic ruptures/leak even for Methanol, Bromine including Hydrochloric acid, Sulphuric acid and Benzoyl Chloride etc.**
- **Frequency/Probability of leak per year as done for any risk analysis.**
- **Individual risk contours and societal risk F-N curves to assess against risk acceptance criteria using advanced 3D modeling.**
- **Disaster management plan**

Reply: We have given for detail study of 3D Risk CFD Modelling & Consequence Analysis Study and it is almost ready. We will be submitted it as we received.

PO For 3D Risk CFD Modelling & Consequence Analysis Study:



Sandhya Group
PHOSPHORUS CHEMISTRY

SANDHYA ORGANIC CHEMICALS PVT. LTD. - UNIT II

Admn & Sales Office : 101-104, Sangam CHS Ltd., 1st Floor, A Wing, S. V. Road, Santacruz (W), Mumbai - 400054.
Tel.: +91-22-61565555 / 26104202 / 26151500 • Fax : +91-22-26104201
Redg. Office & Factory : Plot No.1249 & 1250, G.I.D.C., Sarigam - 396 155, Tal - Umbergam, Dist - Valsad, Gujarat, India.
Tel.: +91-9725260270 / 9537756084 / 9377014296
E-mail : socpl@vsnl.com • Website : www.sandhya-group.com
(An ISO 9001:2015, ISO 14001:2015 & OHSAS 18001:2007 Certified Company)

07-07-2020

To,
Aqua-Air Environmental Engineers Pvt. Ltd.
(Pollution Control Consultants & Engineers)
403, Centre Point, Nr. Kadiwala School
Ring Road, Surat – 395 002
Ph. 0261 – 2460654 / 2461241
E-mail : aquaair_surat@hotmail.com, jayeshpatel_surat@hotmail.com

Ref: Your Quotation AEE/51101/136/2020 dt. 17-06-2020

Sub: Work Order for getting 3D Modeling & Consequence Analysis Study of Proposed Pesticide Technical & Pesticide Intermediate manufacturing unit at Plot No.1249 & 1250, G.I.D.C. Sarigam – 396155, Gujarat

Kind Attn: Mr. Jayesh Patel (Managing Director)

With reference to your above quotation and our discussion for time to time , we are pleased to assign you the work for getting 3D Modeling & Consequence Analysis Study of Proposed Pesticide Technical & Pesticide Intermediate manufacturing unit at Plot No.1249 & 1250, G.I.D.C. Sarigam – 396155, Gujarat on following Terms & Condition.

SCOPE OF YOUR WORK

1. To obtain & submit 3D Module Presentation as per the requirement of MoEF.
2. All the data for preparation of 3D Module Presentation is available at your end however please inform us if you required any other information / documentation.

Payments

1- Your Consultancy Fees for the above work will be paid Rs.8,00,000/- [Rupees Eight Lac only] plus applicable GST for carrying out above work.

SANDHYA ORGANIC CHEMICALS PVT. LTD. SARIGAM

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PHOSPHORUS CHEMISTRY

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Tel.: +91-9725260270 / 9537756084 / 9377014296
E-mail : socpl@vsnl.com • Website : www.sandhya-group.com
(An ISO 9001:2015, ISO 14001:2015 & OHSAS 18001:2007 Certified Company)

Mode of Payments (with GST as applicable)

(a) 25% along with Work Order.
(b) 25% against submission of Draft Report
(c) 40% against submission of final Report in MoEF.
(d) 10% against receipt of E.C. from MoEF without any query as far as 3D Module presentation is concern.

Your payment will be subject to applicable tax and you have provided us your GST Registration No. 24AAHCA0485H1ZU and PAN No. AAHCA0485H

If you are agreeable on above terms and condition then please sign the duplicate copy of this letter in token of your acceptance

Thanking you
For Sandhya Organic Chemicals Pvt. Ltd.

SANDHYA ORGANIC CHEMICALS PVT. LTD. SARIGAM

R. J. Shah
General Manager- Works

Encl : A cheque No._____ Dt._____ for Rs.2,16,000/- (25% of Rs.8,00,000= Rs.2,00,000/- + GST @ 18% = Rs.36,000/-= Total Rs.2,36,000/- Less TDS @ 10% on Rs.2,00,000/- = Rs.20,000/-. Net Amount will be Rs.2,16,000)

We accept above Terms & Condition
For Aqua-Air Environmental Engineers Pvt. Ltd.

Authorized Signatory

Annexure-4

Status of TSDF membership needs to be submitted.

Membership details of TSDF

DETOX INDIA
operated by VEOLIA

REF No: DIPL/1300000372/2020-21/29 Date of Issue: 01/06/2020

TO WHOMSOEVER CONCERN

PROVISIONAL MEMBERSHIP CERTIFICATE

This is to certify that **M/s. SANDHYA ORGANIC CHEMICALS PVT. LTD. (Generator)** having its Production Unit at **Plot No. 1249, 1250, GIDC Sarigam, Dist: Valsad-396155** has approached **M/s. Detox India Pvt. Ltd. (Operator)** for obtaining membership of its Integrated Common Hazardous Waste Management Facility (I.C.H.W.M.F) at Kutch Site for disposal of Industrial Hazardous Waste generated from their Production activities.

This Provisional Certificate with validity of 06 (six) months from date of issue has been issued for meeting and complying any immediate requirement of the Regulators.

Final Membership Certificate shall be awarded subject to successful completion of all essential membership formalities.

Note: **Waste disposal activities shall commence post receipt of Final Membership Certificate by the Generator.**

In event of any clarification/discussion, please feel free to contact us at info@detoxindia.com for further assistance.

Thanks & Regards,

For, Detox India Pvt. Ltd.

(Director)

Detox India Private Limited
(Formerly : Ankleshwar Cleaner Process Technology Centre Pvt. Ltd.)
Corporate Office : Detox House, Opp. Gujarat Samachar Press, Udhna Darwaja, Ring Road, Surat-395 002 (Guj.) INDIA
Ph. : +91 261 2351248, 2346181, E-mail : info@detoxindia.com | CIN : U90000GJ2010PTC060122