BEFORE THE HON'BLE NATIONAL GREEN TRIBUNAL,

PRINCIPAL BENCH, NEW DELHI

AT NEW DELHI

Original Application No.671/2022

"4 Killed, 20 injured and several missing after Surat Factory Dire"

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New Delhi

Date: 21/09/2022

Advocate for Respondent Company

BEFORE THE HON'BLE NATIONAL GREEN TRIBUNAL,
PRINCIPAL BENCH, NEW DELHI
AT NEW DELHI

Original Application No.671/2022

"4 Killed, 20 injured and several missing after Surat Factory Dire"

REPLY ON BEHALF OF M/S ANUPAM RASAYAN INDIA LIMITED
(hereinafter for the sake of brevity will be referred to as the Respondent Company)

MAY IT PLEASE THE HON'BLE TRIBUNAL -

1. At the outset, the Respondent Company submits that, the fateful incident that occurred on 10th September 2022 is most unfortunate and the Respondent Company deeply sympathizes with the families of the all-deceased persons. However, the Respondent Company would like to state on record that, the Respondent Company has been scrupulously following and complying with all the statutory compliances and also by obtaining the necessary legal permissions to run the Company. The Respondent Company is filing the present reply for the initial hearing in the present case and reserves its right to file a detailed reply as and when necessary.

2. Before adverting to the fateful incident, the Respondent Company would like to state certain facts on record. The Respondent Company applied for a factory license from the Director Industrial, Safety and Health, Surat. The same came to be granted on 15th July 2019. Copy of the Factory License is annexed hereto and marked as **ANNEXURE – R-1**. The Respondent Company received the Environmental Clearance from the State Level Impact Assessment Authority (SEIAA) on 23rd August 2019 for setting up of Synthetic Organic Chemicals manufacturing plant at Plot No.2423 & 2425, Sachin GIDC Estate, Sachin, District Surat. The products manufactured by the Company are not toxic on combustion. On combustion at high temperature the product burns out totally. Copy of the Environmental Clearance is annexed hereto and marked as **ANNEXURE – R-2**.

3. The Respondent Company after receipt of the Environmental Clearance applied for Consent to Establish vide application dated 25th October 2019. The Respondent Company, thereafter received the Consolidated Consent and Authorisation (CCA) on 26th December 2019. The said CCA is valid and subsisting till 30th June 2024. Copy of the said CCA dated 26th December 2019 is annexed hereto and marked as **ANNEXURE – R-3**.

4. The Respondent Company has also received the ISO certification from the TUV Authority on 23rd November 2021 as it had complied with all the required requisitions for setting up of a synthetic chemical manufacturing plant. Copy of the ISO certificates are annexed hereto and marked as **ANNEXURE – R-4**.

5. The Respondent Company has also evaluated itself under the ECOVADIS rating regime. The objective of the EcoVadis Corporate Social Responsibility (CSR) rating methodology is to measure the quality of a company's CSR management system – through its policies, actions and results. The EcoVadis CSR rating methodology is based upon seven founding principles. The scoring scale includes five sustainability performance levels: - Outstanding (score 85-100); - Advanced (score 65-84); - Good (score 45-64). The score of the Respondent Company upon evaluation of performances is 45. Copy of the ECOVADIS certificate is annexed hereto and marked as **ANNEXURE – R-5**.

6. The Respondent Company further submits that the Respondent Company had undertaken a safety audit from a third party vide report dated 20th November 2020. The said report records that the Respondent Company has followed the Indian Standards 14489 (2018): Code of Practice on Occupational Safety & Health Audit.

The report records all compliances done on the part of the Respondent Company for safety and health. Copy of the said safety audit dated 20th November 2020 is annexed hereto and marked as **ANNEXURE – R-6**.

7. The Respondent Company submits that on 10th September 2022, the day when the fateful incident took place, there was no report of any malfunctioning of the system or any adverse observation by the workers working in the factory. The Respondent Company submits that during the distillation process there was an increase in the temperature while unloading of the material. The hot material in the receiver led to the fire which spread in the whole of plant -1 leading to the explosion. The Respondent Company had taken and put in place every possible precaution for the safety of its employees and the unit. Despite it the said unfortunate incident occurred for reasons beyond the control of the Respondent Company. The incident of the blast occurred and there were 4 casualties and 20 injured employees. Copy of the preliminary investigation report is annexed hereto and marked as **ANNEXURE – R-7**.

8. Upon knowledge of the said incident, the injured were immediately taken to the Apple and Unique Hospitals and treated. It is submitted that out of 20 employees, 17 have been discharged between 12th to

17th September 2022. A copy of the discharge summary alongwith a table giving all the details is annexed hereto and marked as **ANNEXURE – R-8**.

9. The Respondent Company immediately reported the said incident to the Director Industrial Safety and Health, Surat. The DISH inspector has drawn up a report dated 11th September 2022. A copy of the said report is annexed hereto and marked as **ANNEXURE – R-9**. The Gujarat Pollution Control Board (GPCB) also inspected the premises of the Respondent Company on 11th September 2022 and prepared an inspection note. The Respondent Company was directed to file a response to the same. The Respondent Company has submitted a detailed reply on 19th September 2022 alongwith the supporting documents. The reasons for the blast have been placed before the respective authorities for their consideration. However, the Respondent Company is yet to receive any response from them. Copy of the notice of the GPCB is annexed hereto and marked as **ANNEXURE – R-10** and the reply of the Company is annexed hereto and marked as **ANNEXURE – R-11.**

10. The Respondent Company submits that the Company has deposited the compensation in accordance with the provisions of Section 3 of the Employees Compensation Act, 1923 before the Employees

Compensation Commissioner, Surat in accordance to the undertaking given on 11th September 2022. Details of the compensation paid to the employees is annexed hereto and marked as **ANNEXURE – R-12**. Copy of the details of the compensation paid to the injured is annexed hereto and marked as **ANNEXURE – R-13**. The Company has also taken the Liability Insurance in accordance with the Public Liability Insurance Act, 1991. Copy of the insurance policy is annexed hereto and marked as **ANNEXURE – R-14**.

11. The Respondent Company submits that the GPCB vide its notice dated 16th September 2022 issued under the provisions of Section 31-A of the Air (Prevention and Control of Pollution) Act, 1981 directed the Respondent Company to deposit the interim damage compensation of Rs.1 crore. The GPCB vide the said notice also directed the Company to forthwith stop the operations and also submit the compliance as mentioned in the said notice. In the said notice the GPCB stated as under: -

(i) This order shall be effective with immediate effect;
(ii) If your plant runs on captive power plant or DG set, than you shall stop them also;
(iii) To direct the concerned authority to stop supply of electricity immediately;
(iv) To comply with the DISH direction and submit its compliance report;

(v) *To submit safety Audit report, HAZOP study report and PLI policy.*

(vi) *To collect & dispose generated wastewater, burned/partially burned material due to fire incident in a scientific manner and submit the details.*

The Respondent Company responded to the said notice. The Company has submitted the safety audit report, the HAZOP study report and the PLI policy. Copy of the HAZOP report is annexed hereto and marked as **ANNEXURE – R-15**. The Respondent Company has on 18th September 2022 deposited the said interim compensation with the GPCB. Copy of the notice of the GPCB alongwith the payment acknowledgment is annexed hereto and marked as **ANNEXURE – R-16**.

12. The Respondent Company submits that there are around 7 companies in the vicinity. The said Companies function in around 3 shifts. These companies have also given a certificate certifying that there was no loss in their premises and that there was no harm caused to any of the employees working in the premises. The said certificates have also been handed over to the GPCB intimating that there is no loss of any nature on account of the incident at the site of

the Respondent Company. Copies of the said certificates are annexed hereto and marked as **ANNEXURE – R – 17 colly**.

13. The Respondent Company submits that; it will ensure that no such untoward incident will take place in the future. The Respondent Company further ensures that, it will abide by the all legal provisions and that the authorities may be directed to issue requisite permissions in order to enable the Respondent Company to commence the manufacturing. The Hon'ble Tribunal may pass appropriate directions to the Respondent Company and the compliance will be reported to the respective authorities.

New Delhi
Date: 21/09/2022

Advocate for Respondent Company

सत्यमेव जयते

Directorate Industrial Safety & Health

Directorate Industrial Safety & Health

Gujarat State

FORM NO. 4

(Prescribed under Rules 5)

FORM NO. 4

License to work a factory

(Prescribed under Rules 5)

License to work a factory

Registration No. **5077/24** **19/2019** License No. **37958**

FIN. **S19037958A** D.A. **01-Jun-2019**

License is hereby granted to

Mr. ANAND SURESHBHAI DESAI

For the premises known as

ANUPAM RASAYAN INDIA LTD. (UNIT - VI)

situated at

PLOT NO. 2423 & 2425 G. I. D. C. SACHIN SURAT

Ta.: **Chorasi** Dist.: **Surat**

for use as a factory within the limits specified in the plan approved by the

Joint Director Industrial Safety and Health, Surat Region

vide No. **6412** Date **19-Jun-2019** subject to provisions of the

Factories Act, 1948 and the Rules made thereunder.

The license is issued for:

- Maximum Number of workers to be employed on any day during the Year :** **50****
- Maximum installed power in B.H.P. on any day during the year :** **2,000****

The license is valid up to 31st December **2028**,

Fees paid Rs. **106,000.00**
Fees due Rs. **106,000.00**
Excess Rs. **0.00**
Place : Surat
Date : 15-Jul-2019

DIRECTORATE INDUSTRIAL SAFETY & HEALTH GUJARAT STATE

Signature valid

Digitally signed by BAMANIYA SURSINH CHAMPAKLAL
Date: 2019.07.15 15:54:07 +05:30
Reason: Approval
Location: Surat

Joint Director
Industrial Safety and Health
Surat Region

S. M. SAIYAD, IFS
MEMBER SECRETARY
SEIAA (GUJARAT)

सत्यमेव जयते

STATE LEVEL ENVIRONMENT IMPACT ASSESSMENT AUTHORITY GUJARAT

Government of Gujarat

No. SEIAA/GUJ/EC/5(f)/1150 /2019 **Date: 23 AUG 2019** By R P A D

Time Limit

Sub: Environment Clearance to M/s. Anupam Rasayan India Ltd. (Unit-6) for setting up of Synthetic Organic Chemicals manufacturing plant at Plot No. 2423 & 2425, Sachin GIDC Estate, Sachin, Dist.: Surat. In Category 5(f) of Schedule annexed with EIA Notification dated 14/09/2006.

Ref: Your Proposal No. SIA/GJ/IND2/37213/2017.

Dear Sir,

This has reference to your application along with EIA report dated **08/06/2019** submitted to SEIAA, seeking Environmental Clearance under Environment Impact Assessment Notification, 2006 and additional information / documents submitted vide letter dated 25/06/2019 to the SEAC.

The proposal is for Environmental Clearance to **M/s. Anupam Rasayan India Ltd. (Unit-6) for setting up of Synthetic Organic Chemicals manufacturing plant at Plot No. 2423 & 2425, Sachin GIDC Estate, Sachin, Dist.: Surat.** It is a proposed unit for manufacturing following products, which falls in the category - 5(f) of the schedule of the EIA Notification-2006:

Sr. No	NAME OF PRODUCT	CAS No.	QUANTITY (MT/MONTH)	END USE OF PRODUCT
1	2,4-Dichloro Acetophenone	2234-16-4	200	As a Raw Material in Pharma Products
2	2,5-Dichloro Acetophenone	2476-37-1		
3	4-Fluoro Acetophenone	403-42-9		
4	2,4-Dichloro-5-Fluoro Acetophenone	704-10-9		
5	2,4-Dichloro Phenacyl Bromide	2631-72-3		
6	2,4-Dichloro Phenacyl Chloride	4252-78-2		
7	2,4-Dichlorobutero Phenone	66353-47-7		
Phenoxy Compounds / Diphenyl Ether Compounds				
8	2 -Chloro-4-(4-Chloro Phenoxy) Phenacyl Bromide	112110-16-4	200	As a Raw Material in Pharma Products
9	2-Chloro-4-(4-Chlorophenoxy) Acetophenone / 4-Acetyl-3,4'-Dichloro Diphenyl Ether	119851-28-4		
10	3- Chloro-4-(2-Bromo Ethyl-4-Methyl-1,3-dioxolane-2-yl)-4-Chloro Diphenyl Ether	873012-43-2		
11	4-(2-Bromomethyl -4-propyl-1,3-dioxolane-2-yl)-1,3-Dichlorobenzene	60207-89-8		
Benzoic Acid / Ester Compounds				
12	5-Methyl-2,3-Pyridine Dicarboxylic Acid	112110-16-4	100	As a Raw Material in Pharma Products
13	3,4,5-Tri Methoxy Benzoic acid	118-41-2		
14	3,4,5-Tri Methoxy Toluene	6443-69-2		
15	1-(4-methoxyphenyl)-3-(4-tert-butylphenyl)propane-1,3-dione	87075-14-7		
16	2-Ethylhexyl-2-Cyano-3,3-diphenyl-2-Propionate	6197-30-4		
17	2-Ethylhexyl(2E)-3-(4-methoxyphenyl)prop-2-enoate	5466-77-3		
18	2-Ethylhexyl-2-Hydroxybenzoate	118-60-5		
19	2 – Amino 3-Chloro Benzoic Acid Methyl Ester	77820-58-7		
20	2- Nitro-5-Chloro-4-Methyl Benzoic Acid Iso Propyl Ester	1204518-43-3		
21	N-(2-Hydroxypropyl)-2-Picolylamine	68892-16-0		
Advanced Specialty / Pharma Products				
22	Ortho PhenyleneDiamine	95-54-5	150	As a Raw Material in Pharma Products
23	Meta PhenyleneDiamine	108-45-2		
24	Para PhenyleneDiamine	106-50-3		
25	Resorcinol / 1,3 Benzenediol / Meta Di Hydroxy Benzene	108-46-3		
26	Meta Amino Phenol	591-27-5		
27	2,4-Difluoro Aniline	367-25-9		

28	2,4- Difluoro Nitrobenzene	446-35-5		
29	2,6- Difluoro Aniline & its intermediate (2,6 Difluoro Benzamide)	5509-65-9 (Intermediate CAS: 18063-03-1)		
30	1,2-Di Fluoro Benzene	367-11-3		
31	2-Amino Benzotrifluoride	88-17-5		
32	3 – Amino Benzotrifluoride	98-16-8		
33	4 – Amino Benzotrifluoride	455-14-1		
34	3,4-Difluoro Benzonitrile	64248-62-0		
35	4-[[4,6-bis[[4-(2-ethylhexoxy-oxomethyl]phenyl]amine]-1,3,5-triazin-2-yl]amino]benzoic acid -2-ethylhexyl ester	88122-99-0		
36	4, 4'-[[6-[[(1, 1-dimethylethyl)amino]carbonyl]phenyl]amino]-1, 3, 5-triazine-2, 4-diyl]diimino]bis-bis(2-ethyhexyl)benzoate.	154702-15-5		
37	2-(2, 4-dihydroxyphenyl)-4, 6-bis (2, 4-dimethylphenyl)-1, 3, 5-triazine.	1668-53-7		
38	4-n-Butyl Resorcinol	18979-61-8		
39	4-n-Hexyl Resorcinol	136-77-6		
40	Propanedionic 2,2'-(1,4-phenylenedimethylidyne)bis - 1,1',3,3'-tetraethyl Ester	6337-43-5		
41	2,4-dihydroxy Benzophenone	131-56-6		
42	2-Hydroxyl-4-methoxyBenzophenone	131-57-7		
43	2-Hydroxyl-4-(Octyl)Benzophenone	1843-05-6		
44	2-Hydroxy-3,3,5-trimethyl Cyclohexyl Ester Benzoic Acid	118-56-9		
45	4H-3,1-Benzoxazin-4-one,2,2'-(1,4-phenylene)bis-	18600-59-4		
46	2-(4,6-diphenyl-1,3,5-triazin-2-yl)-5-(hexyloxy)phenol	147315-50-2		
47	2-Hydroxy-4-Methoxy Benzophenone -5- Sulphonic acid	4065-45-6		
48	Benzoic acid -4-[[(methylphenylamino)methylene]amino] Ethyl Ester	57834-33-0		
49	2-(5-chloro-2H-benzotriazol-2-yl)-6- (1,1-dimethylethyl)-4-Methyl Phenol	3896-11-5		
50	2-(2H-benzotriazol-2-yl)-4-(1,1-dimethylethyl)-6-(1-methylpropyl)phenol	36437-37-3		
51	2-(2H-benzotriazole-2-yl)-4,6 bis(1-methyl-1-Phenylethyl)phenol	70321-86-7		
52	2-(2H-benzotriazol-2-yl)-4,6-bis (1,1-dimethylethyl)phenol	3846-71-7		
53	2-(2H-benzotriazole-2-yl)-4-methyl phenol	2440-22-4		
54	2-(5-chloro-2H-benzotriazol-2-yl)-4,6-bis (1,1-dimethylethyl)phenol	3864-99-1		
55	2-(2H-benzotriazol-2-yl)-4-(1,1-dimethyletnyl)-phenol	3147-76-0		
56	2,2'-methylene bis [6-(2H-benzotriazol-2-yl)-4-(1,1,3,3-tetramethylbutyl)phenol	103597-45-1		
57	2-(2H-Benzotriazol-2-yl)-4-(1,1,3,3-tetramethybutyl)-Phenol	3147-75-9		
58	2- Acetylphenothiazine	66311-94-3		
59	2- Chlorophenothiazine	92-39-7		
60	2- Trifluoromethyl Phenothiazine	92-30-8		
61	2-Methoxy Phenothiazine	1771-18-2		
62	2- Mercaptomethyl Phenothiazine	7643-08-5		
63	Chlopromazine Hydrochloride	50-53-3		used to control hiccups, reduce anxiety and treat nausea and vomiting
64	Bupropion Hydrochloride	34911-55-2		antidepressants
65	2-(6-Methoxy napthalen-2-yl) Propionic Acid	22204-53-1		As a Raw Material in Naproxen
66	Citalopram Hydro Bromide	59729-33-8		Antidepressants
67	Cyclobenzaprine Hydrochloride	303-53-7		to treat skeletal muscle

68	Cyproheptadine Hydrochloride	129-03-3		Antihistamine
69	Tamoxifen Citrate	10540-29-1		Anti Cancer
70	Doxepine Hydrochloride	1668-19-5		antidepressants
71	Doxylamine Succinate	469-21-6		antihistamine
72	ImatinibMesylate	152459-95-5		Anti Cancer
73	Etoricoxib	202409-33-4		for the treatment of rheumatoid arthritis, psoriatic arthritis, osteoarthritis, ankylosing spondylitis, chronic low back pain, acute pain, and gout
74	Dothiepin (Dosulepin) Hydrochloride	113-53-1		antidepressant
75	FlupentixolDihydrochloride	2413-38-9		Antipsychotic
76	Ketamine Hydrochloride	6740-88-1		anesthetic
77	Losartan Potassium	114798-26-4		to treat high blood pressure
78	TeneligliptinHydrobromide Hydrate	760937-92-6		Anti Cancer
79	OlmesartanMedoxomil	144689-24-7		to treat high blood pressure
80	KetoLoratadine	79794-75-5		antihistamine
81	Tedizolid Phosphate	856866-72-3		antibiotic
82	Enzalutamide	915087-33-1		anti-androgen
83	Empagliflozin	864070-44-0		Anti Diabetes
84	Dapagliflodin	461432-26-8		Anti Diabetes
Total Production of All Groups (1 to 4)			**650**	

The project activity is covered in 5(f) and is of 'B' Category. Since, the proposed project is located in notified industrial area, public consultation is not required as per paragraph 7(i) (III) (i) (b) of the Environment Impact Assessment Notification-2006.

The SEAC, Gujarat vide their letter dated **12/07/2019** had recommended to the SEIAA, Gujarat, to grant the Environment Clearance for the above-mentioned project based on its meeting held on **27/06/2019**. The proposal was considered by SEIAA, Gujarat in its meeting held on **15/07/2019** at Gandhinagar. After careful consideration, the SEIAA hereby accords Environmental Clearance to above project under the provisions of EIA Notification dated 14th September, 2006 subject to the compliance of the following conditions.

A. CONDITIONS :

A.1 SPECIFIC CONDITION :

1. Close loop solvent recovery with adequate condenser/chilling system shall be provided to recover solvent vapors in such a manner that recovery shall be maximum. Recovered solvent shall be reused in the process within premises.
2. Unit shall explore the possibilities for environment friendly methods for disposal of Incinerable & land fillable wastes before sending to CHWIF/TSDF sites.
3. Leak Detection and Repair (LDAR) program shall be prepared and implemented as per the CPCB guidelines. LDAR Logbooks shall be maintained.
4. Unit shall comply all the conditions & recommendations mentioned in the guidelines for the management of the spent solvents published by GPCB in letter and spirit.
5. Unit shall have to adhere to the prevailing area specific policies of GPCB with respect to the discharge of pollutants, and shall carry out the project development in accordance & consistence with the same.
6. Flame proof electric fittings shall be provided within premises.
7. Safety measures for Hazardous chemical handling as per PESO standards shall be provided.
8. Unit shall adopt proper methods for segregation of waste water streams based on characteristics at source and its sound management keeping in view direction under section 18 (1) (b) of the Water (Prevention and Control of Pollution) act, 1974 issued by CPCB regarding compliance of CETP.
9. Unit shall explore the possibilities for environment friendly methods for disposal of Incinerable & land fillable wastes before sending to CHWIF/TSDF sites.
10. All measures shall be taken to prevent soil and ground water contamination.
11. The project proponent must strictly adhere to the stipulations made by the Gujarat Pollution Control Board, State Government and/or any other statutory authority.
12. The National Ambient Air Quality Emission Standards issued by the Ministry vide G. S. R. No. 826 (E) dated 16th

November, 2009 shall be complied with.

13. National Emission Standards for Organic Chemicals Manufacturing Industry issued by the Ministry vide G. S. R. 608 (E) dated 21/07/2010 and amended from time to time shall be followed.
14. Unit shall provide Continuous Emission Monitoring System [CEMS] and an arrangement shall also be done for reflecting the online monitoring results on the company's server, which can be assessable by the GPCB on real time basis.

A. 2 WATER :

15. Total water requirement for the project shall not exceed 455 KLD. Unit shall reuse 28 KLD Hence, fresh water requirement shall not exceed 427 KLD and it shall be met through GIDC water supply only. Prior permission from the concerned authority shall be obtained for withdrawal of water.
16. The industrial effluent generation from the project shall not exceed 74 KLD.
17. Entire effluent generated from process and washing 47.0 KLD shall be first treated in solvent stripper followed by primary ETP and treated effluent shall be sent to Common MEE of Globe Enviro Care Ltd for final treatment and disposal.
18. In case of non-operation of Common MEE, concentrated stream shall be treated in in-house MEE. In that case concentrated stream shall be subjected to in-house Stripper followed by Primary ETP & MEE with ATFD. Condensate (40 KLD) shall be reused for Boiler after conforming the GPCB/CPCB/MoEF&CC norms and in that case fresh water requirement shall not exceed 387 KL/day.
19. Entire effluent generated from boiler blow down & cooling tower blow down 15 KLD shall be passed through RO, RO – Permeate 10 KLD shall be reused back in process and 5 KLD RO – Reject shall be disposed into ETP along with process and washing effluent which will be finally sent to Common MEE of Globe Enviro Care Ltd for final treatment and disposal.
20. Domestic wastewater generation shall not exceed 18 KL/Day and it shall be treated in STP and treated effluent shall be used in (1) Gardening – 5 KLD, (2) Washing – 5 KLD & (3) Cleaning (Domestic) – 8 KLD.
21. During monsoon season when treated sewage may not be required for the plantation / Gardening / Green belt purpose, it shall be stored within premises. There shall be no discharge of waste water outside the premises in any case.
22. Unit shall provide buffer water storage tank of adequate capacity for storage of treated waste water during rainy days.
23. Unit shall provide adequate effluent treatment plant (ETP), STP for treatment of industrial effluent and domestic sewage and it shall be operated regularly and efficiently so as to achieve the GPCB/CPCB/MoEF&CC norms.
24. The unit shall provide metering facility at the inlet and outlet of the ETP, STP, reuse line and maintain records for the same.
25. Proper logbooks of ETP & RO operation, chemical consumption in ETP, quantities and qualities of effluent discharge to M/s GECL, power consumption etc. shall be maintained and shall be furnished to the GPCB from time to time.

A. 3 AIR:

26. Unit shall not exceed fuel consumption for Steam Boiler, TFH and stand-by DG set as mentioned below:

Sr. no.	Source of emission With Capacity	Stack Height (meter)	Type of Fuel	Quantity of Fuel MT/Day	Type of emissions i.e. Air Pollutants	Air Pollution Control Measures (APCM)
1	Steam Boiler (10 MT/hr)	15	Natural Gas	1670 SCM/DAY	SPM SO_2 NOx	As Natural Gas shall be use, about 15 meters stack height shall be provided.
2	Thermopack Unit – 4 Nos, Capacity : 600 U each	15	Natural Gas	5000 SCM/DAY		
3	D. G. Set - 3 Nos Capacity: 2050 KVA × 1 1025 KVA 2	15	Diesel	300 lit/Day		Adequate Stack Height

27. Unit shall provide adequate APCM with flue gas generation sources as mentioned above:
28. Unit shall provide adequate APCM with process gas emission as mentioned below:

Sr. no.	Specific Source of emission (Name of the Product & Process)	Type of emission	Stack/Vent Height (meter)	Air Pollution Control Measures (APCM)
1	Process Vent-1 (Bromination)	HBr	11	Two Stage Scrubber (1st Water & 2nd Caustic)
2	Process Vent-2 (Chlorination)	HCl SO_2	11	Two Stage Scrubber (1st Water & 2nd Caustic)
3	Process Vent-3 (Ammoniation)	NH_3	11	Two Stage Water Scrubber

29. The fugitive emission in the work zone environment shall be monitored. The emission shall conform to the standards

prescribed by the concerned authorities from time to time (e.g. Directors of Industrial Safety & Health). Following indicative guidelines shall also be followed to reduce the fugitive emission.

- Internal roads shall be either concreted or asphalted or paved properly to reduce the fugitive emission during vehicular movement.
- Air borne dust shall be controlled with water sprinklers at suitable locations in the plant.
- A green belt shall be developed all around the plant boundary and also along the roads to mitigate fugitive & transport dust emission.

30. Regular monitoring of Volatile Organic Compounds (VOCs) shall be carried out in the work zone area and ambient air.
31. For control of fugitive emission, VOCs, following steps shall be followed :
    a. Closed handling and charging system shall be provided for chemicals.
    b. Reflux condenser shall be provided over Reactors / Vessels.
    c. Pumps shall be provided with mechanical seals to prevent leakages.
32. Air borne dust at all transfers operations/ points shall be controlled either by spraying water or providing enclosures.
33. Solvent management shall be carried out as follows :
    - Measures shall be taken to reduce the process vapors emissions as far as possible. Use of toxic solvents shall be minimum. All venting equipment shall have vapour recovery system
    - Reactor shall be connected to adequate chilling system to condensate solvent vapors and reduce solvent losses.
    - Reactor and solvent handling pump shall have mechanical seals to prevent leakages.
    - The condensers shall be provided with sufficient HTA and residence time so as to achieve maximum solvent recovery.
    - Solvents shall be stored in a separate space specified with all safety measures.
    - Proper earthing shall be provided in all the electrical equipment wherever solvent handling is done.
    - Solvent storage and handling area shall be flame proof. The solvent storage tanks shall be provided with breather valve to prevent losses.
34. Regular monitoring of ground level concentration of SPM, PM10, PM2.5, SO2, NOX, O3, Pb, NH3, As, Ni, Cl2, VOCs, C6H6 & CO shall be carried out in the impact zone and its records shall be maintained. Ambient air quality levels shall not exceed the standards stipulated by the GPCB. If at any stage these levels are found to exceed the prescribed limits, necessary additional control measures shall be taken immediately. The location of the stations and frequency of monitoring shall be decided in consultation with the GPCB.

A. 4 SOLID / HAZARDOUS WASTE:

35. All the hazardous waste management shall be taken care as mentioned below:

Sr. no	Type/Name of Hazardous waste	Source of generation	Category and Schedule as per HW Rules.	Quantity (MT/Annum)	Disposal Method
1	ETP Sludge	ETP	SCH-I/ 35.3	432	Collection, Storage, Transportation and dispose to TSDF
2	Used Oil	Thermo Pack / Pumps	SCH-I/ 5.1	100 Liter	Collection, Storage, Transportation, Disposal by selling to registered recycler
3	Discarded Drums /Liners/Bags	Product/ Raw Materials	SCH-I/ 33.1	12600 Nos	Collection, Storage, Transportation, Disposal by selling to registered recycler
4	Inorganic Process waste (Iron sludge)	Process	SCH-I/ 26.1	3060	Collection, Storage, Transportation and send for coprocessing to cement industries
5	Distillation Residue	Distillation	SCH-I/ 20.3	920	Collection, Storage, Transportation and dispose to CO-processing in cement industries OR common incineration Site
6	Stripper Sludge	Solvent stripper	SCH-I/ 35.3	660	
7	Evaporation salt (MEE Salt)*	MEE	SCH-I/ 35.3	1284	Collection, Storage, Transportation and dispose to TSDF
8	Spent Catalyst	Process	SCH-I/	12	Collection, Storage and

			28.2		dispose to CO-processing in cement industries OR common incineration Site
9	Spent Carbon	Process	SCH-I/ 28.3	12	
10	Sodium Sulphate	Process (Product No. 13, 14, 32, 65,76,)	SCH-I/ 28.1	2100	Collection, Storage and Sell to Registered Party / End User who is Having Rule-9 Permission.
11	Aluminium Chloride (20%)	Process (Product No. 1, 2, 3,4, 5, 6, 9, 80,)	SCH-II/ B-36	31056	
12	Dil. HCL (30%)	Scrubber + Process (Product No. 1, 2, 3,4, 5, 6,9,21, 35, 36, 37, 41)	SCH-II/ B-15	5268	Collection, Storage and reuse in plant premises in mfg of Product No. 49 (Reqd Qty. : 1828.8 TPA), Product No. 57 (Reqd Qty. : 17910 TPA)
13	HBr Solution (28%)	Scrubber + Process (Product No.5, 8, 13,14)	SCH-II/ B-15	6456	Collection, Storage and Sell to Registered Party / End User who is Having Rule-9 Permission.
14	Dilute Sulphuric Acid (70%)	Process (Product No.12, 20, 34, 51, 54, 55, 56, 76)	SCH-II/ B-15	8472	
15	Sodium bromide Solution (30%)	Scrubber + Process (Product No. 13)	SCH-II/ B-36	1596	
16	Potassium Bromide Salt	Process (Product No. 14)	SCH-II/ B-36	384	Collection, Storage and Sell to Registered Party / End User who is Having Rule-9 Permission.
17	Potassium Chloride salt	Process (Product No. 65, 79)	SCH-I/ 28.1	1836	
18	Aluminium Hydroxide (15%)	Process (Product No. 49, 51,53,55, 56,79)	SCH-I/ 28.1	1824	
19	Sodium bisulphite (25%)	Scrubber + Process (Product No. 49, 51, 53, 55, 57)	SCH-I/ 28.1	43860	
20	Ammonium Chloride salt	Process (Product No. 31, 33, 65)	SCH-I/ 28.1	288	
21	Sodium Acetate Salt	Process (Product No. 65)	SCH-I/ 28.1	936	
22	Ammonium Acetate Salt	Process (Product No. 73)	SCH-I/ 28.1	6600	
23	Zinc Chloride Solution (45%)	Process (Product No. 38, 39)	SCH-I/ 28.1	7152	
24	Ammonium Bisulphate (22%)	Process (Product No. 25, 26)	SCH-I/ 28.1	4230	
25	Sodium Chloride solution (99%)	Scrubber + Process (Product No. 69, 79)	SCH-I/ 28.1	17202	
26	Liquor ammonia (24%)	Scrubber + Process (Product No. 19, 29, 65)	SCH-I/ 28.1	8480.4	Collection, Storage and reuse in plant premises (Require quantity of Liquor Ammonia – 4500 MT/Annum (Products No. 73) & 5494 MT/Annum(Products No. 29), 3390 MT/Annum – (Product No. 31)
27	Copper Sulphate Salt	Process (Product No. 34)	SCH-I/ 28.1	1644	Collection, Storage and Sell to Registered Party / End User who is Having Rule-9 Permission.
28	Sodium Sulphite (20%)	Process (Product No. 80,)	SCH-I/ 28.1	1260	
29	Spent Solvent	Process	SCH-I/ 28.6 .	78680	Collection, Storage, inhouse distillation and reuse within factory premises.

36. Authorized end-users shall have permissions from the concerned authorities under the Rule 9 of the Hazardous and Other Wastes (Management and Transboundary Movement) Rules 2016.

A. 5 OTHER:

37. The project proponent shall allocate the separate fund of Rs. 163 Lakhs i.e. > 2 % of the capital investment (whichever is

applicable) for activities like Educational activities, Public Health and family welfare and Preservation of Environment, rain water harvesting under Corporate Environment Responsibility (CER) in accordance to the MoEFCC's Office Memorandum No. F.No.22-65/2017-IA.III dated 01/05/2018. The entire activities proposed under CER shall be monitored and the monitoring report shall be submitted to the regional office of MoEF&CC as a part of half-yearly compliance report and to district collector. The monitoring report shall be posted on the website of the project proponent.

38. All the recommendations, mitigation measures, environmental protection measures and safeguards proposed in the EIA report of the project prepared by Aqua Air Environmental Engineering Pvt. Ltd, Surat and submitted by project proponent and commitments made during presentation before SEAC and proposed in the EIA report shall be strictly adhered to in letter and spirit.

B. GENERAL CONDITIONS:

B.1 CONSTRUCTION PHASE:

39. Water demand during construction shall be reduced by use of curing agents, super plasticizers and other best construction practices.
40. Project proponent shall ensure that surrounding environment shall not be affected due to construction activity. Construction materials shall be covered during transportation and regular water sprinkling shall be done in vulnerable areas for controlling fugitive emission.
41. All required sanitary and hygienic measures shall be provided before starting the construction activities and to be maintained throughout the construction phase.
42. First Aid Box shall be made readily available in adequate quantity at all the times.
43. The project proponent shall strictly comply with the Building and other Construction Workers' (Regulation of Employment & Conditions of Service) Act 1996 and Gujarat rules made there under and their subsequent amendments. Local bye-laws of concern authority shall be complied in letter and spirit.
44. Ambient noise levels shall conform to residential standards both during day and night. Incremental pollution load on the ambient air and noise quality shall be closely monitored during construction phase.
45. Use of Diesel Generator (DG) sets during construction phase shall be strictly equipped with acoustic enclosure and shall conform to the EPA Rules for air and noise emission standards.
46. Safe disposal of waste water and municipal solid wastes generated during the construction phase shall be ensured.
47. All topsoil excavated during construction activity shall be used in horticultural / landscape development within the project site.
48. Excavated earth to be generated during the construction phase shall be utilized within the premises to the maximum extent possible and balance quantity of excavated earth shall be disposed off with the approval of the competent authority after taking the necessary precautions for general safety and health aspects. Disposal of the excavated earth during construction phase shall not create adverse effect on neighbouring communities.
49. Project proponent shall ensure use of eco-friendly building materials including fly ash bricks, fly ash paver blocks, Ready Mix Concrete [RMC] and lead free paints in the project.
50. Fly ash shall be used in construction wherever applicable as per provisions of Fly Ash Notification under the E.P. Act, 1986 and its subsequent amendments from time to time.

B.2 OPERATION PHASE:

B.2.1 WATER:

51. The water meter shall be installed and records of daily and monthly water consumption shall be maintained.
52. All efforts shall be made to optimize water consumption by exploring Best Available Technology (BAT). The unit shall continuously strive to reduce, recycle and reuse the treated effluent.

B.2.2 AIR:

53. In case of use of spray dryer, the unit shall provide the adequate & efficient APCMs with spray dryer so that there should not be any adverse impact on human health & environment. Unit shall carry out third party monitoring of the proposed Spray dryer & it's APCM through the credible institutes and study report for impacts on Environment and Human Health shall be submitted to GPCB every year along with half yearly compliance report.
54. Acoustic enclosure shall be provided to the DG sets (If applicable) to mitigate the noise pollution and shall conform to the EPA Rules for air and noise emission standards.
55. Stack/Vents (Whichever is applicable) of adequate height shall be provided as per the prevailing norms for flue gas emission/Process gas emission.
56. Flue gas emission & Process gas emission (If any) shall conform to the standards prescribed by the GPCB/CPCB/MoEF&CC. At no time, emission level should go beyond the stipulated standards.
57. All the reactors / vessels used in the manufacturing process shall be closed to reduce the fugitive emission.

B.2.3 HAZARDOUS/SOLID WASTE:

58. The company shall strictly comply with the rules and regulations with regards to handling and disposal of Hazardous

waste in accordance with the Hazardous and Other Wastes (Management and Transboundary Movement) Rules 2016, as may be amended from time to time. Authorization of the GPCB shall be obtained for collection / treatment / storage / disposal of hazardous wastes.

59. Hazardous wastes shall be dried, packed and stored in separate designated hazardous waste storage facility with pucca bottom and leachate collection facility, before its disposal.
60. The unit shall obtain necessary permission from the nearby TSDF site and CHWIF. (Whichever is applicable)
61. Trucks/Tankers used for transportation of hazardous waste shall be in accordance with the provisions under the Motor Vehicle Act, 1988, and rules made there under.
62. The design of the Trucks/tankers shall be such that there is no spillage during transportation
63. All possible efforts shall be made for Co-Processing of the Hazardous waste prior to disposal into TSDF/CHWIF.
64. Management of fly ash (If any) shall be as per the Fly ash Notification 2009 & its amendment time to time and it shall be ensured that there is 100% utilization of fly ash to be generated from the unit.

B.2.4 SAFETY:

65. The occupier/manager shall strictly comply the provisions under the Factories Act 1948 and the Gujarat Factories Rules 1963
66. The project authorities shall strictly comply with the provisions made in Manufacture, Storage and Import of Hazardous Chemicals Rules (MSIHC) 1989, as amended time to time and the Public Liability Insurance Act for handling of hazardous chemicals etc. Necessary approvals from the Chief Controller of Explosives and concerned Govt. Authorities shall be obtained before commissioning of the project. Requisite On-site and Off-site Disaster Management Plans have to be prepared and implemented.
67. Main entry and exit shall be separate and clearly marked in the facility.
68. Sufficient peripheral open passage shall be kept in the margin area for free movement of fire tender/ emergency vehicle around the premises.
69. Storage of flammable chemicals shall be sufficiently away from the production area.
70. Sufficient number of fire extinguishers shall be provided near the plant and storage area.
71. All necessary precautionary measures shall be taken to avoid any kind of accident during storage and handling of toxic / hazardous chemicals.
72. All the toxic/hazardous chemicals shall be stored in optimum quantity and all necessary permissions in this regard shall be obtained before commencing the expansion activities.
73. The project management shall ensure to comply with all the environment protection measures, risk mitigation measures and safeguards mentioned in the Risk Assessment report.
74. Only flame proof electrical fittings shall be provided in the plant premises.
75. Storage of hazardous chemicals shall be minimized and it shall be in multiple small capacity tanks / containers instead of one single large capacity tank / containers.
76. All the storage tanks shall be fitted with appropriate controls to avoid any leakages. Bund/dyke walls shall be provided for storage tanks for Hazardous Chemicals.
77. Handling and charging of the chemicals shall be done in closed manner by pumping or by vacuum transfer so that minimal human exposure occurs.
78. Tie up shall be done with nearby health care unit / doctor for seeking immediate medical attention in the case of emergency.
79. Personal Protective Equipments (PPEs) shall be provided to workers and its usage shall be ensured and supervised.
80. First Aid Box and required Antidotes for the chemicals used in the unit shall be made readily available in adequate quantity.
81. Training shall be imparted to all the workers on safety and health aspects of chemicals handling.
82. Occupational health surveillance of the workers shall be done and its records shall be maintained. Pre-employment and periodical medical examination for all the workers shall be undertaken as per the Factories Act & Rules.
83. Transportation of hazardous chemicals shall be done as per the provisions of the Motor Vehicle Act & Rules.
84. The company shall implement all preventive and mitigation measures suggested in the Risk Assessment Report.
85. Necessary permissions from various statutory authorities like PESO, Factory Inspectorate and others shall be obtained prior to commissioning of the project.

B.2.5 NOISE:

86. The overall noise level in and around the plant area shall be kept well within the standards by providing noise control measures including engineering controls like acoustic insulation hoods, silencers, enclosures etc. on all sources of noise generation. The ambient noise level shall confirm to the standards prescribed under The Environment (Protection) Act, 1986 & Rules.

B.2.6 CLEANER PRODUCTION AND WASTE MINIMISATION:

87. The unit shall undertake the Cleaner Production Assessment study through a reputed institute / organization and shall form a CP team in the company. The recommendations thereof along with the compliance shall be furnished to the GPCB.
88. The company shall undertake various waste minimization measures such as :
    a. Metering and control of quantities of active ingredients to minimize waste.
    b. Reuse of by-products from the process as raw materials or as raw materials substitutes.
    c. Use of automated and close filling to minimize spillages.
    d. Use of close feed system into batch reactors.
    e. Venting equipment through vapour recovery system.
    f. Use of high pressure hoses for cleaning to reduce wastewater generation.
    g. Recycling of washes to subsequent batches.
    h. Recycling of steam condensate.
    i. Sweeping / mopping of floor instead of floor washing to avoid effluent generation.
    j. Regular preventive maintenance for avoiding leakage, spillage etc.

B.2.7 GREEN BELT AND OTHER PLANTATION:

89. The unit shall develop green belt within premises as per the CPCB guidelines. However, if the adequate land is not available within the premises, the unit shall take up adequate plantation on road sides and suitable open areas in GIDC estate or any other open areas in consultation with the GIDC / GPCB and submit an action plan of plantation for next three years to the GPCB.
90. Drip irrigation / low-volume, low-angle sprinkler system shall be used for the green belt development within the premises.

B.3 OTHER CONDITION:

91. Unit shall comply all the applicable standard conditions prescribed in Office Memorandum (OM) published by MoEF&CC vide no. F. No. 22-34/2018-IA.III dated 09/08/2018 for Pharmaceutical and Chemical industries mentioned at (Sr. no. XX).
92. Rain water harvesting of surface as well as rooftop runoff shall be undertaken and the same water shall be used for the various activities of the project to conserve fresh water as well as to recharge ground water. Before recharging the surface run off, pre-treatment must be done to remove suspended matter.
93. The unit shall join and participate financially and technically for any common environmental facility / infrastructure as and when the same is taken up either by the Industrial Association or GIDC or GPCB or any such authority created for this purpose by the Govt. / GIDC.
94. Application of solar energy shall be incorporated for illumination of common areas, lighting for gardens and street lighting in addition the provision for solar water heating system shall also be provided.
95. The area earmarked as green area shall be used only for plantation and shall not be altered for any other purpose.
96. All the commitments / undertakings given to the SEAC during the appraisal process for the purpose of environmental protection and management shall be strictly adhered to.
97. The project proponent shall also comply with any additional condition that may be imposed by the SEAC or the SEIAA or any other competent authority for the purpose for the environmental protection and management.
98. In the event of failure of any pollution control system adopted by the unit, the unit shall be safely closed down and shall not be restarted until the desired efficiency of the control equipment has been achieved.
99. The project authorities must strictly adhere to the stipulations made by the Gujarat Pollution Control Board (GPCB), State Government and any statutory authority.
100. During material transfer there shall be no spillages and garland drain shall be constructed to avoid mixing of accidental spillages with domestic wastewater or storm water.
101. Pucca flooring / impervious layer shall be provided in the work areas, chemical storage areas and chemical handling areas to minimize soil contamination.
102. Leakages from pipes, pumps shall be minimal and if occurs, shall be arrested promptly.
103. No further expansion or modifications in the plant likely to cause environmental impacts shall be carried out without obtaining prior Environment Clearance from the concerned authority.
104. The above conditions will be enforced, inter-alia under the provisions of the Water (Prevention & Control of Pollution) Act,1974, Air (Prevention & Control of Pollution) Act, 1981, the Environment (Protection) Act, 1986, Hazardous Wastes (Management, Handling and Transboundary Movement) Rules, 2008 and the Public Liability Insurance Act, 1991 along with their amendments and rules.
105. The project proponent shall comply all the conditions mentioned in "The Companies (Corporate Social Responsibility Policy) Rules, 2014" and its amendments from time to time in a letter and spirit.

106. The project management shall ensure that unit complies with all the environment protection measures, risk mitigation measures and safeguards recommended in the EMP report and Risk Assessment study report as well as proposed by project proponent.
107. The project authorities shall earmark adequate funds to implement the conditions stipulated by SEIAA as well as GPCB along with the implementation schedule for all the conditions stipulated herein. The funds so provided shall not be diverted for any other purpose.
108. The applicant shall inform the public that the project has been accorded environmental clearance by the SEIAA and that the copies of the clearance letter are available with the GPCB and may also be seen at the Website of SEIAA/ SEAC/ GPCB. This shall be advertised within seven days from the date of the clearance letter, in at least two local newspapers that are widely circulated in the region, one of which shall be in the Gujarati language and the other in English. A copy each of the same shall be forwarded to the concerned Regional Office of the Ministry.
109. It shall be mandatory for the project management to submit half-yearly compliance report in respect of the stipulated prior environmental clearance terms and conditions in soft copies to the regulatory authority concerned, on 1st June and 1st December of each calendar year.
110. Concealing factual data or submission of false/fabricated data and failure to comply with any of the conditions mentioned above may result in withdrawal of this clearance and attract action under the provisions of Environment (Protection) Act, 1986.
111. The project authorities shall also adhere to the stipulations made by the Gujarat Pollution Control Board.
112. The SEIAA may revoke or suspend the clearance, if implementation of any of the above conditions is not found satisfactory.
113. The company in a time bound manner shall implement these conditions. The SEIAA reserves the right to stipulate additional conditions, if the same is found necessary.
114. The project authorities shall inform the GPCB, Regional Office of MoEF and SEIAA about the date of financial closure and final approval of the project by the concerned authorities and the date of start of the project.
115. This environmental clearance is valid for seven years from the date of issue.
116. Any appeal against this environmental clearance shall lie with the National Green Tribunal, if preferred, within a period of 30 days as prescribed under Section 16 of the National Green Tribunal Act, 2010.
117. Submission of any false or misleading information or data which is material to screening or scoping or appraisal or decision on the application makes this environment clearance cancelled.

With regards,
Yours sincerely,

(S. M. SAIYAD)
Member Secretary

Issued to:
M/s. Anupam Rasayan India Ltd. (Unit-6)
Plot No. 2423 & 2425, Sachin GIDC Estate,
Sachin, Dist.: Surat- 394230.

State Level Environment Impact Assessment Authority SEIAA Gujarat

GUJARAT POLLUTION CONTROL BOARD
PARYAVARAN BHAVAN
Sector-10-A, Gandhinagar 382 010
Phone : (079) 23222425
(079) 23232152
Fax : (079) 23232156
Website : www.gpcb.gov.in

By R.P.A.D

In exercise of the power conferred under section-25 of the Water (Prevention and Control of Pollution) Act-1974, under section-21 of the Air (Prevention and Control of Pollution)-1981 and Authorization under rule 6(2) of the Hazardous And Other Waste (Management and Transboundary) Rules, 2016 framed under the Environmental (Protection) Act-1986. This Board is empowered to Grant CC&A.

And whereas Board has received consolidated consent application letter no. **161919 dated 29-07-2019** for the **Consolidated Consent and Authorization** (CC & A) of this Board under the provisions / rules of the aforesaid Acts. Consents & Authorization are hereby granted as under:

CONSENTS AND AUTHORISATION:
(Under the provisions /rules of the aforesaid environmental acts)
To,
M/s. Anupam Rasayan India Ltd. (Unit-6)
Plot No: 2425, GIDC,
Sachin-394230,
Tal: Chorasi, Dist: Surat.

1. **Consent Order No. AWH-104795 Date of issue: 25-10-2019.**

2. The consents shall be **valid upto 30-06-2024** for the use of outlet for the discharge of treated effluent and emission due to operation of industrial plant for manufacturing of the following items/ products:

Sr. No.	Product	Total Production quantity
1)	Research & Development (R&D) centre along with Pilot Plant to no commercial purpose	1 MT/Month
	Note: • Chemistry Competencies (Group/Molecule) • Halogenated Compounds • Hydrogenation Compounds • Agro Intermediate & Finished products • Pharma intermediates & Finished products • Acetylated Compounds • Acrylated Compounds • UV-Based Compounds • Nitro & Dinitro Compounds • Cyanation Compounds • Compound from Grinard Reaction	

Clean Gujarat Green Gujarat
ISO-9001-2008 & ISO-14001 - 2004 Certified Organisation

	• Triazine Benzophenone derivatives	
Acetylated Compounds		
1.	2,4-Dichloro Acetophenone	200
2.	2,5-Dichloro Acetophenone	
3.	4-Fluoro Acetophenone	
4.	2,4-Dichloro-5-Fluoro Acetophenone	
5.	2,4-Dichloro Phenacyl Bromide	
6.	2,4-Dichloro Phenacyl Chloride	
7.	2,4-Dichlorobutero Phenone	
Advanced Specialty / Pharma Products		
8.	Ortho Phenylene Diamine	150
9.	Meta Phenylene Diamine	
10.	Para Phenylene Diamine	
11.	Resorcinol / 1,3 Benzenediol / Meta Di Hydroxy Benzene	
12.	Meta Amino Phenol	
13.	2,4-Difluoro Aniline	
14.	2,4- Difluoro Nitrobenzene	
15.	2,6- Difluoro Aniline	
16.	1,2-Di Fluoro Benzene	
17.	2-Amino Benzotrifluoride	
18.	3 – Amino Benzotrifluoride	
19.	4 – Amino Benzotrifluoride	
20.	3,4-Difluoro Benzonitrile	
21.	4-[[4,6-bis[[4-(2-ethylhexoxy-oxomethyl]phenyl]amine]-1,3,5-triazin-2-yl]amino]benzoic acid -2-ethylhexyl ester	
22.	4, 4'-[[6-[[(1, 1-dimethylethyl)amino]carbonyl]phenyl]amino]-1, 3, 5-triazine-2, 4-diyl]diimino]bis-bis(2-ethyhexyl)benzoate.	
23.	2-(2, 4-dihydroxyphenyl)-4, 6-bis (2, 4-dimethylphenyl)-1, 3, 5-triazine.	
24.	4-n-Butyl Resorcinol	
25.	4-n-Hexyl Resorcinol	
26.	Propanedionic 2,2'-(1,4-phenylenedimethylidyne)bis -1,1',3,3'-tetraethyl Ester	
27.	2,4-dihydroxy Benzophenone	
28.	2-Hydroxyl-4-methoxyBenzophenone	
29.	2-Hydroxyl-4-(Octyl)Benzophenone	
30.	2-Hydroxy-3,3,5-trimethyl Cyclohexyl Ester Benzoic Acid	
31.	4H-3,1-Benzoxazin-4-one,2,2'-(1,4-phenylene)bis-	
32.	2-(4,6-diphenyl-1,3,5-triazin-2-yl)-5-(hexyloxy)phenol	

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33.	2-Hydroxy-4-Methoxy Benzophenone -5- Sulphonic acid	
34.	Benzoic acid -4-[[(methylphenylamino)methylene]amino] Ethyl Ester	
35.	2-(5-chloro-2H-benzotriazol-2-yl)-6- (1,1-dimethylethyl)-4-Methyl Phenol	
36.	2-(2H-benzotriazol-2-yl)-4-(1,1-dimethylethyl)-6-(1-methylpropyl)phenol	
37.	2-(2H-benzotriazole-2-yl)-4,6 bis(1-methyl-1-Phenylethyl)phenol	
38.	2-(2H-benzotriazol-2-yl)-4,6-bis (1,1-dimethylethyl)phenol	
39.	2-(2H-benzotriazole-2-yl)-4-methyl phenol	
40.	2-(5-chloro-2H-benzotriazol-2-yl)-4,6-bis (1,1-dimethylethyl)phenol	
41.	2-(2H-benzotriazol-2-yl)-4-(1,1-dimethylethyl)-phenol	
42.	2,2'-methylene bis [6-(2H-benzotriazol-2-yl)-4-(1,1,3,3-tetramethylbutyl)phenol	
43.	2-(2H-Benzotriazol-2-yl)-4-(1,1,3,3-tetramethybutyl)-Phenol	
44.	2- Acetylphenothiazine	
45.	2- Chlorophenothiazine	
46.	2- Trifluoromethyl Phenothiazine	
47.	2-Methoxy Phenothiazine	
48.	2- Mercaptomethyl Phenothiazine	
49.	Chlopromazine Hydrochloride	
50.	Bupropion Hydrochloride	
51.	2-(6-Methoxy napthalen-2-yl) Propionic Acid	
52.	Citalopram Hydro Bromide	
53.	Cyclobenzaprine Hydrochloride	
54.	Cyproheptadine Hydrochloride	
55.	Tamoxifen Citrate	
56.	Doxepine Hydrochloride	
57.	Doxylamine Succinate	
58.	Imatinib Mesylate	
59.	Etoricoxib	
60.	Dothiepin (Dosulepin) Hydrochloride	
61.	Flupentixol Dihydrochloride	
62.	Ketamine Hydrochloride	
63.	Losartan Potassium	
64.	Teneligliptin Hydrobromide Hydrate	
65.	Olmesartan Medoxomil	
66.	Keto Loratadine	
67.	Tedizolid Phosphate	
68.	Enzalutamide	
69.	Empagliflozin	
70.	Dapagliflodin	
Total Production of All Groups (1 to 4)		**350**

Subject to specific condition:

1. Steam will be obtained from common Boiler of M/s. Sanjoo Dyeing & Printing Mills Pvt. Ltd-Sachin. However, unit will install 10 MT Gas based Steam Boiler as stand by utility system.
2. Concentrated raw effluent shall be disposed off to Common MEE-facilities of M/s. Globe Enviro Care Limited (GECL) - Sachin / Mahavir Eco Project Pvt. Ltd. (MEPL)- Sachin for spray drying.
3. Applicant shall comply with conditions laid down in Environment clearance issued vide order no. SEIAA/GUJ/EC/5(f)/1150/2019, dated 23/08/2019 by State Level Environment Impact Assessment Authority Gujarat.
4. Industry shall not use any raw material or carry out any activities which attracts provision of Rule 9 of Hazardous and Other Waste (Management & Transboundary) Rules 2016.
5. Industry shall manage Solid Wastes generated from industrial activities as per Solid Waste Management Rules-2016 (solid waste as defined in Rule-3(46)).
6. Industry shall obtain NOC from CGWA as per order of Hon. National Green Tribunal for the withdrawal of ground water and you shall strictly comply with condition of NOC granted from CGWA.
7. Industry shall provide STP since domestic waste water generation is 20 KL/Day and submit documentary proof to the Board within 3 month and inform Head Office & Regional Office.
8. Unit shall adhere to stringent air pollutants standards i.e. 80 % of existing flue gas and process emission standards in the CPA (For critical parameter PM). This standard shall be reviewed periodically.
9. Unit shall adhere to stringent air pollutants standards i.e. 90 % of existing flue gas and process emission standards in the SPA(For critical parameter PM). This standard shall be reviewed periodically.
10. Following air pollution control measures shall be provided for the flue gas emission sources like Boiler, Thermic Fluid Heaters etc. (As Applicable)

Stipulated APCM in Red / Orange category industrial units of CPA/ SPA	
Steam generation capacity (in TPH)	Type of APCM
Less than 1	Multi Cyclone

11. Unit shall provide at least two stage scrubbing system of appropriate media for the control of the process gas emission.
12. Unit shall install and commission Continuous Emission Monitoring System- CEMS (as per CPCB guidelines for relevant parameters) which shall be connected with GPCB/CPCB server (In case of large and medium red category industries)
13. All common facilities shall install CEMS (as per CPCB guidelines for relevant parameters) which shall be connected with GPCB/CPCB server to the Stacks provided with Common Multiple Effect Evaporator (CMEE), Common Spray Dryer, Common incinerator etc.
14. The unit shall adhere to Sector specific guidelines/ SOP published by GPCB / CPCB from time to time for effective fugitive emission control. (like guidelines for: Stone crushing units, Coal handling units, spent solvent handling and management, spent acid management, Decontamination of drums, containers etc.)

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15. Unit shall take adequate measures to control odour nuisance from the industrial activities which may include measures like- use of masking agent with atomizer system (water curtain), closed / automatic material handling system, containment of the odour vulnerable areas etc.
16. Unit shall not use Pet-coke, furnace oil, LSHS as a fuel.
17. Unit shall adopt sectoral Best Available Technology-BAT(Like Use of Induction Furnace, Electric Arc Furnace instead of Cupola furnace in foundry industry, Caustic Recovery System in Cotton Textile units etc.)
18. Unit shall provide green belt of 40% of the plot area, using concept of the social forestry and development of green belt outside project premises in adjacent areas.
19. Unit shall provide Wall to Wall carpeting in vehicle movement areas within premises to avoid dusting.
20. Unit shall only use treated effluent for preparation of lime and other slurry in ETP. No fresh water shall be utilized in ETP.
21. In the case, if the Industry is not a member of CETP and domestic waste water generation is more than 10 KLPD, industry shall install STP of adequate capacity and treated sewage shall be reused / recycled to the maximum extent.
22. In case of Large and Medium Red Category industry, the unit shall install system for continuous monitoring of effluent quality / quantity as per CPCB guidelines for relevant parameters (like pH, Flow, Temperature, TOC/COD, NH3-N etc.) and shall be connected to GPCB server. In case, if the industry is a member of CETP, unit shall install flow meter.
23. If the water consumption of the unit is more than 50 KLPD, Unit shall submit detailed water harvesting plan (off site).
24. The unit shall explore Techno-Economic feasibility of Zero Liquid Discharge (ZLD) and if feasible, ZLD should be adopted.
25. Unit shall strictly carry out handling, storage and disposal of fly-ash, slag, red-mud, de-inking sludge etc. (High Volume- Low Effect Wastes) as per prevailing guidelines and its disposal at designated locations approved by the Board.
26. Industry shall dispose its hazardous wastes through co-processing, pre-processing to the extent possible prior its disposal to incineration/ landfill as per provisions of Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016.
27. Industry shall strictly comply with all the measures specified in guidelines for spent solvent management, spent acid management, and other guidelines/directions published from time to time by GPCB and/or CPCB, etc.
28. Unit shall carry out transportation of hazardous wastes through GPS mounted vehicles only.

3. CONDITIONS UNDER THE WATER ACT:

3.1. Source of water: - Borewell.
3.2. The quantity of the fresh water consumption for industrial purpose shall not exceed 435 KL/Day.
3.3. The quantity of the fresh water consumption for domestic purpose shall not exceed 20 KL/Day
3.4. The quantity of the industrial effluent to be generated from the manufacturing process and other ancillary industrial operations shall not exceed 57 KL/Day.

3.5. Industrial effluent of 57 KL/Day generated from manufacturing activities, washing and scrubbing will be treated in ETP, and then after neutralized wastewater shall go to common MEE facilities of either M/s. Globe Enviro Care Limited (GECL)-Sachin M/s. Mahavir Eco Project Pvt. Ltd. (MEPL) - Sachin. In case of common MEE facilities of M/s. Globe Enviro Care Limited (GECL) / spray dyeing facility of M/s. Mahavir Eco Project Pvt. Ltd. (MEPL) goes to non-operational condition, than unit shall operate their captive system and effluent will be treated in In-house MEE. After passing through Solvent Stripper. 10 KL/Day of Boiler Blow Down Water shall be recycled back into the scrubber and 5 KL/Day of Cooling Tower Blow Down shall be recycled back in to the washing purpose. If any RO reject is generated it shall go to MEE.

3.6. The quantity of domestic waste water shall not exceed 20 KL/Day.

3.7. Domestic effluent shall be disposed off through septic tank/soak pit system. Looking to quantity unit should provide STP or treat with industrial waste water.

3.8. The applicant shall operate effluent treatment system efficiently so that effluent from the industrial unit shall conform to the CETP inlet norms mentioned below however the final discharge of treated effluent from CETP shall adhere to the prescribed standards for CETP of M/s. Globe Enviro care Ltd(GECL).

PARAMETERS	***CETP NORMS***
pH	6.5 TO 8.5
Temperature	40^0 C
Colour (pt.co.scale) in units	100 units
Suspended Solids	300 mg/l
Oil and Grease	10 mg/l
Phenolic Compounds	1 mg/l
Sulphides	2 mg/l
Ammonical Nitrogen	50 mg/l
Total Chromium	2 mg/l
Hexavelent Chromium	0.1 mg/l
BOD (5 days at 20^0C)	1500 mg/l
COD	4000 mg/l
Total Dissolved Solids	2100 mg/l
Copper	3 mg/l
Nickel	3 mg/l
Zinc	5 mg/l
Lead	0.1 mg/l

3.9. The final treated effluent confirming to the above standards shall be fully conveyed into CETP of M/s. Globe Enviro care Ltd(GECL). through tanker & in no case effluent shall be discharged in to Environment by any means.

3.10. In case of failure of CETP, applicant shall have to treat the trade effluent of their unit fully so as to achieve the quality of the treated effluent from their industrial premises as per the GPCB norms mentioned below:-

PARAMETERS	**GPCB NORMS**
PH	6.5 TO 8.5
Temperature	40^0 C
Suspended Solids	100 mg/l
Oil and Grease	10 mg/l

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Total Dissolved Solids	2100 mg/l
Phenolic Compounds	1 mg/l
Sulphides	2 .0 mg/l
Ammonical Nitrogen	50 mg/l
Total Chromium	2 mg/l
Hexavelent Chromium	0.1 mg/l
BOD (5 days at 20^0C)	30 mg/l
COD	100 mg/l
Chlorides	600 mg/l
Sulphate	1000 mg/l

OR

The applicant shall either stop or curtail its production activities if the effluent is not adequately treated by the CETP of GECL to conform to the standards specified by G.P.C.B.

3.11. The applicant shall be responsible for conveyance of entire treated effluent to the CETP of M/s. GECL & due care shall be taken to avoid any leakage or spillage of effluent during conveyance of treated effluent through drain.

3.12. Unit shall provide flow meters at inlet & outlet of ETP & maintain its record.

3.13. The applicant shall inform renewal/termination of CETP membership well in advance to GPCB.

3.14. The applicant shall be required to make storage facilities to store the primary treated effluent for at least 48 hours by providing acid proof brick lined impervious tanks/HDPE tanks.

3.15. The applicant shall make fixed arrangement for loading the effluent after primary treatment to the CETP. The unit shall not keep any by-pass line or system or loose or flexible pipe line for discharging effluent into the under ground drainage system of GECL.

3.16. Leachate from the hazardous solid waste, if any shall also be connected into a collection tank through leachate collection facilities and shall be conveyed alongwith industrial effluent to the CETP of GECL.

3.17. Magnetic flow meters shall be installed at the inlet & outlet of effluent collection tanks/ETP to measure the quantity of effluent discharging in to the tanker of GECL.

3.18. The ENTIRE quantity of industrial effluent shall have to be conveyed by GECL. In no circumstances the effluent either treated or untreated shall be discharged any where else.

3.19. Disposal system for storm water shall be provided separately. In no circumstances storm water shall be mixed with the industrial effluent.

3.20. GECL member unit have to modify / improve performance of existing Effluent treatment facilities for efficiency & adequacy in order to comply with prescribed in let standards.

3.21. The applicant shall keep accurate records of quantity of production of each product, quantity of water consumption, quantity of effluent generated and consumption of electricity on day to day basis and required to submit the complied record of one month to GPCB & GECL on or before fifth day of the succeeding month.

3.22. In case of shut-down of plant for more than three days for any reason, the GECL unit member shall intimate to GECL authority & GPCB well in advance for the better operation & management of CETP.

3.23. The authorized representative of GECL may have right of entry at any time for the purpose of inspection and monitoring the effluent collection facilities/ETP (if required) of the applicant.

3.24. If the GECLL authority terminates the membership of the applicant for CETP, the GECL member unit shall have to close down the manufacturing activities/industrial operation of the process plant immediately until the GECL membership is resumed.

3.25. The applicant shall put up at the entrance a board displaying GECLL membership number & date of joining of GECL, the name of unit, particulars of the products/ process and the name of proprietor/partners /directors of the unit and the electricity consumer number as on the record of GSECL.

4. CONDITIONS UNDER THE AIR ACT:

4.1 The following shall be used as a fuel in Steam Boiler, Thermo Pack, and D.G.Sets respectively.

Sr. No.	Utility	Fuel	Quantity
1)	Thermopack (600 U, 4 nos)	Natural Gas	5000 SCM/Day
2)	D.G.Set (2050 KVA×1, 1025 KVA×2)	Diesel	300 lit/day

4.2. The applicant shall install & operate comprehensive adequate air pollution control system in order to achieve prescribed norms.

4.3. The flue gas emission through stack attached to Steam Boiler, Thermo Pack, and D.G.Sets shall conform to the following standards:

Stack No.	Stack attached to	Stack height in Meter	Parameter	Permissible Limit
1	Thermopack Unit – 4 Nos. (600 U) each	15 (Common Stack)	Particulate Matter SO_2 NO_x	150 mg/NM^3 100 ppm 50 ppm
2	D. G. Set - 3 Nos (2050 KVA × 1 No. 1025 KVA × 2 No)	11 (each)	Particulate Matter SO_2 NO_x	150 mg/NM^3 100 ppm 50 ppm

4.4. The process emission through various stakes/vent of reactors,process,vessel shall conform to the following.

Stack No.	Stack attached to	Stack height in Meter min 11 M from GL	Air Pollution Control System	Parameters	Permissible Limit
1.	Reaction Vessel	4	Two stage Scrubber (First Stage Water and second stage Caustic Scrubber)	HBr	30 mg/Nm^3

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2	Reaction Vessel	4	Two stage Scrubber (First Stage Water and second stage Caustic Scrubber)	HCl SO_x	20 mg/Nm^3 40 mg/Nm^3
3	Reaction Vessel	4	Two stage Water Scrubber	NH_3	175 mg/Nm^3

4.5. Industry shall take adequate measure to control dusting due to storage, transportation & handling of Coal/Lignite & fly ash.

4.6. Industry shall comply with Coal handling guideline of the Board.

4.7. Industry shall comply with fly ash notification 1999 as amended from time to time.

4.8. The concentration of the following parameters in the ambient air within the premises of the industry and a distance of 10meters from the source) other than the stack/vent) shall not exceed the following levels.

PARAMETERS	PERMISSIBLE LIMIT (Microgram/M^3)	
	Annual	24 Hrs Average
Particulate Matter-10 (PM_{10})	60	100
Particulate Matter- 2.5 ($PM_{2.5}$)	40	60
SO_2	50	80
NO_x	40	80

4.9. The applicant shall provide portholes, ladder, platform etc at chimney(s) for monitoring the air emissions and the same shall be open for inspection to/and for use of Board's staff. The chimney(s) vents attached to various sources of emission shall be designed by numbers such as S-1, S-2, etc. and these shall be painted/displayed to facilitate identification.

4.10. The industry shall take adequate measures for control of noise levels from its own sources within the premises so as to maintain ambient air quality standards in respect of noise to less than 75dB(A) during day time and70 dB (A) during night time. Daytime is reckoned in between 6a.m. and10 p.m. and nighttime is reckoned between 10 p.m. and 6 a.m.

4.11. D.G. SETS CONDITIONS

The D.G. Set shall have acoustic enclosure and shall comply sith the standards specified at Sr. no. 95 of Schedule-I of the rule-3 of E.P. Rules -1986 and Noise pollution level as per the Air Act-1981.

D.G. Sets standards:-

The flue gas emission through stack attached to D.G. Sets shall conform to the following standards.

a) The minimum height of stack to be provided with each of the generator set shall be H=h + 0.2 (KVA) $^{1/2}$, where H= Total stack height in meter, h= height of the building in meters where or by the side of which the generator set is installed.

a) Noise from DG set shall be controlled by providing an acoustic enclosure or by treating the room acoustically, at the users end.

b) The acoustic enclosure or acoustic treatment of the room shall be designed for minimum 25 dB (A) insertion loss or for meeting the ambient noise standards, whichever is on the higher side (if the actual ambient noise is on the higher side, it may not be possible to check the performance of the acoustic enclosure/ acoustic treatment. Under such circumstances the performance may be checked for noise reduction up to actual ambient noise level, preferably, in the night time). The measurement for insertion loss may be done at different points at 0.5 m from the acoustic enclosure/room, and the averaged.

c) The D.G. Set shall be provided with proper exhaust muffler with insertion loss of minimum 25 dB (A).
d) All efforts shall be made to bring down the noise level due to the D.G.Set, outside the premises, within the ambient noise requirements by proper siting and control measures.
e) Installation of a D.G. Sets must be strictly in compliance with the recommendations of the D.G.Set manufacturer.
f) A proper routine and preventive maintenance procedure for the D.G.Set should be set and followed in consultation with the DG Set manufacture which would help prevent noise levels of the DG Set from deteriorating with use.

5. AUTHORIZATION as per HAZARDOUS AND OTHER WASTE (MANAGEMENT AND TRANSBOUNDARY) RULES, 2016 Form-2 [See rule 6 (2)]

Form for grant of authorization for occupier or operator handling Hazardous waste

5.1 Authorization order No:- **AWH-104795** date of Issue: **25-10-2019.**

5.2 **M/s. Anupam Rasayan India Ltd. (Unit-6).** is hereby granted an authorization to operate facility of below for following hazardous wastes on the premises situated at **Plot No: 2425, GIDC, Sachin-394230, Tal: Chorasi, Dist: Surat.**

Sr. No	Waste	Quantity	Schedule-I/ Category	Facility
1	Chemical Sludge from waste water treatment	240 MT/Month	35.3	Collection, Storage, Transportation and disposal at GPCB authorized TSDF Site, SEPPL, Kutchh..
	Evaporation /MEE Salt	70 MT/Month	35.3	Collection, Storage, Transportation and disposal at GPCB authorized TSDF Site, SEPPL, Kutchh..
2	Used Oil	0.046 MT/Year	5.1	Collection, storage, transportation and disposal by selling to Registered re-refiners.
3	Empty barrels/containers/ liners contaminated with hazardous chemicals/ wastes	96 MT/Year	33.1	Collection, storage transportation and disposal to authorized decontaminator
4	Distillation Residue	12 MT/Month	36.1	Collection, Storage, Transportation, Disposal by incineration in common incinerator of SEPPL, Kutchh. OR RSPL, Panoli/ co processing to cement industries.
5	Process Waste (Iron Sludge)	250 MT/Month	26.1	Collection, Storage, Transportation, Disposal by send it to TSDF- SEPPL, Kutchh / Sale to Cement Manufacturing Industries for Co- processing
6	Spent Carbon	12 MT/Year	28.3	Collection, Storage,Transportation, Disposal by CHWIF or co processing to Cement industries.
7	Spent solvent	51918	28.6	Collection, Storage, reuse for captive purpose.

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8	Sodium Chloride	1509 MT/Month	35.3	Collection, Storage, reuse for captive purpose/TSDF.
9	Sodium Sulphate	25 MT/Month	35.3	Collection, Storage, Transportation, Disposal by send it to TSDF Site-SEPPL, Kutchh.
10	Sodium Sulphate Solution	130 MT/Month	D2	Collection, Storage, reuse for captive purpose.
11	Aluminum Chloride	2000 MT/Month	D2	Collection, Storage, disposal to M/s. Shree Ambica Chemicals Industries, Plot No Ex-3, phase 1 GIDC estate, Vapi, Dist: Valsad for reuse within premises.
12	Dilute HCl Solution	439 MT/Month	B15	Collection, Storage, reuse for captive purpose.
13	Hydro Bromic Acid	450 MT/Month	D2	Collection, Storage, reuse for captive purpose.
14	Spent H_2SO_4	500 MT/Month	D2	Collection, Storage, reuse for captive purpose.
15	Sodium Bromide	83 MT/Month	B36	Collection, Storage, disposal to M/s. Balaji Tex Fab, Block No: 537 & 538, N.H. No: 08, Tal: Palsana, Dist: Surat for reuse within premises.
16	Potassium Bromide	32 MT/Month	B6	Collection, Storage, reuse for captive purpose.
17	Potassium Chloride Salt & Solution	153 MT/Month	28.1	Collection, Storage, reuse for captive purpose.
18	Aluminum Hydroxide	48 MT/Month	28.1	Collection, Storage, reuse for captive purpose.
19	Sodium Bi Sulphite	3455 MT/Month	28.1	Collection, Storage, reuse for captive purpose.
20	Ammonium Chloride	15 MT/Month	B15	Collection, Storage, reuse for captive purpose.
21	Ammonium Acetate	350 MT/Month	D2	Collection, Storage, reuse for captive purpose.
22	Sodium Acetate	52 MT/Month	D2	Collection, Storage, reuse for captive purpose.
23	Silica Oxide	50 MT/Month	D2	Collection, Storage, reuse for captive purpose.
24	Ammonium Bi Sulphate	52.5 MT/Month	D2	Collection, Storage, reuse for captive purpose.
25	Liq. Ammonia	400 MT/Month	D2	Collection, Storage, reuse for captive purpose.
26	Copper Sulphate	0.000 MT/Month	D2	Collection, Storage, reuse for captive purpose.
27	Sodium Sulphite	105 MT/Month	D2	Collection, Storage, reuse for captive purpose.
28	Zinc Chloride	Not generated	D2	Collection, Storage, reuse for captive purpose.
29	Magnesium Sulphate	Not generated	D2	Collection, Storage, reuse for captive purpose.
30	Raney Nickel	Not generated	D2	Collection, Storage, Reuse to Respective process within premises.

5.3 The authorization shall be valid up to **30-06-2024.**

5.4 The authorization is subject to the conditions stated below and such other conditions as may be specified in the rules from time to time under the Environment (Protection) Act-1986.

5.5 The authorization is granted to operate a facility for collection, storage within factory premises transportation and ultimate disposal of Hazardous wastes as per condition no.5.2 to the industry having valid CCA of this Board.

6. TERMS AND CONDITIONS OF AUTHORISATION

1. The applicant shall comply with the provisions of the Environment (Protection) Act-1986 and the rules made there under.
2. The authorization or its renewal shall be produced for inspection at the request of an officer authorized by the Gujarat Pollution Control Board.
3. The persons authorized shall not rent, lend, sell, and transfer or otherwise transport the hazardous wastes without obtaining prior permission of the Gujarat Pollution Control Board.
4. Any unauthorized change in personnel, equipment or working conditions as mentioned in the authorization order by the persons authorized shall constitute a breach of this authorization.
5. The person authorized shall implement Emergency Response Procedure (ERP) for which this authorization is being granted considering all site specific possible scenarios such as spillages, leakages, fire etc. and their possible impacts and also carry out mock drill in this regard at regular interval of time;
6. The person authorized shall comply with the provisions outlined in the Central Pollution Control Board guidelines on ''Implementing Liabilities for Environmental Damages due to Handling and Disposal of Hazardous Wastes and Penalty''
7. It is the duty of the authorized person to take prior permission of the Gujarat Pollution Control Board to close down the facility.
8. The imported hazardous and other wastes shall be fully insured for transit as well as for any accidental occurrence and its clean-up operation.
9. The record of consumption and fate of the imported hazardous and other wastes shall be maintained.
10. The hazardous and other wastes which gets generated during recycling or reuse or recovery or pre-processing or utilization of imported hazardous or other wastes shall be treated and disposed of as per specific conditions of authorization.
11. The importer or exporter shall bear the cost of import or export and mitigation of damages if any.
12. An application for the renewal of an authorization shall be made as laid down in rules 6(2) under Hazardous Waste and Other Waste Rules, 2016.
13. Any other conditions for compliance as per the Guidelines issued by the Ministry of Environment, Forest and Climate Change or Central Pollution Control Board from time to time.
14. The waste generator shall be totally responsible for (i.e. collection, storage, transportation and ultimate disposal) the wastes generated.
15. Records of waste generation, its management and annual return shall be submitted to Gujarat Pollution Control Board in Form-4 by 30th day of June of every year for the preceding period April to March.
16. In case of any accident, details of the same shall be submitted on Form-11 to Gujarat Pollution Control Board.
17. As per "Public Liability Insurance Act-91" company shall get Insurance Policy, if applicable.

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18. Empty drums and containers of toxic and hazard material shall be treated as per guideline published for "Management & Handling of discarded containers". Records of the same shall be maintained and forwarded to Gujarat Pollution Control Board regularly.
19. In case of transport of hazardous wastes to a facility for (i.e. treatment, storage and disposal) existing in a State other than the State where hazardous wastes are generated, the occupier shall obtain 'No Objection Certificate' from the State Pollution Control Board or Committee of the concerned State of Union Territory Administration where the facility exists.
20. Unit shall take all concrete measures to show tangible results in waste generation, reduction, avoidance, reuse and recycle. Actions taken in this regard shall be submitted within three months and also along with Form-4.
21. Industry shall have to display the relevant information with regards to hazardous waste as indicated in the Hon. Supreme Court's Order in W.P. No.657 of 1995 dated 14th October, 2003.
22. Industry shall have to display on-line data outside the main factory gate with regard to quantity and nature of hazardous chemicals being handled in the plant, including wastewater and air emissions and solid hazardous wastes generated within the factory premises.

7. SPECIFIC CONDITIONS:-

7.1. The authorized actual user of hazardous and other wastes shall maintain records of hazardous and other wastes purchased in a passbook issued by the State Pollution Control Board along with the authorization.
7.2. Handling over of the hazardous and other wastes to the authorized actual user shall be only after making the entry in the passbook of the actual user.
7.3. In case of renewal of authorization, a self-certified compliance report in respect of effluent, emission standards and the conditions specified in the authorization for hazardous and other wastes shall be submitted to SPCB.
7.4. The occupier of the facility shall comply Standard operating procedure/guidelines published by MOEF&CC or CPCB or GPCB from time to time.
7.5. Unit shall comply provisions of E-Waste Management Rules-2016.
7.6. The disposal of Hazardous Waste shall be carried out as per the waste Management hierarchy.
7.7. The occupiers of facilities shall not store the hazardous and other wastes for a period not exceeding **ninety days**. Prior permission of the Board shall be obtained for extension of the storage period.
7.8. The occupier shall maintain the records of generation, sale, storage, transport, recycling, co processing and disposal of hazardous waste and make available during the inspection.
7.9. The transportation of the hazardous waste shall be carried out in GPS mounted dedicated vehicles.

8. GENERAL CONDITIONS: -

8.1. Any change in personnel, equipment or working conditions as mentioned in the consents form/order should immediately be intimated to this Board.
8.2. Applicant shall also comply with the general conditions given in annexure I.
8.3. Whenever due to accident or other unforeseen act or ever, such emissions occur or is apprehended to occur in excess of standards laid down such information shall be forthwith

reported to Board, concerned Police Station, Office of Directorate of Health Service, Department of Explosives, Inspectorate of Factories and local body.

8.4. In case of failure of pollution control equipments, the production process connected to it shall be stopped. Remedial actions/measures shall be implemented immediately to bring entire situation normal.

8.5. The Environmental Management Unit/Cell shall be setup to ensure implementation on and monitoring of environmental safeguards and other conditions stipulated by statutory authorities. The Environmental Management Cell/Unit shall directly report to the Chief Executive of the organization and shall work as a focal point for internalizing environmental issues. These cells/units also coordinate the exercise of environmental audit and preparation of environmental statements.

8.6. The Environmental audit shall be carried out yearly and the environmental statements pertaining to the previous year shall be submitting to this State Board latest by 30th September every year.

For and on behalf of
Gujarat Pollution Control Board

(Sushil Vegda)
Senior Environmental Engineer

NO: GPCB/CCA-SRT-2195/ID_50114/ 531548

Date:- 26/12/19

Issued to:
M/s. Anupam Rasayan India Ltd. (Unit-6)
Plot No: 2425, GIDC,
Sachin-394230,
Tal: Chorasi, Dist: Surat.

ANNEXURE - R-4

ZERTIFIKAT ◆ CERTIFICATE ◆ 認証書 ◆ СЕРТИФИКАТ ◆ CERTIFICADO ◆ CERTIFICAT

CERTIFICATE

The Certification Body
of TÜV SÜD South Asia Private Limited

certifies that

Anupam Rasayan India Limited

Plot no-2423-2425 Sachin GIDC Estate, Sachin,
Surat - 394230, Gujarat, INDIA

has implemented Occupational Health and Safety Management System

in accordance with **ISO 45001:2018**

for the scope of

Manufacture and Supply of
Pharma Intermediates and Specialty Chemicals.

The certificate is valid in conjunction
with the main certificate from **2021-12-13** until **2024-12-12**
Subject to successful completion of annual periodic audits

The present status of this certificate can be obtained through TUV SUD website by scanning below QR code and by entering the certificate number (without spaces) on web page. Further clarifications regarding the status & scope of this certificate may be obtained by consulting the certification body at info.in@tuvsud.com

Certificate Registration No. **99 117 00778/03**

Date of Initial certification: **2021-01-14**

Issue Date: **2021-11-23** Rev. **00**

Rahul Kale
Head of Certification Body
of TÜV SÜD South Asia Private Limited,
Mumbai
Member of TÜV SÜD Group

NABCB OH003

South Asia

ZERTIFIKAT ◆ CERTIFICATE ◆ 認証書 ◆ СЕРТИФИКАТ ◆ CERTIFICADO ◆ CERTIFICAT

CERTIFICATE

The Certification Body
of TÜV SÜD South Asia Private Limited

certifies that

Anupam Rasayan India Limited
Plot no-2423-2425 Sachin GIDC Estate,
Sachin, Surat - 394230, Gujarat, INDIA

has implemented Quality Management System

in accordance with **ISO 9001:2015**

for the scope of

Manufacture and Supply of
Pharma Intermediates and Specialty Chemicals.

The certificate is valid in conjunction
with the main certificate from **2021-12-13** until **2024-12-12**
Subject to successful completion of annual periodic audits
The present status of this certificate can be obtained through TUV SUD website by scanning below QR code and by entering the certificate number (without spaces) on web page. Further clarifications regarding the status & scope of this certificate may be obtained by consulting the certification body at info.in@tuvsud.com

Certificate Registration No. **99 100 22001/06**

Date of Initial certification: **2021-01-14**

Issue Date: **2021-11-23** Rev. **00**

Rahul Kale
Head of Certification Body
of TÜV SÜD South Asia Private Limited,
Mumbai
Member of TÜV SÜD Group

QM011

ZERTIFIKAT ◆ CERTIFICATE ◆ 認証書 ◆ СЕРТИФИКАТ ◆ CERTIFICADO ◆ CERTIFICAT

CERTIFICATE

The Certification Body
of TÜV SÜD South Asia Private Limited

certifies that

Anupam Rasayan India Limited
Plot no-2423-2425 Sachin GIDC Estate,
Sachin, Surat - 394230, Gujarat, INDIA

has implemented Environmental Management System

in accordance with **ISO 14001:2015**

for the scope of

Manufacture and Supply of
Pharma Intermediates and Specialty Chemicals.

The certificate is valid in conjunction
with the main certificatefrom **2021-12-13** until **2024-12-12**
Subject to successful completion of annual periodic audits
The present status of this certificate can be obtained through TUV SUD website by scanning below QR code and by entering the certificate number (without spaces) on web page. Further clarifications regarding the status & scope of this certificate may be obtained by consulting the certification body at info.in@tuvsud.com

Certificate Registration No. **99 104 01292/06**

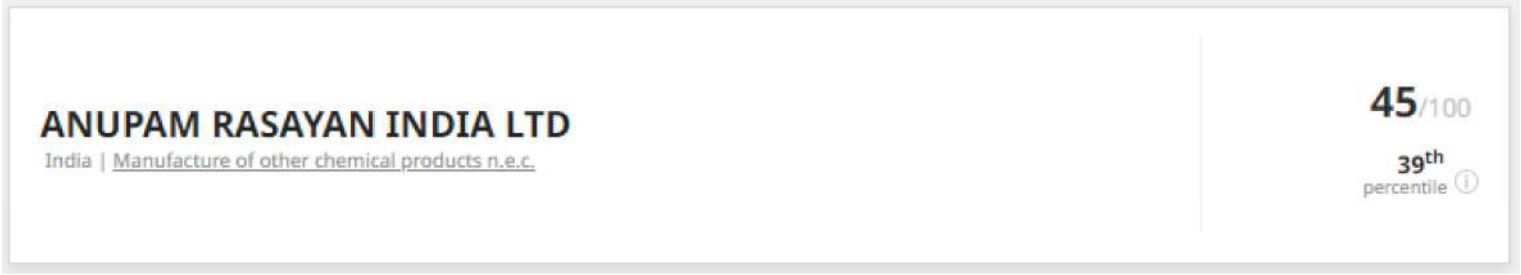
Date of Initial certification: **2021-01-24**

Issue Date: **2021-11-23** Rev. **00**

Rahul Kale
Head of Certification Body
of TÜV SÜD South Asia Private Limited,
Mumbai
Member of TÜV SÜD Group

EM009

ANNEXURE - R-5


ANUPAM RASAYAN INDIA LTD
India | Manufacture of other chemical products n.e.c.
45/100
39th
percentile

THIRD PARTY SAFETY AUDIT

(NOVEMBER - 2020)

ANUPAM RASAYAN (INDIA) LTD.

M/s. ANUPAM RASAYAN INDIA LTD.,

SACHIN

Conducted & Prepared By,

JOGI GO SAFE

JOGI SafeTech Pvt. LTD.

An ISO 9001:2015 Certified Organization

Doc. No.: 2020/JSPL/047/TPSA/063
Rev. No.: 00, 15th December, 2020

DOCUMENT DETAILS

TITLE	Report of Third Party Safety Audit	**JOGI SafeTech Pvt. LTD.** A-701/702, Shreeji Arcade, B/h. Bhulka Bhavan School, Anand Mahal Road, Adajan, Surat, Gujarat (India) - 395009. Ph.: 0261 - 2746499 Mo.: +91 7405480710 **Email:** disha@jogisafetech.com **Website:** www.jogisafetech.com
FOR	M/s. ANUPAM RASAYAN INDIA LTD., Plot No.2423 & 2425, GIDC, Sachin, Surat, Gujarat-	
AUDITOR	Mr. Anil Shah	
DATE	20th November 2020	

DOC. NO.	2020/JSPL/047/TPSA/063	REVISION NO.	00
DATE OF ISSUE	26th November, 2020	STATUS	Final Report
PREPARED BY	Kaushal Bhavsar *Assistant Engineer*	*Signature*	KB
REVIEWED BY	Disha Jethva *Head-Business*	*Signature*	Jethva. D.M.
APPROVED BY	Nilesh Jogal *Director*	*Signature*	

REPORT SUMMARY
M/s. JOGI SafeTech Pvt. Ltd. conducted Third Party Safety Audit of **M/s. ANUPAM RASAYAN INDIA LTD., SACHIN.** In this audit, we have followed Indian Standards 14489 (2018): *Code of Practice on Occupational Safety & Health Audit* and have further referred to relevant documents, guidelines & good engineering practices which are being followed across the industries. This report presents the findings of the Third Party Safety Audit.

REVISION HISTORY			
00	15th December, 2020	Final Report	Comments Incorporated
--	26th November, 2020	Draft Report	Issued For Comments
REV.	DATE	STATUS	DESCRIPTION

CERTIFICATE

This is to certify that this Third Party Safety Audit of **M/s. ANUPAM RASAYAN INDIA LTD., SACHIN,** has been conducted by us on **20th November 2020**

To evaluate the adequacy of existing safety management systems of an industry, Safety Audit is one of the most effective tools. It focuses on giving a comprehensive status of all the aspects of Environment, Health and Safety.

In this audit, we have adopted an approach beyond the scope of statutory requirements. We have followed *Indian Standards 14489 (2018): Code of Practice on Occupational Safety and Health Audit* and have further referred to relevant documents and guidelines issued by the department of Director of Industrial Safety and Health.

It should be noted that this Safety Audit is carried out based on the information, details, data, etc. provided by the management and as observed by auditors during their visits and verification. We have exercised all reasonable skill, care and diligence in conducting the audit. However, this report should not be treated as any undertaking or warranty.

We are very much thankful for the co-operation and help extended during the audit by members of Technical Services Mr. Kantilal Patel (*Production Manager*), Mr. Kunal Aneja *(Manager- Safety)*, and all other Managers / Engineers / Officers from M/s. ANUPAM RASAYAN INDIA LTD., SACHIN.

For JOGI SafeTech Pvt. LTD.,

JOGI SAFETECH PVT. LTD. SURAT

Nilesh Jogal
(Director)
Place: Surat
Date: 15/12/2020

For Management of **M/s. ANUPAM RASAYAN INDIA LTD., SACHIN:**

Document Approved By,		
Name	**Designation**	**Sign**
Yagnesh V. Rana	Officer - EHS	

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EXECUTIVE SUMMARY

M/s. ANUPAM RASAYAN INDIA LTD., SACHIN hired the services of M/s. JOGI SafeTech Pvt. Ltd. to conduct Third Party Safety Audit as per Indian Standards - 14489 (2018) : *Code of Practice on Occupational Safety and Health Audit*. Our qualified & well-experienced Audit team undertook visits of various areas of the unit; collected details in form of questionnaires, checklist, tables, etc. and verified the relevant documents and records.

The major strengths and scope of improvement on Safety Audit elements are as illustrated below:

STRENGTHS OF THE COMPANY

- ✓ Experienced and committed senior employees' team.
- ✓ Positive approach of employees.
- ✓ Management is prepared to progress towards HSE.
- ✓ Suitable and adequate fire extinguishers were found provided and well maintained.
- ✓ Good level of safety slogan found displayed across the plant.
- ✓ Good aisle making observed in plant area.
- ✓ COVID-19 Pandemic general guidelines found followed in the premises.
- ✓ All fire extinguishers are inspected regularly on monthly basis and well maintained.
- ✓ Adequate number of assembly points identified.
- ✓ Cylinders are labelled as per gas cylinder rule.
- ✓ No major incident reported in last year.
- ✓ No fugitive emissions observed in plant area. Scrubber system found installed & in running condition.
- ✓ Periodic calibration schedule prepared & followed strictly. Records maintained.
- ✓ Primary treatment carried out at ETP & treated effluent sent to CETP.

SCOPE FOR IMPROVEMENT

➢ **Safe work practices.**

- ✓ Two SV's found installed on steam boiler. Lever of one SV found wrongly fitted i.e. in upward direction. Lever for the same to be fitted in appropriate direction.
- ✓ Water leakage found leaking from inlet flange of one Mobrey level controller. Leakage to be attended urgently.
- ✓ Gas detector found installed in the lab but not in Gas cylinder storage area. Gas Detectors to be installed in storage area.
- ✓ No Safety shower & eye washer found in lab and in PTZ- Plant G.F. safety showers to be installed at conspicuous locations.
- ✓ MSDS not found displayed. Same to be displayed.
- ✓ Mobile phones found being allowed & used in plant area. Use of mobile phones to be barred in plant areas.
- ✓ Trip-bypass register not found maintained. Proper records of bypass & taking in line to be maintained.
- ✓ PM schedule and checklists found prepared. However, list of critical equipments to be prepared. History cards of all critical equipments to be maintained.
- ✓ Scrap materials found kept inside factory. A Scrap tracking & Management system to be developed.

➢ **Electrical Safety**

- ✓ A bonding jumper for Reactor (RP1-104) inlet line sight glass flange found missing. Jumper to be provided for the same & periodic continuity test to be conducted.

➢ **Fire Safety**

- ✓ Steam boiler water feed line found clamped on nearby CNG supply line for support.. Water feed line to be installed by providing support on wall or installing stand on ground floor but not with CNG line.
- ✓ No smoke detector found in critical areas, MCC Room, Substation, HT room. Same to be provided & connected with fire alarm panel.

INTRODUCTION OF THE COMPANY

Anupam Rasayan India Limited is a leading custom manufacturer of speciality chemicals which are used for the Agrochemicals, Anti-Bacterial, Polymers, Pharmaceuticals, Material Sciences. With their customers at the heart of everything they do, their focus is to manufacture products with sustainability using their cutting edge technologies, greater R&D and engineering capabilities to deliver values for their customers for their complex and multi-step synthesis projects.

Since 1977, Anupam Rasayan India Limited has been a valuable partner to their customers for custom manufacturing of multi-synthesis molecules such as Agrochemical Actives & Intermediate, Pharmaceutical intermediates, Home and Personal Care chemicals and Polymer and material science products on exclusive basis for their customers. They are an ISO 9001:2015 and ISO 14001:2015 certified company with sound technology, environment consciousness, rich history of innovation through research, and total commitment to excellence towards quality and sustainability.

They have developed a strong R&D structure to drive company growth and hold the prestige of introducing many firsts to India's market space. Thanks to their R&D team, Anupam Rasayan India Limited has secured a strong market position. Because they strongly believe that continued investment in Research and Development activities is imperative for continued success and growth. Their state-of-the-art Research and Development Centre is a perfect testimony of the commitment to this belief.

Green manufacturing and Green growth have always been to the top of their agenda, they have developed new eco-friendly, safer and novel routes for many products. Most of these products have been introduced on an exclusive basis for their customers.
They have six manufacturing sites that are located in the state of Gujarat: 4 sites are in Sachin, Surat and 2 state of art sites are in Jhagadia, Gujarat.

1. AUDIT METHODOLOGY

1.1 INTRODUCTION

Safety Audit is an integral & essential part of loss prevention strategy. The objectives of the safety audit are to look after the safety, health & welfare of employees in the industry, to maintain the high standards of safe operation and to improve them.

Its aim is to disclose the strength and weakness and the wider area of risk. In its most common form, safety audit comprises a series of activities undertaken on the initiative of an organization's management to evaluate safety performance. It is a systematic, objective approach to verify both safety compliance and the systems in place to manage safety responsibilities. It is qualitative efforts on safety related matters rather than quantitative.

Safety audit is an important tool to identify organizational & operational safety policy, and practices, plant conditions or operating procedures that could lead to an accident and significant losses in life or property and their effectiveness against accident preventative program.

1.2 OBJECTIVES

The safety audit was conducted with the following objectives:

1. To know the compliance of Health and Safety Policy and management systems.
2. To find out strengths and weaknesses of safety program.
3. To identify areas of high risk and vulnerability and recommendations them for more detailed risk analysis if required.
4. To find out potential hazards present in the existing plants.
5. To ensure that operation and maintenance are carried out according to the plant manual without any serious deviation.
6. To ensure the compliance of important statutory requirements.
7. To check the existing firefighting, first-aid and training facilities.
8. To know the status of emergency preparedness and regular mock exercises.
9. To know the personal attitudes of employees.
10. To study the existing system, procedures and measures for controlling the hazards besides the provisions of Factories Act, 1948 , Chemical (MSIHC)Rule and other applicable legislation.
11. Recommended measures to improve overall safety performance of the plant.

1.3 SCOPE OF WORK

M/s. ANUPAM RASAYAN INDIA LTD., SACHIN has assigned the task of conducting Third Party Safety Audit as per Indian Standard: 14489 of their unit to the external agency **M/s. JOGI SafeTech Pvt. LTD., Surat.**

1.4 AUDIT TEAM

The Safety Audit has been conducted by the team of "JOGI SafeTech Pvt. LTD." and coordinated by the team of "ANUPAM RASAYAN INDIA LTD., SACHIN".

JOGI SAFETECH PVT. LTD.	
Auditor:	**Mr. Anil Shah** *Lead Auditor,* *Process Safety Expert, PDIS*
Team Member:	**Mr. Kaushal Bhavsar** *Assistant Engineer, B.E Chemical*
ANUPAM RASAYAN INDIA LTD., SACHIN.	
Audit Coordinators:	**Mr. Kantilal Patel** *Production Manager* **Mr. Yagnesh Rana** *Safety officer*

1.5 OPENING AND CLOSING MEETINGS

The opening meeting for discussing the overview and proceedings of this Third Party Safety Audit was conducted in the morning of 20th November, 2020.

The closing meeting for sharing major observations along with the recommendations was conducted in the evening of 20th November 2020.

The details of all the officers / mangers / engineers who were present in the opening and closing meetings are documented in the attendance sheet which is attached in the Annexure - I of this report.

1.6 METHODOLOGY

We have followed *Indian Standards: 14489 (2018) : "Code Of Practice On Occupational Safety & Health Audit"* and have referred relevant documents, statutes, guidelines and published books both from national and international authors and have also referred good engineering practices which are being followed across industries. The execution of audit was carried out stage-wise as described in following sections:

- **Site Inspection**

Site inspection was carried out by the audit team along with the audit coordinator. During plant visit various observations were made to find any apparent hazards. Observations were made with respect to Vessels, Equipment's, Storage, Piping, Unsafe Conditions, House Keeping, Safety Display Boards, Maintenance Work, Safety Precautions, Fire protection facilities and Safety Control Measures.

- **Verification Of Documents**

The records on Examination, Test Certificates, Statutory Records, Mandatory Records, etc. were examined, verified and checked.

- **Discussion With Supervisors, Operators And Workers**

Discussions were held with the personnel at various levels, Manager, Supervisors and workers for cross verification of the information received during the site inspection and management levels.

- **The Questionnaire**

The questionnaire was prepared and existing conditions were checked at the time of site inspection and the details on various control and safety measures were collected and noted. Some clarifications have been sought and complete listed methods have been verified, collected and noted.

1.7 TECHNIQUES

Every effort is made to ensure that all statements and information offered in this report are given in good faith and without prejudice. The references, details and data are collected during our visits and as per the conditions prevailing at that time. Hence, the Audit report is fully made as per the conditions available at that time.

All documents, records and procedures submitted to us were checked and verified. During the Audit, no tests were conducted nor any tests were started nor was any plant or equipment operated. No statement was recorded for the audit purpose. The physical observation, site inspection, checking of records and discussion held at various level of management are most relevant basis for the Audit.

Further, the report includes positive findings as well as deficiencies. The report follows *Indian Standards: 14489 (2018) "Code of Practice on Occupational Safety & Health Audit"* and refers relevant statutes.

2. OBSERVATIONS AND RECOMMENDATIONS FOR THE OPERATIONAL AREAS AND SAFETY

The observations and recommendations associated with various process elements like operational areas, tank farm, production facilities, process equipment's, procedures; layout, hazards, emergency preparedness, employee's awareness, etc. have been given separately in following sections:

Area: Plant- 1

SR.	OBSERVATIONS	RECOMMENDATIONS
1.	Trip-bypass register not found maintained.	Proper records of bypass & taking in line to be maintained.
2.	Some Fire extinguishers & Safety showers in plant area found without tag nos.	• Proper identification to be done & records to be maintained. • Drain pit to be constructed for safety showers to prevent slippery floor in plant area.
3.	PA system not found.	PA system to be installed.
4.	Emergency lights found available in plant & UPS supply given.	Red markings to be done on emergency lights for identification.
5.	Emergency staircase steps found wider. Handrail provided on one side.	Handrails to be provided on both side of emergency staircase for safe escape in case of emergency.

Area: PTZ- Plant.

SR.	OBSERVATIONS	RECOMMENDATIONS
6.	Trip-bypass register found not maintained	Proper records of bypass & taking in line to be maintained.
7.	Some Fire extinguishers & Safety showers in plant area found without tag Nos.	Proper identification to be done & record maintained.
8.	PA system not found.	PA system to be installed.
9.	Goods lift cage door limit switch found not working.	The same to be attended and rectified.
10.	For Centrifuge bag lifting device, chain pulley block testing found not done.	Testing of chain pulley block to be done as per GFR.
11.	Emergency lights found available in plant & UPS supply given.	Red markings to be done on emergency lights for identification.
12.	A bonding jumper for Reactor RP1-104 inlet line sight glass flange found missing.	Jumper to be provided & periodic continuity test to be conducted.
13.	The screen guard of Reactor (RP1-101) agitator was not installed back after the completion of maintenance work.	The screen guard to be installed back & good practices to be followed strictly.
14.	No Safety shower found installed at G.F area in plant.	Safety shower to be installed.

Area: Utilities Area

SR.	OBSERVATIONS	RECOMMENDATIONS
15.	SOPs are well prepared and documented.	Appreciable.
16.	Steam boiler water feed line found clamped on nearby CNG supply line for support. (Unsafe Act)	Water feed line should be installed by providing support on wall or installing stand on ground floor but not with CNG line.
17.	Two SV's found installed on steam boiler. Lever of one SV found wrongly fitted i.e. in upward direction.	Lever to be fitted in right direction.
18.	No electrical bonding arrangement found on CNG feed line to boiler.	Electrical bonding & grounding system to be implemented for CNG supply system.
19.	Water leakage found leaking from inlet flange of one Mobrey level controller. (Unsafe Condition)	Leakage to be attended on urgent basis.
20.	No concrete steps found to descend from boiler area flooring to road.	Concrete steps to be constructed.
21.	Thermo pack hot fluid circulation pump discharge line drain valve kept closed.	Drain valve to be blinded when not in use.

Area: Quality Control Lab and R&D Center.

SR.	OBSERVATIONS	RECOMMENDATIONS
22.	SOPs are well prepared & documented.	Appreciable.
23.	All chemicals MSDS found not available.	Same to be made available.
24.	Calibration schedule of instruments found well prepared & records are maintained.	Appreciable.
25.	One hot air oven RTD calibration found not done.	Calibration to be carried out & records to be maintained as per the schedule.
26.	PPE's stock is well maintained at work place.	Appreciable.
27.	Gas detector found installed in the lab but not in Gas cylinder storage area. Full & empty cylinders found marked & segregated.	• Gas detectors to be installed in cylinder storage area. • When cylinders are secured by a chain or strap, the preferable method is to secure them in two locations – one strap or chain 1/3 from the top of the shoulder of the cylinder and one strap or chain 1/3 up from the bottom of the cylinder.
28.	Chemical compatibility chart & safe handling chart found not displayed.	Chemical compatibility chart & safe handling chart to be displayed.
29.	No Safety shower & eye washer found in lab.	The same to be provided at conspicuous locations.

Area: Tank Farm Area

SR.	OBSERVATIONS	RECOMMENDATIONS
30.	MSDS not found displayed.	Safety measures for the chemicals stored should be displayed.
31.	Earthing & bonding provided on unloading pumps for flammable chemicals.	The crocodile clamps with Earth Relay System to be provided in tanker unloading area.
32.	Safety shower found installed & in proper working condition.	Proper identification to be done.
33.	A ladder provided to enter/exit tank farm area, hand rail was missing.	Hand rails to be provided on ladder.

Area: Engineering department and Store.

SR.	OBSERVATIONS	RECOMMENDATIONS
34.	PM schedule and checklists found prepared & followed strictly & records well maintained by Mech./Elect depts.	List of critical equipments to be prepared. History cards of all critical equipments to be maintained.
35.	Periodic calibration of instruments found done & records are maintained.	Good practice.
36.	SOPs for calibration & maintenance of instruments are well prepared and documented.	Appreciable.
37.	In Engg. Store, some spare parts & materials found stored in haphazard style without marking & identification.	Materials identification & traceability system to be developed & implemented.

Area: Electrical Installations.

SR.	OBSERVATIONS	RECOMMENDATIONS
38.	Identification, Test due date and resistance value found displayed on nearby wall near all earth pits.	Display boards to be installed on the pit inspection cover. Earth pit should be lifted from ground for easy & secure access with proper lifting arrangement and protecting the termination of electrodes from the climatic damage, to prevent ingress of foreign materials. The same to be followed for all pits in whole factory area.
39.	Switch yard gate found unlocked.	Switch yard gate to be kept locked and list of authorized persons should be displayed at gate.
40.	Electric shock treatment chart found displayed in substation.	SLD to be displayed.
41.	No smoke detector found in critical areas, MCC Room, Substation, HT room.	The same to be provided & connected with fire alarm panel.
42.	Two DG sets found installed & connected with common Stack/ chimney.	Earthing to be provided on Stack/chimney.

Area: Fire Pump House

SR.	OBSERVATIONS	RECOMMENDATIONS
43.	All fire fighting pumps found in working condition, running on auto & required pressure is achieved.	Good.
44.	No LG provided on Fire water storage tank for makeup of water but Level marking is done inside the tank.	LG to be provided on Fire water storage tank for makeup of water & may be with auto system for makeup. Float type LG to be provided on Fire water storage tank.
45.	No Earthing provided on diesel storage tank.	Earthing to be provided on diesel storage tank.
46.	No PG provided on farthest point in fire hydrant system.	A PG to be provided on farthest point in fire hydrant system to check/ensure the pressure.
47.	No rubber mat & earthing found on fire pumps operating electrical panel.	Rubber mats & earthing to be provided.

Area: OHC

SR.	OBSERVATIONS	RECOMMENDATIONS
48.	Ambulance was not available.	• Plant specific ambulance should be made available & well maintained. • Monthly checklist for ambulance & OHC to be prepared, filled and records to be maintained.

Area: ETP

SR.	OBSERVATIONS	RECOMMENDATIONS
49.	A leakage found from treated effluent transfer pump discharge line flange. A flow meter was installed in line to measure quantity of treated effluent but found difficult to note reading as was installed at height.	• Leakage to be attended. • A platform with ladder to be constructed to take reading of flow meter in safe manner.

Area: Security Office

SR.	OBSERVATIONS	RECOMMENDATIONS
50.	Emergency contact Nos. found displayed on board on wall outside security office.	The same to be displayed inside office also.
51.	Emergency siren system found available & testing done.	Emergency siren coding system to be decided & to be displayed in office.
52.	Mobile phones found being allowed & used in plant area.	Mobile phones should not be allowed in factory area considering Hazardous processes & chemicals being handled.

Area: General

SR.	OBSERVATIONS	RECOMMENDATIONS
53.	Emergency "Siren Code" defined in company.	Emergency siren code board to be displayed in English, Hindi and Gujarati at prominent locations in whole factory. Assembly point's details should also be mentioned on the board.
54.	Overall good housekeeping observed.	Appreciable. Inter-departmental competition for

		good housekeeping should be arranged.
55.	Company has prepared OSEP.	• Educate total work force including contract workers on OSEP. • OSEP to be prepared & updated as per schedule 8A and include information related to emergency & risk scenario regarding existing & new developments in plant area.
56.	Color coding of pipelines found done in the plant area.	It should cover all the pipelines throughout the site.
57.	SOPs are well prepared & documented.	• Safety measures required to be taken in case of leakages & other abnormalities to be incorporated. • SOPs to be prepared for new products & development in plant area. • Standard / safe operating procedures to be displayed or made available and to be explained in the local language to the workers.
58.	Tool box talks found conducted.	Appreciable.
59.	Safety signages & posters found displayed in plant area.	HAZCOM system should be improved.
60.	Manual call points found installed in the plant area.	MCPs should be made addressable.
61.	Emergency contact Nos. board found displayed.	Plot Plan & Fire hydrant system lay out to be displayed near main gate.
62.	Work permit system implemented & followed.	• General/Cold work permit format to be prepared & implemented. • Work permit no. to be mentioned in work permit to maintain proper records. • Ensure that only a trained, certified & authorized person sign the Confined Space entry permit.

63.	Scrap materials found kept inside factory.	• A Scrap tracking & Management system to be developed. • A list should be prepared for non-recyclable, non-movable & movable goods and proper disposal arrangements.
64.	Access control system installed in plant area & office.	Good.

3. LEGAL APPLICABILITY

SR.	LEGAL DOCUMENT	AUDITOR'S REMARK / OBSERVATIONS
1.	Stability Certificate (of Factory Building)	Form No. 1A was checked during the visit. Report Number: GUJ/DISH/CPT/A/0197/2014 Issue Date: 22/06/2019 Next due Date: 21/06/2024.
2.	Form No. 4: License to work a Factory (Factory License)	Form No. 4 was checked during the visit. Licence Number: 37958 Valid till: 31/12/2028
3.	Humidity Register	Not Applicable.
4.	Record of Lime Washing, Painting, etc.	Records of Lime washing and painting are maintained and the same was verified during the visit.
5.	Register of worker employed for work on or near moving machinery	Not Applicable.
6.	Report of Examination of Hoists and Lifts	Examination of Hoists and Lifts is done and report for the same is maintained.
7.	Examination of the lifting Machines, Ropes and Lifting Tackles	Examination of Hoists and Lifts is done and report for the same is maintained.
8.	Report of Examination or Test of Pressure Vessel	Report of Examination of Pressure Vessel is maintained and the same was verified during the visit.
9.	Register of Adult Workers	Register of adult workers is available and maintained in Hard copies.
10.	Health Register	Not applicable.
11.	Report of the Accidents Including, Dangerous Occurrence Resulting in Death or Bodily Injury	Form No: 21 is maintained. No such accidents have occurred yet.
12.	Report of Dangerous Occurrence which does not result in bodily injury	Format for the same is developed internally and records are maintained.

SR.	LEGAL DOCUMENT	AUDITOR'S REMARK / OBSERVATIONS
13.	Notice of poisoning or disease	Not applicable.
14.	"Abstract of the Factories Act 1948 and The Gujarat factories Rules, 1963" (Generally displayed at the main entry of the company. i.e. at security gate)	The same has been displayed at the main gate.
15.	Master form in respect of the Factories Act, 1948, Payment of Wages Act, 1936, Maternity Benefit Act, 1961, Workman's Compensation Act, 1923 And As Applicable To Registered Factories Covered Under The Factories Act, 1948.	The same has been displayed at the main gate.
16.	Test Report: Dust/Fume Extraction System.	Not Applicable.
17.	Certificate of Fitness	Form no. 27-A is available and maintained.
18.	Muster Roll	The same is available at Security gate and is well maintained.
19.	Register of Accidents, Major Accidents and Dangerous Occurrences	Format for the same is developed internally. No such cases have occurred yet.
20.	Special Certificate of Fitness	Not Applicable. No special hazard associated.
21.	Factory Inspector book	Factory Inspector book is available and maintained.
22.	Health Register (For all employees)	Health Register is available and maintained.
23.	Certificate of fitness if employment in hazardous process & equipments.	It is maintained by the OHC department.
24.	Workplace Monitoring Records(Records of industrial hygiene surveys (Noise, Ventilation and Levels, Illumination	Records of illumination study and Noise Study are available and maintained.

SR.	LEGAL DOCUMENT	AUDITOR'S REMARK / OBSERVATIONS
	Levels, Airborne and Toxic Substances, Explosive Gases)	
25.	NOC/CCA from GPCB & EC from MoEF	NOC is available with License. No.: AWH-104795. Issue Date: 25/10/2019 Due Date: 30/06/2024
26.	On- Site Emergency plans and records of mock drills.	Records of Mock drills are available. OEP is available.
27.	Records of previous Audits	This is the First Third Party Safety Audit since the plant was commissioned last year.
28.	Plant Layout	Same to be displayed at Main Entry Gate.
29.	Safety policy	The same is displayed at Conspicuous locations.
30.	Information booklet for workers	The same is available and maintained.
31.	HAZOP Reports	HAZOP study to be carried out and should be revised after every 5 years.
32.	SOP's	Available and well maintained.
33.	Permit Procedures	PTW system is in place but a General/Cold work permit format to be developed and implemented.
34.	Thickness survey records.	Thickness survey records are available and maintained.

4. SAFETY AUDIT QUESTIONNAIRE (AS PER IS: 14489-2018)

Sr.	Attribute	Comments by Company	Auditor's Remark
ELEMENT: C-1 OH & SMANAGEMENT			
1.	Does the organization have OH & S policy?	Yes	Complies with applicable statutes.
2.	Who has signed the OH & S policy?	Managing Director	Complies.
3.	Whether the OH & S- policy is per guidelines of the statutory provisions?	Yes	Complies.
4.	When was the OH & S policy declared and adopted?	The OH & S policy declared and adopted on 01st April 2019.	Noted.
5.	Whether the OH & S policy reviewed periodically?	Yes.	Much Appreciable. Records of the same to be maintained.
6.	Whether the OH & S policy is available in local language and made known to all?	Yes.	Appreciable.
7.	What was the last date of updation?	01st April 2019	Noted.
8.	Does the policy find a place in the annual report?	The Company has planned to incorporate the same in annual report.	Complies.
C-2 OH & S ORGANIZATIONAL SET UP			
C-2.1 Safety Department			
9.	Does the factory have a safety department and what	Safety Head, safety officer (3 No.) and Fire	Noted.

	is strength of safety department?	Fighter (10 Nos.)	
10.	Whether the strength and qualifications of Safety Officers are as per the statutes?	Yes.	Complies
11.	Does the head of safety department report to the Chief Executive?	Yes.	Appreciable
12.	How often are the safety officers retrained in the latest techniques of total safety management? What is the frequency of retraining?	Safety officers are retrained internally on a half yearly basis.	It is recommended to send HSE officer for training. Outside seminars and training programme to be attended, like HSE conference, seminars etc.
13.	What additional duties the safety officer is required to do?	No additional duties are assigned to Safety officers	Appreciable.
14.	What is the power of safety officer vis-a-vis unsafe condition or unsafe act?	He has authority to stop the work at unsafe act or at unsafe condition.	Meets the requirement.
C-2.2 Safety Committee:			
15.	Does the factory has a safety committee(s)? What are the types, structures and terms of reference of the committees?	Yes. Site level safety committee comprising of members representing various departments. The committee consists of 3 levels: Chairperson, secretary and committee members.	Appreciable
16.	Is the constitution of the safety committee(s) as per the statute?	Yes	Complies with applicable statutes.

17.	How are the members of safety committee(s) selected? (elected / nominated)	Members are elected as per qualification and experience	Appreciable
18.	How often are the meetings of safety committee(s) held?	Once in three Months	Appreciable
19.	Are the recommendations of the committees(s) implemented?	Yes.	Appreciable
20.	Are the minutes of the safety committee(s) meetings circulated among the members?	Yes. Minutes are sent through mail.	Noted.
21.	Are the minutes forwarded to the trade union(s) and chief executive and occupier?	Yes. The same are submitted to chief executive and occupier.	Noted.
22.	Whether the management and trade union play their active roles in supporting and accepting the committee(s) recommendations?	Yes the management accepts committee's recommendations	Appreciable.
23.	How arethe safety committee(s) members apprised of the latest development in safety, health and environment?	Safety committee(s) members apprised of the latest development in safety, health and environment through training.	Appreciable.
C-2.3 Safety Budget:			
24.	What is the annual safety budget?	Annual Safety budget is prepared considering requirements for new year.	Noted

25.	How much percentage is this budget of the total turnover of the company?	Depends on requirements.	No comments.
26.	How much budget has been utilized till date?	Depends on requirements.	No comments.
27.	Is the safety budget adequate?	Yes.	No comments.
28.	How is the safety budget arrived at?	Safety officer prepares the budget based on the requirement.	Noted.
29.	What is the pattern of expenditure for the last five years?	The unit has been established a year ago.	Noted. Data for pattern of expenditure to be maintained with the safety department.
30.	What are the approved sanctions for the expenditure in this budget?	As per the requirement.	Noted.
31.	Does this budget get reflected in the annual report of the company?	Yes, budget will be reflected in the annual report. This is an under development unit so annual report isnot published yet.	Appreciable.
C-3 SAFETY MANUAL			
32.	What is the periodicity of updation / review of safety manual?	The management has planned to review the safety manual every 3 years	The safety manual to be reviewed & updated on a yearly basis.
33.	Does the safety manual adequately address all the hazards in the plant?	Yes	Appreciable.

34.	Are the employee made aware of safety rules / instruction mentioned in the safety manual?	Yes	Noted.
C-4 STANDARD OPERATING PROCEDURES (SOP)			
35.	Are written Standard / safe operating procedures available for all operations and processes?	SOP's are available for all the processes	Appreciable.
36.	Whether the written Standard / safe operating procedures are displayed or made available and explained in the local language to the workers?	All Standard / safe operating procedures are made available to concerned employees and training is imparted to them for effective implementation.	Complies. Same to be made available in local languages.
37.	Whether concerned section and safety department prepares standard / safe operating procedure jointly?	Yes. Concerned Employees and safety department prepare standard / safe operating procedure jointly.	Appreciable
38.	Are standard / safe operating procedures reviewed and updated?	Yes. The SOP's are recently prepared and will be reviewed and updated accordingly.	Appreciable
39.	Have the workers been informed ofthe consequences of failure to observe the standard / safe operating procedures?	Yes.	Appreciable
C-5 PLANT MODIFICATION PROCEDURES			
40.	What is the system for effecting any change in the existing plant, equipment or process?	Yes, MOC is followed	Noted.

41.	Whether the P & I diagrams and other related documents are updated accordingly?	Yes.	Appreciable.
42.	Whether hazard assessment done before implementation of modification?	Yes.	Appreciable.
C-6 WORK PERMIT SYSTEM			
43.	What types of work permits exist in the factory?	Hot work permit, Work at Height, Confined space, lifting, Excavation permit, LOTO system.	Appreciable. Need for the requirement of cold work permit to be assessed.
44.	Are the necessary forms detailing required safety precautions have been prepared and used for each type of work-permit?	Yes.	Appreciable.
45.	Is the responsibility assigned to authorize person for issuing of safety work permit?	Yes.	Appreciable.
46.	Is the copy of safe work permit sent to safety officer before execution of the job?	Yes (For Hot work, confined space, line opening) and as per the criticality of the work	Appreciable.
47.	Is validity period specified in the safety work permit?	Yes.	Appreciable.
48.	Are the records of work permit available and maintained in proper order?	No.	Same to be developed and followed.

C-6.1 Control Measures for Work at Height			
49.	Is adequate safe access provided to all places where workers need to work?	Yes	Appreciable
50.	Are all such access in good condition?	Yes	Same was observed during the visit.
51.	Are all scaffolds are properly designed and erected?	Mobile scaffolds are made available.	Noted
52.	Are scaffolds inspected every day before work begins?	Yes.	Noted
53.	Are ladders securely clamped or lashed in place?	Yes	Noted
54.	Are planks in good condition?	Yes	Appreciable
55.	Are scaffold walkways, platforms, runs or stairs free of debris, grease, any unnecessary obstruction and projecting nails?	Yes	Appreciable
56.	Are the scaffolds higher than 20 m.? If yes, is a netting or intermediate railing provided between toe-boards and hand railings?	No	No comments
57.	Are folding stepladders properly used?	Yes	Noted
58.	Are ladders set up at the proper slope of about 1:4?	Yes	Appreciable

59.	Do workers use hand lines to lift tools or materials?	Yes.	Appreciable.
60.	Are proper ladders used around electrical hazards?	Yes	Appreciable
61.	On sloping roofs, are crawling boards, lifelines, safety belts and edge protection provided where needed?	Yes.	Noted.
62.	Whether the weak spots, skylights, or deteriorated asbestos-cement boards through which a worker might fall while working in the roof has been identified and safety net provided appropriately?	No such cases have been identified.	Noted
63.	Are the workers being medically examined for their fitness to work at height?	Yes	Appreciable. Records are maintained for the same.
C-6.2 Work in Confined Space Not Applicable; No such area available in the plant.			
64.	Is work permit system followed for working in confined space?	Yes	Noted.
65.	Whether monitoring of the atmosphere inside the confined space is carried out and ensured that there is no flammable or toxic gas in the area?	Yes. Through the VOC meter.	Appreciable.
66.	Whether the person entering the confined space is using suitable personal protective equipment (PPE)?	Yes. PPE's used are confined space kit, safety shoes, goggles, helmets.	Appreciable.

67.	Is rescue team available in case of any emergency?	Yes	Noted.
C-7 CONTRACTORS' SAFETY SYSTEM			
68.	Is there any system for selection of contractors?	Yes.	Noted.
69.	Are there any guidelines on contractor's safety and training?	Yes.	Noted
70.	Whether contract document includes necessary safety and welfare clauses as per statutes?	Yes	Noted.
71.	Is there any programme to ensure use of PPE by contractors personnel?	Yes, Safety inspection. PPE's are made available by the contractor.	Noted.
72.	Do the contractors have their own safety?	Yes	Noted.
73.	Are the contractors reporting all accidents and injuries?	Yes	Meets the requirement.
74.	Are contractor workers trained to observe safety at work place?	Yes	Appreciable, records to be maintained.
75.	Whether contractor workers are engaged in process / operations? If yes, are they aware of safe operating procedures?	No. they are involved only in maintenance and project work.	Noted.
C-8 PLANT DESIGN AND LAYOUT			
76.	Whether hazardous operations in the plant are segregated?	Yes	Appreciable

77.	Whether occupational health & safety aspects are considered during the design?	Yes	Appreciable
78.	Are all the equipment provided with adequate space for working, maintenance etc.?	Yes	Appreciable
79.	Are the storage tanks provided with enough space/ clearance between them?	Yes.	Noted.
80.	Whether the plant layout has taken care of the movement of fire fighting equipment and emergency exits?	Yes	Complies
C-9 MEDICAL MANAGEMENT OF ACCIDENTS			
81.	Are medical facilities available with trained first aid staff and equipment in round the clock shift for all including contractors?	Yes. OHC centre of Main unit is utilized. Trained first aiders are available.	Separate OHC centre to be made available. Certified first aiders to be made available in each shift & list to be displayed in plant area.
82.	Is the ambulance van available for round the clock basis with the dedicated driver?	Yes, the same is available at Unit 1. (Central vehicle for Anupam Rasayan India ltd. – Main Unit)	Provision for a dedicated ambulance to be made for this unit.
83.	Is there any mutual aid scheme available with the nearest hospitals to manage and treat injuries during emergency?	Yes. Abhishek hospital, Jyoti hospital, INS hospital.	Appreciable.
84.	Are the workers / contractor workers aware	Yes. Training is given	Appreciable

	of emergency medical facilities?		
C-10 MANAGEMENT OF EMERGENCIES (NATURAL / MAN-MADE)			
85.	Does the system exist to detect and control these Emergencies?	Yes	Appreciable
86.	Are the employees aware of the measures to be taken during emergencies?	Yes	Appreciable
C-11 EMPLOYEES SELECTION AND PLACEMENT			
87.	Whether norms are available for selection of different category of employees?	Yes	Appreciable
88.	Whether pre-employment medical examination is being conducted for employees?	Yes, form no. 33 is being maintained.	Complies
89.	Is there any procedure to evaluate safety awareness and record of the employees during their promotion?	Yes	Appreciable
C-12 SAFETY CULTURE			
C-12.1 Attitudes of Managers			
90.	Do the managers follow the plant safety rules at all times?	Yes	Same to be ensured strictly, as the down line will follow what they see.
91.	What are their attitudes towards safety reviews and audits?	All the managers have a positive attitude.	Appreciable

92.	What is the response of management to safety violation?	Management has proposed strict actions for violation safety aspects.	Much appreciable
93.	Whether safety related decisions are taken in consultation with the workers?	Yes	Appreciable
94.	What is the attitude of the managers towards non-use of personal protective equipment?	Managers immediately stop the work and comply the use of PPE's.	Appreciable.
C-12.2 Attitudes of Workers			
95.	Whether workers are aware of the consequences of their wrong actions?	Yes	Same is noted
96.	Are laid down safe working procedures followed strictly?	Yes	Appreciable
97.	What is the attitude of the workers towards their own mistake, which can prejudice safety?	Workers have a positive attitude, are well aware of safety measures and repetition of mistakes is avoided.	Appreciable
98.	Do the workers report near miss incidents and suggest safety improvements?	Yes	Appreciable
99.	Are the workers aware of the system of rewards and sanctions relating to safety matters?	Yes	Appreciable
100.	What is the attitude of workers towards use of	Usage of PPE's is considered of utmost	Much appreciable

	personal protective equipment?	importance.	
C-13 STATUTORY LICENSES, APPROVALS AND RECORDS			
101.	Whether all the safety related Acts / Rules (with latest amendments) applicable to your organization identified, informed to all employees and complied?	Yes, the same has been identified and informed to relevant employees.	Noted.
102.	Whether the licences have been validated?	Yes. All the licenses have been validated.	Complies
C-14 MOTIVATIONAL AND PROMOTIONAL MEASURES FOR OH&S			
103.	Does the factory have occupational health and safety suggestion scheme?	Yes.	Appreciable.
104.	Are occupational health and safety contests organized in the factory?	Yes.	Appreciable.
105.	Does the factory participate in National Awards?	No	No comments.
106.	Has the factory been awarded during last five years?	No	No comments.
107.	Does the organization publish safety bulletin / newsletters?	No	No comments.
108.	Whether the safety bulletins are widely distributed?	No	No comments.
109.	How is the occupational health and safety information including	Statistics are shared through mail.	Appreciable.

	accident statistics disseminated in the factory? (Bulletin boards, Newsletter etc.)		
110.	What are the activities conducted during National Safety day / week?	Quiz competition, safety poster & Slogan competition, SCBA competition, training of different topics, etc..	Appreciable.
111.	What is the percentage of Workers participating in the various safety promotional activities?	100%	Much Appreciable. Best practice
C-15 HAZARD IDENTIFICATION AND JOB SAFETY ANALYSIS			
112.	Was an initial process hazard analysis (PHA) completed?	Internal HIRA completed.	Need for PHA to be assessed and same to be carried out.
113.	What are the stages of PHA? Whether a dedicated group is identified for PHA?	A dedicated team is identified for HIRA and PSSR.	No Comments
114.	Was the PHA appropriate for the complexity of the process and identify, evaluate, and control the hazards involved in the process?	No PHA study carried out.	Need for PHA to be assessed and same to be carried out.
115.	Does the hazard evaluation use one or more of the following PHA methodologies: What-If Analysis, Process Checklist, Hazard and Operability Study (HAZOP), Failure Mode and Effects Criticality Analysis	PSSR and HIRA is conducted internally.	Need for HAZOP study to be assessed and same to be conducted.

	(FMECA), Fault Tree Analysis (FTA) or any other appropriate equivalent methodology?		
116.	Does PHA assures addressing issues of inherent safety features with respect to material and their properties?	No PHA study carried out.	Need for PHA studies to be assessed and the same to be carried out.
117.	Does the PHA address the hazard identification, incidents history, consequences of failures (engineering and administrative controls), human factors, consequent analysis with respect to possible safety and health effects of failure of controls?	No PHA study carried out.	Need for PHA studies to be assessed and the same to be carried out.
118.	What are the stages of PHA? Whether a dedicated group is identified for PHA?	No PHA study carried out.	Need for PHA studies to be assessed and the same to be carried out.
119.	Does the system exists to promptly address findings and recommendations of PHA?	No PHA study carried out.	PHA studies to be carried out and system to be developed to address the findings and recommendations
120.	Are the PHA's updated and revalidated at least every five years by a qualified team to assure that the PHA is consistent with the current process?	No PHA study carried out.	PHA studies to be carried out and updated accordingly.

121.	Whether the activities requiring Job Safety Analysis have been identified?	Yes.	Appreciable.
122.	Whether the identified jobs for Hazard Identification have been carried out by trained and experienced persons?	Yes.	Appreciable.
123.	Whether the checklists have been prepared on each Job Safety Analysis and are being used while carrying out the job?	Yes.	Appreciable.
C-16 PRODUCT SAFETY			
124.	Whether hazards arising from use of the products are identified?	Yes.	Appreciable.
125.	Whether material safety data sheet prepared for the products?	Yes.	Noted. However, MSDS to be displayed at strategic locations.
126.	Are all the products labelled and packed appropriately?	Yes.	Appreciable.
127.	Whether safety instructions are given along with products?	Yes.	Appreciable.
128.	Whether policy exists for recall of products?	No.	No Comments
C-17 SAFETY TRAINING			
129.	Whether training needs have been identified?	Yes.	Noted.
130.	Is there any programme of induction training, its	Yes. 2 hours of induction training is imparted to	Coverage of relevant topics to be ensured.

	duration and topics covered?	new employees.	
131.	Whether the assessment of the trainees has been carried out?	Yes.	Appreciable.
132.	What are the infra-structural facilities available for training?	Training is done in Conference room.	Appreciable.
133.	Whether training is conducted by qualified person?	Yes, by Safety Officer	Appreciable.
134.	Whether trainers are being re-trained from time to time?	Yes. Trainers are retrained on a yearly basis.	Appreciable.
135.	Whether proper records of training program conducted are maintained?	Yes.	Noted.
136.	How training programs are evaluated?	Training programs are evaluated by top management.	Appreciable.
137.	Whether schedule for training on occupational health and safety is available and maintained?	No.	Same to be made available and maintained.
138.	Whether the training programmes are reviewed?	No	Training programs to be reviewed periodically.
139.	Are all the employees periodically trained / retrained and what is the frequency of such training?	Yes. The employees will be trained on a yearly basis.	Appreciable. Records of training should be maintained.
140.	Are the retraining needs identified whenever a new process / products and	Yes	Noted.

	change in existing process introduced?		
141.	Whether training covers top management?	Yes	Appreciable.
142.	How many hours of safety training is given to different employees?	2 hours of safety training is given to concerned employees	Appreciable.
C-18 CHANGE MANAGEMENT			
C-18.1 Management of Change			
143.	Are there written procedures for managing change to process chemicals, technology, equipment and procedures and changes to facilities that affect the plant process / system operation?	Yes. MOC is followed.	Appreciable.
144.	Do the procedures assure that the technical basis for the proposed change addressed prior to any change?	Yes	Appreciable.
145.	Do the procedures assure that the impact of the change on safety and health addressed prior to any change?	Yes	Appreciable.
146.	Do the procedures assure that modifications to operating procedures are addressed prior to any change?	Yes	Appreciable.
147.	Do the procedures assure that the necessary time period for the change is	Yes	Appreciable.

	addressed prior to any change?		
148.	Do the procedures assure that the authorization requirements for the proposed change are addressed priorto any change?	Yes	Appreciable.
149.	Are employees involved in operating a process, and maintenance and contract employees whose job tasks will be affected by change informed of, and trained in, the change prior to the start-up of process or affected part of process / operations?	Yes	Appreciable.
150.	Is the safety information is reviewed and updated on changes?	Yes.	Appreciable.
151.	Are the operating procedures or practices updated?	Yes.	Appreciable.
C-18.2 Mechanical Integrity			
152.	Does the mechanical integrity program include for all mechanical equipment including pressure vessels and storage tanks, piping and components, relief devices and vent systems, emergency shutdown systems, pumps, control systems?	Not available.	Procedure for Mechanical Integrity to be prepared and followed strictly.

153.	Are there written procedures to maintain the on- going integrity of process equipment?	Yes. PM schedule and PM procedure prepared.	Same to be covered in MOC procedure also.
154.	Whether training been provided to each employee involved in maintaining the on-going integrity of process equipment?	No.	Trainings to be provided to concerned employees after preparation of MI Procedure.
155.	Are inspections and tests performed on each item of process equipment included in the program?	No.	Mechanical Integrity procedure to be developed and complied.
156.	Do the inspection and test frequencies meet the manufacturer's recommendation and good engineering practice?	No.	The same to be complied after implementing the mechanical integrity program.
157.	Are inspections and tests performed more frequently if determined necessary by operating experience?	No.	The same to be complied after implementing the mechanical integrity program.
158.	Are deficiencies in equipment that are outside limits corrected before further use so as to assure safe operation?	No.	The same to be complied after implementing the mechanical integrity program.
159.	In the construction of new plants and equipment, whether quality assurance programme is implemented to ensure that equipment fabricated is suitable for the process?	Yes.	Noted.

160.	Are appropriate checks and inspections made during equipment installation stage?	Yes.	Noted.
161.	Are the suitability of maintenance materials, spare parts and equipment ensured during maintenance?	Yes.	Appreciable.
C-19 PHYSICAL HAZARD			
C-19.1 Housekeeping			
162.	Are all the passages, floors and the stairways in good condition?	Yes	Noted.
163.	Is glass door taped or otherwise marked to make it visible to workers?	Yes	Best practice.
164.	Do you have the system to deal with the spillage?	Yes. Emergency Spill control Team is employed.	Appreciable.
165.	Do you have sufficient disposable bins clearly marked and whether these are suitably located? Are containers of refuse (waste) and trash emptied at the end of every day or soon after they are full? Are the containers or bins regularly cleaned?	Yes.	They should be cleaned on regular basis.
166.	Are drip trays positioned wherever necessary?	Yes	Complies

167.	Do you have adequate localized extraction and scrubbing facilities for dust, fumes and gases? Please specify.	Yes. Scrubber system is used.	Noted.
168.	Whether walkways are clearly marked and free from obstruction?	Yes	Appreciable, however walkways to be clearly marked.
169.	Do you have any inter-departmental competition for good housekeeping?	No	Noted. However employees to be made aware of benefits of good housekeeping practices
170.	Has your organization elaborated good housekeeping practices and standards and made them known to the employees?	Yes	Complies.
171.	Are there any working conditions, which make the floors slippery? If so, what measures are taken to make them safe?	No	Good.
172.	Does the company have adequate measures to suppress polluting dust arising out of materials stored on the roadside?	No instances of polluting dust exist at site.	No comments.
C-19.2 Machine and General Area Guarding			
173.	Whether machinery and equipment which can cause physical injuries to operator have been identified?	Yes	Appreciable

174.	Are all moving parts and point of operation of machinery adequately guarded?	Yes	Appreciable
175.	Are all fixed guards securely bolted in position and in good condition?	Yes	Appreciable
176.	Are all interlock guards for prevention of physical injury in good condition?	Yes	Noted
177.	Are all emergency stop buttons effective and clearly labelled?	Yes	Marked & identified.
178.	Are the operators for machines having moving parts aware of the danger of working with loose clothing?	Yes.	Appreciable.
179.	Are the openings where there is free fall hazard covered or fenced securely?	Yes, All openings where there is free fall hazard are covered or fenced securely.	Appreciable..
C-19.3 Material Handling			
180.	Are adequate equipment available for handling materials?	Yes	Meets the requirement.
181.	Are the workers aware of the hazards associated with material being handled?	Yes	Complies.
182.	Where manual handling is necessary, are the workers been trained? Do they practice this? Are workers warned for lifting of	Yes. Practice is followed. Workers do not lift excess weights.	Appreciable.

	excessive weight? (Maximum weight of material for adult male and female are 55 Kg and 30 Kg respectively)		
183.	Do workers follow safe procedures for storage of materials?	Yes	Appreciable.
184.	Is the register maintained to record particulars of examination of all lifting machines, tools and tackles?	No	Records to be maintained regularly for the same.
185.	Are all the statutory examinations and tests carried out and certified by competent person(s)?	Yes	Complies. Records to be maintained for same
186.	Are the operators of crane, lifts, hoists and other mechanized operations adequately qualified?	Yes	Appreciable
187.	Is the safe working load clearly marked?	Yes	Complies
188.	Has the person employed to operate crane, forklift, or to give signals to crane been medically examined for eyesight and colour vision?	Yes	Complies
189.	Is the frequency of eyesight and colour vision examination as per the latest rules?	Yes	complies

C-19.4 Electrical Safeguarding			
190.	Are licensed electricians available for electrical work?	Yes	Appreciable
191.	Whether area classification for electrical equipment has been carried out?	Yes	Appreciable
192.	Do the electrical fittings conform to area classification for electrical equipment?	Yes	Appreciable
193.	Is a ground fault current interrupter system (ELCB) in use?	Yes.	Noted.
194.	Are all connections made by using appropriate plugs, receptacles or enclosures? Are fuses provided?	Yes. Fuses are provided.	Appreciable
195.	Are there any make shift connection bare wires or damaged cables?	No	Appreciable
196.	Is there a system of ensuring periodical inspection of hand tools, extension boards used for electrical work?	Yes. Periodic inspections for the same are carried out.	Appreciable
197.	Do the workers use proper types of PPE during the working on live line?	Yes.	Appreciable
198.	Is the separate work permit issued for working on high voltage line?	No. LOTO system is followed.	Noted.

199.	Whether the process(s) and equipment that generate and accumulate static charge have been identified?	Yes.	Noted.
200.	Whether all such equipment including pipelines for flammable materials are properly bonded and earthed?	Yes.	Bonding jumpers found missing in some areas. Same to be ensured at conspicuous locations.
201.	Whether earth pit resistance is measured and the record maintained?	Yes	Records verified during Audit.
202.	Whether lightning arrestor has been installed and is adequate?	Yes. 4 Nos. of Lightning arrestors are installed.	Complies.
C-19.5 Safety in Storage and Warehousing			
203.	Whether the Material Safety Data Sheet for all chemicals is available?	Yes	MSDS to be prepared for all the chemicals.
204.	Are the chemicals stored as per their hazardous properties including the incompatibility?	Yes	Appreciable. However, Chemical compatibility chart & safe handling chart to be displayed.
205.	Are all containers clearly, indelibly labelled? Are all chemicals stored as per safety regulations?	Yes	Appreciable.
206.	Whether all racks and steel cages have sufficient load bearing capacity?	Yes	Appreciable.
207.	Is adequate natural ventilation provided to store room? Is there any emergency exit?	Yes. There is no emergency exit.	An emergency exit to be provided.

208.	Whether adequate fire fighting arrangement existing in flammable chemical storage?	Yes. Hydrant system, Extinguishers are made available.	Noted.
209.	Whether methodology for handling spillages of hazardous chemical available along with the equipment required handling the spillage?	Yes	Noted.
210.	Whether aisles are marked and emergency exits displayed?	Yes	Serves the purpose.
C-19.6 Hazard Assessment for New Equipment			
211.	What is the system for effecting any change in the existing plant, equipment?	MOC	Appreciable.
212.	Is there system for evaluating hazards from new equipment?	Hazard Analysis is carried out.	Noted.
213.	Whether the P and I diagrams and other related documents are updated accordingly?	Yes	Appreciable.
214.	Is any Job Hazard Analysis (JHA) carried out after installation of new equipment?	No	JHA to be implemented and carried out for new equipments.
C-19.7 Hazards from Radiation Sources: Not Applicable as no such hazards available			
215.	Whether licences have been obtained for storage / handling of radioactive material?	No storage of radioactive material done	

216.	Whether approved Radiological Safety Officer appointed?	Not Applicable	No Comments.
217.	Whether appropriate PPEs are used against radiation hazards?		
218.	Is the flooring of the radioactive material handling area amenable for proper decontamination?		
219.	Is the storage room of radiation source as per the licence condition?		
220.	Are all persons working in the facility have radiation safety training?		
221.	Is the operators handling devices using radioactive materials qualified and possess the necessary certificate?		
222.	Is the periodical radiation monitoring carried out?		
223.	Are the records of inventory of radioactive material maintained in the standard format and submitted to the competent authority as per the period specified?		
224.	Are emergency handling tools available?		

225.	Are the personnel monitoring badges (TLD, Pocket dosimeter etc.) assigned and worn by each radiation worker?		
226.	Are the radiation symbol and red light displayed as required?		
C-20 CHEMICAL HAZARD			
C-20.1 Transportation of Hazardous Substances			
227.	What potentially hazardous materials are transported to or from the site (including wastes)	Final product, Hazardous waste, Hazardous salt, Residue etc. are transported.	Noted.
228.	What mode of transport is used? 1) Road, 2) Rail, and 3) Pipelines	Road	Noted.
1) ROAD			
229.	Does the company employ licensed vehicle of its own / outside sources?	Yes, the company employ licensed vehicle of its own as well as outside sources are also employed.	Noted.
230.	Are the loading / unloading procedures in place and safety precautions displayed?	Yes.	Noted.
231.	Is there a provision to check the healthiness of road tanker with respect to explosives rules?	Yes.	Noted.

232.	Are loaded tankers or trucks parked in a specific area on-site?	Yes.	Noted.
233.	Do all truck and tanker drivers carry transport emergency (TREM) card or instruction booklet?	Yes.	Noted.
234.	Do all truck and tanker drivers get training in handling emergencies during transport?	Yes.	Noted.
235.	Are all the tankers marked for proper Hazchem code?	Yes.	
2) RAIL: Not Applicable			
236.	What hazardous materials are transported by rail?	Not Applicable	No Comments.
237.	Does the company have a direct siding on site?		
238.	Are tankers or other wagons used in transportation?		
3) PIPELINES Not Applicable			
239.	What materials are transported to and from the site by pipelines?	Not Applicable	No Comments.
240.	Are the pipelines underground or over ground?		
241.	Are corrosion protection measures employed in pipelines?		
242.	Whether intermediate booster pumps are used?		

243.	What are the maximum, minimum and average transfer rates?		
244.	Are the pipelines extended in the public domain?		
245.	Are the pipelines dedicated for each type of chemicals?		
246.	Are the pipelines fitted with safety equipment such as leak detectors, automatic shut-off valves etc.?		
247.	What is the frequency and method of testing of the pipeline?		
248.	Is there written procedure for tackling leakages in pipeline?		
C-20.2 Handling of Hazardous Substances			
249.	What are the hazardous substances handled in the factory?	Hazardous Materials used are H2SO4, NSA, HNO3, EDC, Spent Acid.	Noted.
250.	Whether quantity of hazardous substances is above the threshold limit specified in the Manufacture, Storage and Handling of Hazardous Substances Rule, 1989? If yes, then required documentation is available as per the rule.	No.	Noted.

251.	Whether written procedure for handling the hazardous substance is available and operators are trained for handling such substances including actions required in case of leakages and spillages?	Yes. OCP's are displayed.	Appreciable.
252.	Are the employees aware of the hazards arising from hazardous substances and safety precautions to be taken during handling of these?	Yes.	Appreciable.
C-20.3 Material Safety Data Sheets (MSDS)			
253.	Are the material safety data sheets available for all the chemicals handled, used and manufactured in the factory?	Yes.	MSDS for some chemicals found missing. The same to be prepared and displayed at prominent locations.
254.	Whether the latest MSDS are displayed at strategic locations?	Yes.	MSDS to be made available plant –wise.
255.	Is it available in local language?	Yes	Appreciable.
C-20.4 Spill Control Measures			
256.	Whether spill control procedure is available?	Yes. An Emergency spill control team is employed.	Appreciable.
257.	Whether spill collection pit / sump is available at the workplace?	Yes	Appreciable.
258.	Whether methodology for recovery /disposal of collected material has been established?	Yes	Appreciable.

C-20.5 Storage of Hazardous Substances			
259.	Whether storage vessels are identified with the capacity as required under MSIHC, Rules 1989.	Yes	Noted.
260.	What are the storage pressure and temperature?	Atmospheric	No Comments.
261.	Whether vessels are above ground / underground?	Above ground	No Comments.
262.	If any of the tanks storing flammable material, whether electrical equipment and fittings are as per electrical area classification?	Yes	Noted. . For FLP fittings, gland packings should be checked periodically & attended if found loose.
263.	Is the bunded area takes into account the total quantity of the largest tank?	Yes	Noted.
264.	Whether the bund perimeter takes into consideration of trajectory of leak from tank?	Yes	Noted.
265.	Are the vessels properly bonded and earthed and whether periodically checked and record maintained?	Yes. Record is maintained for the same.	The same was verified during the visit.
266.	Are the vessels fitted with remotely controlled isolation valves?	PLC system is in place.	Noted.
267.	Are vessels provided with emergency vent, relief valve, bursting disc, level	Yes	Noted.

	indicator, pressure gauge, over flow line?		
268.	Where do such vents discharge?	At safe distances	Noted.
269.	Are the vessels provided with alarms for high level, high temperature and high pressure?	Yes.	Noted.
270.	Are standby empty tanks or any other alternate systems provided for emptying / transfer in case of emergencies?	Yes.	Noted.
271.	What are the provisions made for fire fighting / tackling emergency situations around the storage vessels?	Fire hydrant system, extinguishers, foam trolley and water cum foam monitor installed in surrounding area of tank farm	Appreciable.
272.	Has any consequence analysis for loss of containment been carried out?	No	Need for the same to be assessed and the same to be carried out.
273.	Whether the vessels are tested as per statute?	Yes.	Complies.
274.	Whether log sheets are filled up on daily basis for recording the parameters of these vessels?	Yes	Noted.
275.	Whether monitors for detection of leakage of flammable / toxic material installed?	Yes	Appreciable.
276.	Whether the chemicals stored are as per their compatibility?	Yes	Noted.

C-20.6 Gas Cylinders			
277.	What are the various gas cylinders used in the plant?	Oxygen, Acetylene.	Noted
278.	Are valid licenses available for storing all these cylinders?	License is not required and storage is within permissible limit.	Noted.
279.	Are the cylinders stored and segregated as per their compatibility?	Yes	Appreciable
280.	What are the measures taken for combating any emergency in the cylinders storage area?	Evacuation plan, leaks control kit, Firefighting systems are followed for combating the same.	Appreciable
281.	Whether integrity test certificates are obtained from the suppliers of the cylinders?	Yes.	Appreciable.
282.	Are the cylinders chained and secured properly along with the valve caps and proper identification colour code?	Yes	Noted. When cylinders are secured by a chain or strap, the preferable method is to secure them in two locations – one strap or chain 1/3 from the top of the shoulder of the cylinder and one strap or chain 1/3 up from the bottom of the cylinder.
283.	Are the cylinders protected from heat or sun and rain?	Yes	Meets the requirement.
284.	Whether monitors for detection of leakage of flammable / toxic gas installed?	Yes.	Noted.

C-20.7 Labelling and Colour Coding			
285.	Are all the containers, vessels and storage tanks labeled for its content and capacity?	Yes	Appreciable.
286.	Whether the pipelines are colour coded as per IS 2379?	Yes	Appreciable.
287.	Is any plant specific colour code followed?	Yes. Internal colour codes are developed and followed	Noted.
288.	Whether the colour codes are displayed conspicuously in the working areas?	Yes.	Appreciable.
C-20.8 Hazardous Waste Management			
289.	Is identification done for various types of hazardous wastes?	Yes	Appreciable.
290.	Are these quantities less than those specified by the Hazardous Wastes (Management & Handling) Rules, 1989?	Yes	Noted.
291.	What are their disposal modes?	Sent to the Hazardous waste handling parties	Noted.
292.	What are the systems / measures adopted for controlling air / water / land pollution?	Zero Discharge plan	Noted.
293.	Whether the solid waste like combustibles, plastic, metals etc. segregated?	Yes	Appreciable.

C-21 FIRE AND EXPLOSION HAZARD			
C-21.1 Organisational Set-up for Fire Fighting			
294.	What is the total strength of fire station and fire crew?	10 Nos. of fire personnel in fire crew.	Noted
295.	How many fire crews are available in each shift?	5 Fire fighters in each shift	Appreciable.
296.	Is there fire squad identified in each shift?	Yes	Appreciable.
297.	Standing fire order is available withlatest revision?	No.	Need for the same to be assessed and implied.
298.	How is the communication with fire station?	Through the mobile and intercom.	Noted.
299.	Does fire safety inspections carried out?	On routine basis	Complies.
300.	Does emergency procedure available for leakage or combustion of flammables?	Yes, ERP has been developed	Noted
301.	What measures are available to control the fire load in the plant area?	Minimise the storage of flammable materials.	Noted.
302.	Whether technical knowledge and skills of the manager and staff responsible for overall fire safety of the plant is adequate?	Yes	Complies
303.	How many major and minor incidents / fires were there in the factory during the last five years? Give department / plant wise.	The Factory was an upcoming unit, so no cases of Fires/ Incidents have been registered yet.	Noted

304.	Have all the fires / incidents been investigated and corrective actions taken? Give break-up.	No incidents have occurred yet.	Noted
305.	Resources: Adequacy of protective clothing (coat, trouser, gloves, boots and helmets); Availability of SCBA for fire fighting operations and spare cylinders (at least 2 for each SCBA); Adequacy of hose, nozzles, ladders, lighting equipment and pumps; and Communication facility at fire station, walkie talkie sets during fire fighting.	Available. 06 Nos. of BA sets available. Manual signalling is followed.	Noted. More Means of Communication during emergencies tobe Developed.
C-21.2 Built in Safety in Civil Design and Construction			
306.	Whether the two safe means of escape available? Are they in separate directions?	Yes	Complies
307.	Is emergency exits provided to the building handling flammables?	Yes. Every location has 2 exits.	Noted.
308.	Whether emergency lights are provided?	Yes.	Noted
309.	Whether fire / smoke detectors are installed in fire prone areas?	Available in ZLF, UST, & Lab area	Noted.

310.	Whether fire call points are provided in different areas?	Available in PTZ plant, & Plant-01 is pending	Same to be installed in plant-01
311.	Whether Fire hydrants are provided near the buildings?	Yes	Appreciable.
312.	Is ventilation system in plant handling flammables is adequate to prevent formation of flammable mixtures?	Natural Ventilation Available	Noted
313.	Is adequate separation is provided between combustible / flammable materials and other material to restrict the fire growth?	Fire retardant wall and partition used in lab area	Noted
314.	Access routes for fire fighting operations is available for areas having high fire load?	Yes	Noted
315.	Whether building changes interferes with fire detection and / or fire suppression systems?	No	Appreciable.
316.	Whether building changes cause unreasonable fire loading / openings in the fire rated walls?	No	No Comments
C-21.3 Built in Safety in Electric Circuits and Equipment			
317.	Are the electrical equipment in areas where flammables mixture is likely to be present of flame-proof type?	All the electrical fittings are FLP type	Appreciable.

318.	Are lightning arrestors are provided to the buildings / structures storing flammable materials?	4 No. of lightning arrestors are installed	Appreciable.
319.	Whether adequate bonding and grounding of electrical equipment / pipelines provided?	Yes	Noted
C-21.4 Explosive Substances			
320.	Whether necessary license / approval taken from concerned statutory bodies?	PESO not applicable as all the chemicals are well under threshold limit of storage.	Noted.
321.	Whether systems for explosion suppression, high speed fire detection with deluge, sprinklers, explosion venting etc. are provided?	FLP electrical fittings are installed. There is no need of explosion suppression systems as materials handled are Class B petroleum products.	Noted.
322.	Whether explosion resistant walls or barricades are provided around explosive storage?	Fire retardant wall, door windows are installed at required location	Noted.
323.	Whether explosive substance storage areas are restricted for entry?	Yes.	Noted.
324.	Whether only trained persons are handling explosive substances?	Yes.	Appreciable.
325.	Whether explosive substances are stored and transported in approved containers only?	Yes.	Appreciable.

326.	Whether electrical fixtures in areas handling explosives are explosion proof type?	Yes.	Appreciable.
327.	Whether adequate measures are taken to prevent any sources of ignition where explosive substances are handled?	Yes.	Noted.
C-21.5 Fire Safety in Handling Flammable and Explosive materials			
328.	Whether emergency procedure is available for control of leakage?	Training is provided as well as mock drills are conducted.	Noted.
329.	Whether emergency measures are displayed locally in case of accidental spillage / leakage?	No.	The same to be displayed in Local Languages.
330.	Whether facility is provided for safe drainage of combustible or flammable liquids in case of leakages?	Yes.	Appreciable.
331.	Whether highly flammable liquids are stored under inert atmosphere?	No	The same to be complied.
332.	Whether flammable storage tanks are provided with flame arrestors?	Yes, for EDC tank	Noted.
333.	Whether suitable PPEs are provided?	Yes	Appreciable.
C-21.6 Fire Detection and Alarm System			
334.	What type of fire detection and alarm system provided?	Smoke detectors, LEL sensors, and MCB installed at PTZ plant.	Noted. System for Plant-01 to be installed.

		System for Plant-01 is pending.	
335.	Whether all fire prone areas of the plant are covered with fire detection system?	Yes	Noted. Records to be maintained for the same.
336.	Whether fire detection equipment and smoke alarms in good operating condition?	Yes	Noted.
337.	Whether the number of fire call points are adequate and free from obstruction?	Yes	Complies
338.	Whether regular inspection / maintenance / testing of fire detection and alarm system carried out and records maintained	Yes. Records are maintained for the same.	Noted
339.	Whether any atmospheric monitoring is carried out for explosive mixture of gases or vapours?	Yes	Noted
340.	Whether emergency power supplies are provided to fire detection and fire alarm system?	UPS power supplied	Appreciable.
341.	Whether smoke detectors are located considering ventilation pattern?	Yes.	No smoke detector found in critical areas, MCC Room, Substation, HT room. Same to be installed.
342.	Whether annunciation of fire is local or in the	Yes.	Annunciation to be done in whole factory

	control room or in both places?		
343.	Whether fire panel is constantly attended?	Yes	Appreciable.
C-21.7 Passive and Active Fire Protection System			
344.	What are the passive fire protection measures available? (barriers, doors, dampers.)	Fire retardant wall, door windows installed at required location	Appreciable.
345.	Are the areas requiring fire barriers identified?	Yes	Noted.
346.	Whether the fire barrier provided is of adequate ratings?	4 Hours sustention rating	Appreciable.
347.	Whether ventilation ducts in flammable areas have been provided with isolation dampers of suitable fire rating?	NA	Need for the same to be assessed and installed.
348.	Whether sprinklers / deluge are installed wherever necessary?	No need of sprinklers/ Deluge as materials handled in factory Fall under Class B of petroleum products.	Noted. Serves the purpose.
349.	Whether regular inspection / maintenance / testing of fire protection system carried out and records maintained?	Yes	Appreciable.
C-21.8 Fixed Fire Extinguishing System			
350.	What are the sources of firewater and whether they are dedicated to the fire extinguishing system?	Underground Fire water tank (Capacity: 100KL)	Noted.

351.	Whether the capacity of dedicated water reservoir is adequate to supply to hydrants for minimum 2h?	Capacity to fight fire up to 4 hours	Noted.
352.	Whether un-interrupted power supply is provided to the firewater pumps?	No	Same to be provided.
353.	Whether the extinguishing medium selected is appropriate to the class of fire (water, gaseous, foam, dry powder)?	Yes. ABC, CO2 , Foam type, DCP extinguishers are available .	Complies
354.	Whether fire hydrants layout is available?	Yes	Complies.
355.	Whether additional (over minimum requirement) fire hoses, nozzles are available?	Yes	Noted.
356.	Whether the hydrants lines are kept pressurized?	Yes	Noted.
357.	Whether regular inspection / maintenance / testing of fixed fire extinguishing systems carried out and records maintained?	Yes. Records are maintained.	Appreciable.
C-21.9 Portable Fire Extinguishing System			
358.	Whether suitable type and numbers of fire extinguishers provided?	Yes	ABC , Co_2 ,foam type extinguishers available.
359.	Whether the fire extinguishers are located	Yes	Pathway to access the extinguishers to be kept

	at conspicuous position and easily accessible? Are they fully charged and tagged?		obstruction free for easy access at the time of emergency.
360.	Whether fire extinguishers periodically inspected, tested, refilled and records maintained?	Yes.	Appreciable.
361.	Whether defective / unchecked fire extinguishers present at site?	Yes	Some fire extinguishers' refill pending. Same to be carried out.
362.	Whether additional fire extinguishers are available?	Yes	Appreciable
C-21.10 Fire Fighting Equipment and Facilities			
363.	Whether fire tenders (water / foam) are available?	No	Looking to the hazards present in the company and available fire fighting facilities, need for Fire tender to be assessed.
364.	Whether the fire-fighting system and equipment approved, tested and maintained as per relevant standard?	Yes	Complies with applicable statutes
365.	Whether the SCBA / fire suit provided to fire fighting team for immediate action?	Yes	Appreciable.
366.	What is system for maintenance / recharge of SCBA?	Monthly checking and Refilling is done as per the requirement	Appreciable.
367.	Is proper access available for fire fighting equipment?	Yes	Appreciable.

368.	Whether fire hose cabinets are in good condition, easily visible, and accessible?	Yes	Appreciable.
369.	Whether drilltower is available? Are fire personnel carrying out regular fire drill?	Yes	Appreciable.
370.	What is the communication facility at fire station? Is it adequate?	Mobile and intercom.	Noted. Use of Wireless communication to be implemented. For Eg: FLP Walkie Talkie.
C-21.11 Fire Drill			
371.	Whether mock fire drills are conducted? What is the frequency of drills?	2 months	Appreciable.
372.	Whether fire drills are also performed in night shift?	Yes	Appreciable.
373.	Whether feedback of fire drill is documented?	Yes	Complies
374.	What is the system of mutual-aid scheme?	Mutual Aid available with nearby factories.	Complies.
C-21.12 Fire Fighting Training			
375.	Whether there is a system of providing fire- fighting training to plant personnel?	Yes.	Appreciable.
376.	What is the frequency and duration of such training? Whether training records are maintained?	As per the availability	Training records to be maintained.

377.	Whether fire squads are identified for different areas for first-aid fire fighting and rescue, and suitably trained?	Yes	Appreciable.
378.	Are all personnel conversant with the fire prevention and protection measures?	Yes	Appreciable
379.	Whether the fire staff are sent for refresher / advanced training courses?	Third party training is being arranged at company.	Noted.
C-21.13 Static Electricity and Lightning			
380.	Whether all vessels and pipes are provided with suitable bonding and grounding?	Yes.	Noted. Regular checking of the same to be done
381.	Whether arrangement has been made for grounding the tanker containing flammable liquid during loading / unloading?	Yes.	Noted.
382.	Whether spark resistant tools are provided?	No	The same to be provided.
383.	Whether lightning protection is provided and is adequate?	Yes	Appreciable.
384.	Whether antistatic clothing, hand gloves and footwear are provided?	Yes	Noted.
C-21.14 Pressure Relief System			
385.	Whether the listing of all 'pressure plants' *as	Yes.	Noted.

	defined under Factories Act] has been done?		
C-22 INDUSTRIAL HYGIENE / OCCUPATIONAL HEALTH			
C-22.1 Ventilation, Illumination, Noise, Vibration, Heat stress and Non-ionizing Radiations			
C-22.1.1 Ventilation			
386.	Whether any ventilation study has been carried out?	No	Need for the same to be assessed & same to be carried out.
387.	Whether natural ventilation is adequate or not?	Yes	Plant is well ventilated.
388.	Whether dust / fumes / hot air is generated in the process?	No	No Comments.
389.	Is there any exhaust ventilation system in any section of the plant?	At MCC, PCC area	Noted.
390.	Is periodic / preventive maintenance of ventilation system carried out and record is maintained?	No	The same to be carried out and records to be maintained.
391.	Does any ventilation system re-circulate the exhausted air in work areas?	Stacks provided for DG area Thermal pack area.	No Comments.
392.	Is the work environment assessed and monitored for chemical and physical hazards?	Yes	Appreciable.
393.	Whether PPE are provided to workers exposed to dust / fumes and gases?	No dust/ fumes are generated in any processes.	No Comments.

C-22.1.2 Illumination			
394.	Whether illumination study has been carried out for the assessment of illumination level?	Yes.	The records for the same were verified during the visit.
395.	Is there any system of periodical cleaning and replacing the light fittings / lamps in order to ensure that they give the intended illumination levels?	Yes	Appreciable.
396.	Are the workers subject to periodic optometry tests and records maintained?	Yes.	Workers to be diagnosed as per applicable statues.
397.	Are emergency lighting available at first aid center?	Yes.	The same is made available.
C-22.1.3 Noise			
398.	Whether any noise study conducted?	Yes.	The records for the same were verified during the visit.
399.	Are there any machines / processes generating high-noise?	Yes, Utility area, DG area, Fire pump house.	Noted
400.	Whether engineering and administrative controls been implemented to reduce noise exposure below the permissible limits?	Yes.	Appreciable.
401.	Is there a system of subjecting all those employees to periodic audiometric test who work in high- level noise areas?	Yes	Appreciable.

402.	Whether the workers are made aware of the ill effects of high noise?	Yes	Noted.
403.	Whether ear muffs / plugs are provided and used?	Yes	Ear plugs provided to all employees.
C-22.1.4 Vibration			
404.	Are there equipment which contributes excess level of vibrations and whether they are identified?	No	Noted.
405.	Whether any vibration study has been carried out?	No	Need for Vibration Study to be assessed and the same to be carried out
406.	Are the measures taken to combat vibration to acceptable levels?	No.	The same to be complied after Vibration study is completed.
407.	What is the frequency for measurements of vibration?	No.	The same to be assessed after Vibration study is completed.
408.	Are the records of measurements and maintenance of equipment / system maintained?	No.	The same to be complied after Vibration study is completed.
C-22.1.5 Heat Stress / Cold stress (Extremes of Temperature)			
409.	Are there sources from equipment increasing the heat load in work places?	Thermic fluid heater	Noted.
410.	Whether evaluation of heat stress is carried out?	No	The same to be carried out.
411.	Whether natural ventilation is adequate to minimize the heat stress in work environment?	Yes	Noted.

412.	Are resources available to deal with very hot or very cold conditions (drinking water, lined gloves, insulated boots)?	Yes	Appreciable.
413.	Do workers know the symptoms of heat cramps / heatstroke or frost bite / hypothermia?	Yes	Noted.
414.	Are the personal protective equipment suitable for reducing the effects of heat stress available?	Yes	Appreciable.
C-22.1.6 Non-ionising Radiations: Not Applicable as no such hazard available at site			
415.	Does the work involve likely exposure to non-ionising radiations (ultraviolet, infrared, radiofrequency, microwaves, lasers, etc.)	Not Applicable	No Comments.
416.	Whether risk assessment has been done for all work areas involving presence of non-ionising radiations?		
417.	Are the work areas displayed with relevant safety signs?		
418.	Are the employees aware about the hazards of non-ionising radiations?		
419.	Do written procedures exists for working in non-ionising radiations?		

420.	Is the work environment monitored periodically for physical hazards and control measures initiated whenever deviation from permissible values is observed?		
421.	Whether suitable personal protective equipment are provided to workers exposed to non-ionising radiations?		
C-22.2 Work Place Monitoring for Hazardous Chemicals			
422.	Whether the dust, fumes, smoke aerosols and mist are monitored as per statute and records maintained?	Yes. Form No. 37 is maintained.	The same was verified during the visit.
423.	What are the types of detectors used for monitoring concentration of hazardous chemicals?	VOC detectors are used.	Noted.
424.	Is any alarm system installed for any leakage of hazardous chemicals?	LEL detection system in PTZ	Noted.
425.	Are antidotes available for toxic chemicals?	Yes	Appreciable.
426.	Are control measures initiated whenever deviation from permissible values is observed?	No	The same to be initiated whenever deviations are observed.
C-22.3 First Aid Facilities and Occupational Health Centre (OHC)			
427.	Are adequate numbers of first aid boxes provided? Give location details?	Yes. First aid boxes available at one location in plant.	The same to be provided in all the plants.

428.	Are qualified / trained first aiders available in each shift?	Yes. Trained aiders are available.	Appreciable. However , certified trainers to be made available.
429.	How many qualified / trained first aiders are available at each plant / department?	1 trained First Aider is available in each plant.	Appreciable.
430.	How many persons are trained / given refreshers training in first aid in a year?	All of the concerned persons are trained.	Appreciable.
431.	Whether occupational health centre is provided?	Yes. There is a central OHC in Unit-1.	Plant specific OHC to be constructed.
432.	Does OHC conform to the provisions of the existing statutes?	Yes	Complies
433.	Are the Medical Attendants / Doctors available in each shift?	A visiting doctor is available for 2 hours per day and attendants are available in each shift	Appreciable.
434.	What facilities are available for transportation of the injured to hospital?	A central Ambulance is provided in unit -1.	Noted. However, plant specific emergency vehicle/ Ambulance to be provided.
435.	Are the names of the trained first aiders displayed?	No.	Same to be displayed at strategic locations.
436.	Are the name of nearest hospitals and its telephone number available in OHC?	Yes	Same should be made available with EHS dept. also.
437.	Does the plant have any special preventive medicine program?	No	No comments

438.	Is ambulance posted in proper place and is it available whenever required?	Yes	Available 24 hours. Best practice
439.	Are sufficient numbers of anti-dotes available in case of any emergency?	Yes. Anti-dotes are made available in Unit -1	Antidotes to be provided.
440.	Are fire safety measures provided in first aid centre?	Yes	Noted
441.	Are emergency lighting arrangements available at first aid centre?	Yes	Complies
C-22.4 Periodic Medical Examination			
442.	Whether the periodical medical examination of employees, required under relevant statute is carried out?	Yes	Complies
443.	Whether it is ensured that contractors employee are medically examined during pre-employment as well as during the course of employment?	Yes	Complies
444.	During the periodical medical examination of the workers, are they examined as per the hazardous process in which they work? (First schedule of The Factories Act, 1948)	Yes. Records are available with OHC of Unit-1.	Appreciable.
445.	Are the records of all such examination maintained?	Yes	Appreciable

C-22.5 Personal Protective Equipment and Emergency Equipment			
446.	Whether list of required PPE for each hazardous activity is available?	Yes	Serves the purpose.
447.	Whether feedback from workers obtained during selection of PPE?	Yes.	Appreciable.
448.	Have the workers been trained in proper use of PPE including BA sets?	Yes.	Appreciable.
449.	What is the system of procurement, inspection, issue, maintenance and replacement of PPE?	Replacement of PPE's is done as per requirement.	Records to be maintained for the same.
450.	Whether qualitative and quantitative fit-check for respirators is ensured prior to use?	Yes.	Appreciable.
451.	What are the arrangements for safe custody and storage of PPE?	Yes. Safety Boxes are available to store PPE's	Appreciable
452.	Are the contractor's workers provided with the required PPE?	Yes	Noted
453.	Do the PPE conform to any standard?	Yes, as per statute norms	Meets the requirement
454.	Are sufficient eye wash fountains and safety showers available?	Yes.	Appreciable.
455.	Whether appropriate respiratory protective devices are available in accordance to the hazard potential?	Yes, (SCBA, Cartridge mask).	Appreciable.

456.	Are the staff members trained in the right uses of respiratory protective devices?	Yes.	Appreciable.
C-22.6 Occupational Diseases			
457.	Whether pre-employment medical check-up data available?	Yes	Appreciable
458.	During the medical check-up, is any person found having occupational diseases mentioned in 3rd schedule of The Factories Act, 1948?	No	Noted
459.	Whether the medical practitioner informed the Chief Inspector of Factories aboutthe occurrence of the occupational disease?	Not applicable	No comments
C-23 ACCIDENT / INCIDENT REPORTING, INVESTIGATION AND ANALYSIS			
C-23.1 Accident Reporting and Database Management			
460.	What is the procedure for accident / incident / dangerous occurrence reporting?	Accident, near miss reporting system, and why-why analysis is performed.	Appreciable
461.	Whether the accident data for the last five years for reportable and non-reportable accidents are available?	Yes. Available for 1 year	Noted.
C-23.2 Accident Investigation			
462.	Are all the accidents investigated?	Yes	Appreciable. records to be maintained

463.	Whether accident investigation procedure is documented?	Yes	Noted
464.	Whether accident investigation reports are submitted to top management?	Yes	Appreciable
465.	How are the findings from accident investigation reports communicated to workers?	Through meetings and mail.	Appreciable.
C-23.3 Analysis of Accidents			
466.	Whether accident analysis is done as per IS 3786?	Yes	Noted
467.	Whether root causes of accidents are analysed?	No.	The same to be analysed.
468.	Is the accident statistics effectively utilized? If yes, how?	No accidents have occurred in recent year.	Noted.
469.	What nature of injuries occurred during the last five years?	First Aid Cases have been reported.	Noted.
C-23.4 Implementation of Recommendations			
470.	How does the management ensure implementation of the recommendations to avoid recurrence of accidents and incidents?	Site visit / Review of recommendations are being arranged by the senior management.	Arrange site visit by higher authority and review the recommendations, Also prepare one internal report for pending implementations
C-23.5 Reporting and Investigation of Near-miss Incidents			
471.	Are all near-miss incidents reported and investigated?	Yes	Appreciable

472.	Is there any system of classifying and analyzing the near-miss incidents?	Yes	Noted
C-24 EMERGENCY PREPAREDNESS			
C-24.1 Site Specific Details			
473.	Are the site area maps (including layout, access roads and assembly points) available in control room / emergency control centre?	Yes	Appreciable. The same to be displayed at conspicuous locations.
C-24.2 Duties and Responsibilities of Key Personnel			
474.	Is the hierarchy of emergency response personnel right from site emergency controller downward, and alternative officials identified?	Yes	Noted.
475.	Are the duties and responsibilities assigned to the designated officials during emergency, both during and outside normal working hours clearly identified and understood by them?	Yes	Same to be reviewed during Mock drill & updated accordingly in OSEP.
C-24.3 Identification of Emergencies and Accident Scenario			
476.	Are the possible accident scenarios leading to emergency identified and known to the operating personnel?	Yes	Same to be incorporated in OSEP.
477.	Are approved emergency preparedness plans (on-site and off-site) in place?	Yes.	Plant Specific OSEP to be prepared.

C-24.4 Declaration and Termination of Emergency			
478.	Is the list of designated officials who are to be communicated about declaration and termination of emergency available in the control room / emergency control centre?	Yes	Complies
479.	Are the methods of communication (siren, public address system etc.) for declaration and termination of an emergency known to all the workers?	Yes, they are trained at frequent interval.	Appreciable.
C-24.5 Resources-evacuation / Transport			
480.	Are the following resources (equipment, personnel and procedures) required to handle emergency available? 1. Communications,	Yes	Appreciable.
	2. Public announcement systems	Work is under progress.	Noted.
	3. Monitoring of hazardous releases into the environment,	Yes.	Appreciable.
	4. Emergency shelters at the facility,	No.	Same to be provided if needed.
	5. Emergency exits with proper illumination, with uninterrupted power supply,	Yes.	Appreciable.

	6. Direction for emergency exit / escape route marked in haulage / Alleyways,	Yes.	Appreciable.
	7. Transport for evacuation of plant personnel,	Yes.	Appreciable.
	8. Medical care including administration of Antidotes, and	Yes.	Appreciable.
	9. Security / maintenance of law and order.	Yes.	Appreciable.
C-24.6 Communication Facilities			
481.	Does the emergency control centre have direct communication links with the fire station and the plant control room?	Communication is only possible through Mobile Phones.	Need for other modes to be assessed and same to be implemented.
482.	Are there adequate alarm points from which an emergency alarm can be raised?	Yes. Emergency alarm can be raised from security gate.	Appreciable.
483.	Is there infrastructure available for ensuring backup electric power supply for communication links where required.	No	Same to be developed and implemented.
C-24.7 Medical Care			
484.	Is the procedure for emergency medical care available?	Yes	Appreciable
485.	Whether the system has been tested at regular frequency through mock drill / exercises for its adequacy?	Yes. Half yearly testing is done.	Noted.

486.	Does the system of periodic replacement of antidotes and medicines required in emergency exist?	Yes medicines are replaced periodically as per their expiry dates.	Appreciable
C-24.8 Updation of Emergency Plan			
487.	Is the emergency plan updated based on the feedback from the periodic drills / exercises?	No.	Same to be complied.
488.	Are the contact details of all concerned officials kept updated in the emergency plan?	Yes	Appreciable
C-24.9 Periodic Drills / Exercises			
489.	Are mock-exercises conducted at stipulated intervals?	Yes. Mock drills are conducted every month.	Noted.
490.	Are the scenarios varied in the mock-exercises to ensure that all possible factors including meteorological conditions, affected plant personnel covered?	Yes.	Complies
491.	Whether emergency preparedness Plans have been tested and reviewed at regular frequency through mock drill for its adequacy?	Yes. The plans are reviewed every 6 months.	Appreciable.

C-24.10 Training of Plant			
492.	Are the plant personnel trained in handling emergency equipment?	Yes	Appreciable
C-24.11 Public Awareness Programmes			
493.	Are public awareness programs conducted for the people around the site regarding the actions to be taken in case of off-site emergency?	Yes.	Noted.
C-24.12 Mutual-aid Programme			
494.	Are the types of accidents where external organizations would be involved in remedial actions identified? Are their responsibilities defined?	Yes. The same are defined in OSEP	Appreciable.
495.	Is the plant responsible for rendering mutual aid assistance to any other external organizations? Does this assistance effect the plant's emergency preparedness?	Yes. The same is mentioned in OSEP.	Appreciable.
496.	Whether the communication channels for mutual assistance identified and known with and between two organizations?	Yes. The same is mentioned in OSEP.	Appreciable.

C-24.13 Emergency Control Centre			
497.	Is the emergency control center located beyond the effective distances of identified emergency scenarios?	Emergency control center of main unit is used.	Plant specific ECC to be constructed & equipped with necessary items to be used at the time of emergency.
498.	If the emergency control center is located within the effect distance, is it suitably protected that it will be available in case of emergency?	Emergency control center of main unit is used.	Recommendation same as above.
C-25 SAFETY INSPECTION			
C-25.1 Inspection Programme			
499.	Are checklists available for inspections? For example availability of checklists like: Handling, Storage and Transportation of hazardous chemicals; Electrical hazards; Fire safety; Hand and portable power tools; Machine hazards; Lifting equipment; Ladders and scaffolding; Environmental Monitoring; Civil structure; House keeping; Emergency equipment; and Gas cylinder and other pressure vessels used / available in the organization.	Yes. Available for Fire safety, Hand and portable power tools, Environmental monitoring and Gas cylinder and other pressure vessels used / available in the organization.	Noted. Need of the same for other elements to be assessed and actions to be taken for the same.

C-25.2 Safety Related Deficiency (SRD) Report			
500.	Are SRDs generated based on the area wise checklists?	No	Same to be generated according to area wise checklists.
501.	What is the procedure for resolving the SRDs?	No procedure	Same to be developed and implemented.
502.	Whether the procedure exists for notification and root cause analysis of non-conformities and action taken on them?	No procedure	Same to be developed and implemented.
C-25.3 Safety Inspection Records			
503.	Are the safety inspection records maintained?	Yes	Noted
C-25.4 Methodology and Inspection Team			
504.	Is there written procedure for safety inspection?	Yes	Appreciable.
505.	Whether safety inspection is carried out by a designated team?	Yes	Appreciable.
506.	What is the frequency of safety inspections?	Monthly Internal Department safety audit by Safety officer	Appreciable. Tool Box Talk needs to be conducted in every shift.
507.	Whether an inspection report is generated?	Yes. It is submitted to safety officer.	Noted.
C-25.5 Compliance of Recommendations			
508.	To whom the recommendations are submitted?	Recommendations are submitted to respective in-charges as well as top management.	Complies with best practice.

509.	Are recommendations of safety inspections complied in time?	Yes	Noted
510.	Is compliance of recommendations sent to top management?	Yes	Appreciable
511.	Is compliance of recommendations reviewed by safety committee?	Yes	Appreciable
512.	Does top management follows-up the compliance?	Yes	Appreciable

ANNEXURE - I (ATTENDANCE SHEETS)

Opening and closing Meeting:

Doc Title	Attendance Sheet		
Subject	Meeting TPSA	Client	Anupam Rasayan India Ltd.
Date	20th November, 2020	Time	10: AM.

Sr.	Name	Designation	Dept.	Contact No.	Email-Id	Sign
1.	Pankaj Kantilal M.		Production	9825729694	Kantilal.patel@anupamrasayan.com	Pankaj
2.	Paresh kumar U Patel	Plant In-charge	Plant	9712619994	Paresh.Patel@anupamrasayan.com	Paresh
3.	Yogesh N. Rana	Officer	Safety	9909197163	Yogesh.rana@anupamrasayan.com	Yogesh
4.	Nirmesh A. Vanaliya	Elec. engg.	Electrical	7600925562	Nirmesh.vanaliya@anupamrasayan.com	Nirmesh
5.	Bhavin P. Meghpara	Mech. Engg.	Project Mech.	7698000980	bhavin.meghpara@anupamrasayan.com	Bhavin
6.	Rahul Patil	Safety officer	EHS	7045800917	rahul.patil@anupamrasayan.com	Rahul
7.	Vinay A. Patel	Safety officer	EHS	9601581043	vinay.patel@anupamrasayan.com	Vinay
8.	Ankur S. Patel		Production	8320092472	ankur.patel@anupamrasayan.com	Ankur
9.	Dayes Devang V		"	9428515852	devang.dayes@anupamrasayan.com	Devang
10.	Manojkumar Gupta	Security		9016256448	manojkumar.gupta@anupamrasayan.com	Manoj
11.	Alok Shah	Consultant				Alok
12.	Kaushal Bhavsar	Safety officer		7405487010	Projects.jogi@gmail.com	KB

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Moreover, the findings, conclusions, and the suggestions resulting from the consulting service are based upon certain assumptions, information, documents, and procedures provided by the Customer. As such, in no event and under no circumstance shall the company be liable for special, indirect, punitive or consequential damages of any nature whatsoever, including without limitation, any lost revenue or profits of the customer or its customers, agents and distributors, resulting from, arising out of or in connection with, the services provided by the company. The Customer agrees that the Company shall have no liability for damages, which may result from Client's use, interpretation or application of the consulting services provided by the Company.

END OF REPORT

Safety audit compliance report - Unit-06						
Sr. No	Observation	Recommendation	Area	Responsible person	Remark	Status
1	Trip-bypass register not found maintained	Proper records of bypass & taking in line to be maintained.	Plant-1	Mr. Gopal Chugh	Done	Closed
2	Some Fire extinguishers & Safety showers in plant area found without tag nos.	1. Proper identification to be done & records to be maintained. 2. Drain pit to be constructed for safety showers to prevent slippery floor in plant area.	Plant-1	Safety	Already tagging provided	Closed
3	PA system not found.	PA system to be installed.	Plant-1	Mr. Vinay Saraf	PA system installed	Closed
4	On- Site Emergency plans and records of mock drills.	Plant Specific OEP to be developed.	Legal	Legal	Unit OEP is available	Closed
5	Emergency lights found available in plant & UPS supply given.	Red markings to be done on emergency lights for identification.	Plant-1	Electrical	Done	Closed
6	Work at height permit found issued on 17/11/20 & further extended for installation of bracket & elbow for reactor R-120 column. Permit no. found not mentioned.	1. Permit no. to be mentioned. 2. Cold work permit should be issued along with Work at height permit. 3. SOP should be prepared for cold work permit system.	Plant-1	Mr. Vinay Saraf	Done	Closed
7	Emergency staircase steps found wider. Handrail provided on one side.	Handrails to be provided on both side of emergency staircase for safe escape in case of emergency.	Plant-1	Mr. Vinay Saraf	Work Done	Closed
8	Trip-bypass register not found maintained	Proper records of bypass & taking in line to be maintained.	PTZ-Plant	Electrical/Instrumentation	Done	Closed
9	Some Fire extinguishers & Safety showers in plant area found without tag nos.	1. Proper identification to be done & records to be maintained. 2. Drain pit to be constructed for safety showers to prevent slippery floor in plant area.	PTZ-Plant	Safety	Already tagging provided	Closed
10	PA system not found.	PA system to be installed.	Plant-1	Mr. Vinay Saraf	Installed the PA system	Closed

11	Master form in respect of the Factories Act, 1948, Payment of Wages Act, 1936, Maternity Benefit Act, 1961, Workman's Compensation Act, 1923 And As Applicable To Registered Factories Covered Under The Factories Act, 1948.	The same h[illegible]o be displayed at the main gate.	Legal	Lega[illegible]	Done	Closed
12	Goods lift cage door limit switch found not working.	The same to be attended and rectified.	PTZ-Plant	Electrical	Done	Closed
13	For Centrifuge bag lifting device, chain pulley block testing found not done.	Testing of chain pulley block to be done as per GFR.	PTZ-Plant	Safety	Done	Closed
14	Emergency lights found available in plant & UPS supply given.	Red markings to be done on emergency lights for identification.	PTZ-Plant	Electrical	Closed	Closed
15	A bonding jumper for Reactor RP1-104 inlet line sight glass flange found missing.	Jumper to be provided & periodic continuity test to be conducted.	PTZ-Plant	Maintenance	Closed	Closed
16	The screen guard of Reactor (RP1-101) agitator was not installed back after the completion of maintenance work.	The screen guard to be installed back & good practices to be followed strictly.	PTZ-Plant	Maintenance	Done	Closed
17	No Safety shower found installed at G.F area in plant.	Safety shower to be installed.	PTZ-Plant	Safety	Installed	Closed
18	Steam boiler water feed line found clamped on nearby CNG supply line for support. (Unsafe Act)	Water feed line should be installed by providing support on wall or installing stand on ground floor but not with CNG line.	Utilities Area	Maintenance	Closed	Closed
19	Two SV's found installed on steam boiler. Lever of one SV found wrongly fitted i.e. in upward direction.	Lever to be fitted in right direction.	Utilities Area	Maintenance	Closed	Closed
20	No electrical bonding arrangement found on CNG feed line to boiler.	Electrical bonding & grounding system to be implemented for CNG supply system.	Utilities Area	Maintenance	It should not require as per GSPC guideline	Not Applicable
21	Water leakage found leaking from inlet flange of one Mobrey level controller. (Unsafe Condition)	Leakage to be attended on urgent basis.	Utilities Area	Maintenance	Done	Closed
22	No concrete steps found to descend from boiler area flooring to road.	Concrete steps to be constructed.	Utilities Area	Maintenance	MS Step Provided	Closed

23	Thermo pack hot fluid circulation pump discharge line drain valve kept closed.	Dr valve to be blinded when not in use.	Utilities Area	Maintenance	Done	Closed
24	All chemicals MSDS found not available.	Same to be made available.	QC Lab & R&D Lab	R&D	Done	Closed
25	One hot air oven RTD calibration found not done	Calibration to be carried out & records to be maintained as per the schedule.	QC Lab & R&D Lab	Instrumentation	Done	Closed
26	Different solvents bottles found stored in cup board.	All flammable solvents to be stored in designated fireproof flammable chemicals storage cabinet.	QC Lab & R&D Lab	GC	Done	Closed
27	Gas detector found installed in the lab but not in Gas cylinder storage area. Full & empty cylinders found marked & segregated.	1. Gas detectors to be installed in cylinder storage area. 2. When cylinders are secured by a chain or strap, the preferable method is to secure them in two locations – one strap or chain 1/3 from the top of the shoulder of the cylinder and one strap or chain 1/3 up from the bottom of the cylinder.	QC Lab & R&D Lab	GC	Done	Closed
28	Chlorine cylinder having capacity 100 kg found kept in fume hood area for lab use.	No gas cylinder to be stored in lab room.	QC Lab & R&D Lab	R&D	Done	Closed
29	Chemical compatibility chart & safe handling chart found not displayed.	Chemical compatibility chart & safe handling chart to be displayed.	QC Lab & R&D Lab	R&D/Safety	Done	Closed
30	No Safety shower & eye washer found in lab.	The same to be provided at conspicuous locations.	QC Lab & R&D Lab	Safety	Already installed safety shower at lab, and eye washer bottle available	Closed
31	MSDS not found displayed.	Safety measures for the chemicals stored should be displayed.	Tank Farm Area	Production	Done	Closed
32	Earthing & bonding provided on unloading pumps for flammable chemicals.	The crocodile clamps with Earth Relay System to be provided in tanker unloading area.	Tank Farm Area	Electrical	System already available	Closed
33	Safety shower found installed & in proper working condition.	Proper identification to be done.	Tank Farm Area	Safety	Done	Closed

34	A ladder provided to enter/exit tank farm area, hand rail was missing.	Hand rails to be provided on ladder.	Tank Farm Area	Maintenance	WO realesed/WIP	Closed
35	PM schedule and checklists found prepared & followed strictly & records well maintained by Mech./Elect depts.	List of critical equipments to be prepared. History cards of all critical equipments to be maintained.	Engg department and Store	Elelctrical / Maintenance	List prepared & maintained already	Closed
36	In Engg. Store, some spare parts & materials found stored in haphazard style without marking & identification.	Materials identification & traceability system to be developed & implemented.	Engg department and Store	Store	Segregated/Done	Closed
37	Identification, Test due date and resistance value found displayed on nearby wall near all earth pits.	Display boards to be installed on the pit inspection cover. Earth pit should be lifted from ground for easy & secure access with proper lifting arrangement and protecting the termination of electrodes from the climatic damage, to prevent ingress of foreign materials. The same to be followed for all pits in whole factory area.	Electrical Installations	Electrical	Work was completed on date-03/12/2020	Closed
38	Switch yard gate found unlocked.	Switch yard gate to be kept locked and list of authorized persons should be displayed at gate.	Electrical Installations	Electrical	Done	Closed
39	Electric shock treatment chart found displayed in substation.	SLD to be displayed.	Electrical Installations	Electrical	Done	Closed
40	No smoke detector found in critical areas, MCC Room, Substation, HT room.	The same to be provided & connected with fire alarm panel.	Electrical Installations	Electrical/safety	Done	Closed
41	Two DG sets found installed & connected with common Stack/ chimney.	Earthing to be provided on Stack/chimney.	Electrical Installations	Electrical	Done	Closed
42	No LG provided on Fire water storage tank for makeup of water but Level marking is done inside the tank.	LG to be provided on Fire water storage tank for makeup of water & may be with auto system for makeup. Float type LG to be provided on Fire water storage tank.	Fire Pump House	Fire	Already available	Not Applicable
43	No Earthing provided on diesel storage tank.	Earthing to be provided on diesel storage tank.	Fire Pump House	Safety/Electrical	Done	Closed

44	No PG provided on farthest point in fire hydrant system.	A P[illegible]e provided on farthest point in fire hydrant system to check/ensure the pressure.	Fire Pump House	Safety	Already installed PG at all the header	Closed
45	No rubber mat & earthing found on fire pumps operating electrical panel.	Rubber mats & earthing to be provided.	Fire Pump House	Safety	Provided	Closed
46	First aiders are trained but not qualified and list for the same found displayed.	Certified first aiders to be made available in each shift & list to be displayed in plant area.	OHC	Safety	Done	Closed
47	Ambulance was not available.	1. Plant specific ambulance should be made available & well maintained. 2. Monthly checklist for ambulance & OHC to be prepared, filled and records to be maintained.	OHC	Safety	Done	Closed
48	A leakage found from treated effluent transfer pump discharge line flange. A flow meter was installed in line to measure quantity of treated effluent but found difficult to note reading as was installed at height.	1. Leakage to be attended. 2. A platform with ladder to be constructed to take reading of flow meter in safe manner.	ETP	ETP/Maintenance	Closed	Closed
49	Emergency contact Nos. found displayed on board on wall outside security office.	The same to be displayed inside office also.	Security Office	Safety	Displayed in security office also	Closed
50	Emergency siren system found available & testing done.	Emergency siren coding system to be decided & to be displayed in office.	Security Office	Safety	Displayed in security office also	Closed
51	Mobile phones found being allowed & used in plant area.	Mobile phones should not be allowed in factory area considering Hazardous processes & chemicals being handled.	Security Office	Production	Done	Closed
52	Emergency "Siren Code" defined in company.	Emergency siren code board to be displayed in English, Hindi and Gujarati at prominent locations in whole factory. Assembly point's details should also be mentioned on the board.	General	Safety	Done	Closed
53	Overall good housekeeping observed.	Appreciable. Inter-departmental competition for good housekeeping should be arranged	General	General	WIP	In the discussion

54	Company has prepared OSEP.	1. Educate t[illegible]l work force including contract wo[illegible]ers on OSEP. 2. OSEP to be prepared & updated as per schedule 8A and include information related to emergency & risk scenario regarding existing & new developments in plant area.	General	Safe[illegible]	Training conducted to all worker and staff	Closed
55	Color coding of pipelines found done in the plant area.	It should cover all the pipelines throughout the site.	General	Maintenance	Done	Closed
56	SOPs are well prepared & documented.	1. Safety measures required to be taken in case of leakages & other abnormalities to be incorporated. 2. SOPs to be prepared for new products & development in plant area. 3. Standard / safe operating procedures to be displayed or made available and to be explained in the local language to the workers.	General	General	Done	Closed
57	Visitor's entry done in register at security gate.	1. Gate pass system with photo Id to be implemented. 2. Video based Safety induction training to be provided to visitors.	General	General	Done	Closed
58	Safety signages & posters found displayed in plant area.	HAZCOM system should be improved.	General	Safety	Done	Closed
59	Manual call points found installed in the plant area.	MCPs should be made addressable.	General	Instrumentation/electrical	Addressable already	Closed
60	Emergency contact Nos. board found displayed.	Plot Plan & Fire hydrant system lay out to be displayed near main gate.	General	Safety	Done	Closed
61	Work permit system implemented & followed.	1. General/Cold work permit format to be prepared & implemented. 2. Work permit no. to be mentioned in work permit to maintain proper records. 3. Ensure that only a trained, certified & authorized person sign the Confined Space entry permit.	General	Safety	Done	Closed

62	Scrap materials found kept inside factory.	1. Scrap tracking & Management system to be developed.2. A list should be prepared for non-recyclable, non-movable & movable goods and proper disposal arrangements.	General	Store	Done	Closed
63	PHA study found not done.	1. HAZOP study to be carried out for new developments & product wise. 2. PSSR also to be carried out before starting of operation.	General	Safety	Done	Closed
64	In QA programme for equipments, Protocol for design qualification prepared & records are maintained.	1. Protocol for design qualifications to be prepared & records to be maintained separately individual equipment wise & vendor wise and all the QA points should be verified & recorded as per equipment data sheet. 2. The details of chemical/material which will be stored or processed in particular equipment to be added in design protocol format.	General	QA/QC	Complied	Closed
65	"Abstract of the Factories Act 1948 and The Gujarat factories Rules, 1963" (Generally displayed at the main entry of the company. i.e. at security gate)	The same has to be displayed at the main gate.	Legal	Legal	Done	Closed

ANNEXURE - R-7

ANUPAM RASAYAN INDIA LIMITED

PRELIMINARY INCIDENT INVESTIGATION

Unit	Unit-06	**Plant Name**	Plant-1
Date of Incident	10.09.2022	**Time of Incident**	Approx 22.05 hrs
Exact Location	Plant-1, Ground Floor	**Product line**	2,4-DFNB
System Involved	ATFE	**Equipment Involved**	Receiver no. ATFE RC106
Nos. of Fatalities	05 Nos.	**Nos. of IPs**	19 Nos.

Brief Description of Incident	During distillation, temperature of receiver started to increase while unloading the material. Same had been informed to plant incharge by plant chemist at around 21.40 hrs. Plant incharge was at home and he informed unit head of this condition at around 21.43 hrs. Further, plant incharge went to company from home to oversee the condition. During time, hot material of the receiver caught fire at around 22.05 hrs and further resulted info explosion. Whole plant-1 caught into fire and company's fire team tried to control the fire with the help of internal fire hydrant system and by using foam solution. Since, the situation was moving out of the control, help was taken from nearby fire brigade and informed to police station.
Witness and his statements	**Mr. Sunil :** ATFE process completed at around 16.00 hrs. Mr. Sunil came on duty @ 20.00 hrs and confirm that oil heating valve of receiver were closed. - Further he checked temperature @ 20.00 hrs which was around 145 deg C which was further increased around 147 deg C @ 21.00 hrs. - At around 21.15 hrs, he had observed some abnormal smell and by inspection it came to know that it was from vent of high boiler receiver vent. At that time, temperature was around 180 deg C which was abnormal according to his judgement. - He further observed that other employees started cooling activity and even coordinating plant incharge and resulted in fire and explosion. - He fell down towards new constructed plant and by crawling he reached to new construction area. - He hides himself behind one pillar/ column of new construction area and saved himself during the incident.
Objective evidences collected	Not collected as restriction from authorities and other agencies like insurance.
Brief process Description	Annexure-1 Process description.docx
P&ID of ATFE system	Annexure-2 ATFE-12102 P&ID-1.pdf

ATFE Data sheet	Annexure-3 DWG-290-2019(MDS).pdf
Eng. Drawing of receiver	Annexure-4 DWG-290-2KL RECIEVER WITH LIMI
Why-why Analysis	Attached

Identified Probable Causes	
1	Residue is having chocking nature by which other problem initiated.
2	Hot oil valves for receiver might have malfunction/ pass resulting prolonged heating of high boiler in receiver.
3	Hot oil might have leaked from jacket to insider receiver containing hot high boiler mass.
4	Organic carbon at high temperature ~ 185 deg C might have ignited in presence of air during unloading.

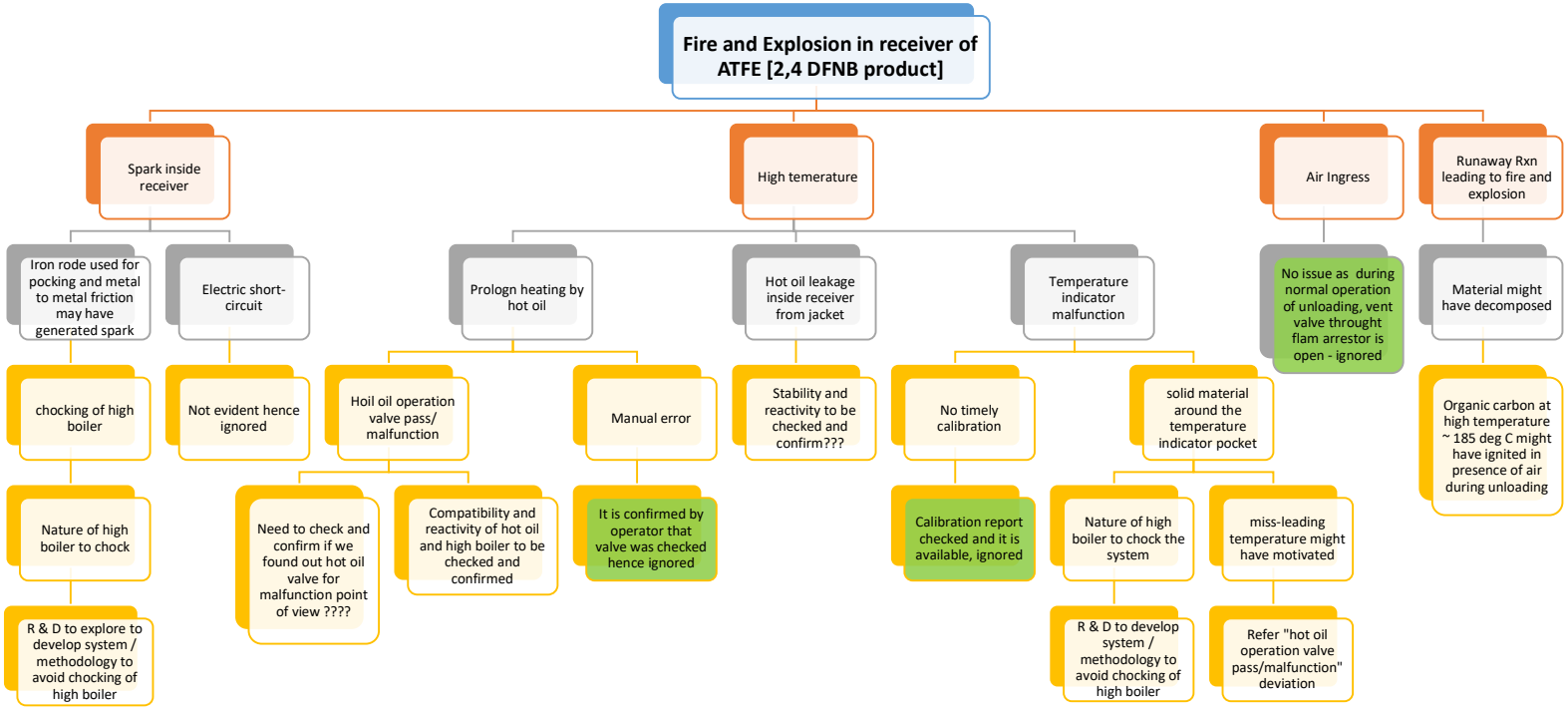
Sr. No.	**Recommendations**
1	Change the utility to be changed from hot oil to steam to avoid high temperature.
2	On/off valve to be provided in steam line and it is to be interlocked with TT of receiver.
3	To control high temperature in abnormal case, cooling facility to receiver shall be provided.
4	To reduce the risk level, receiver capacity shall be reduced from 2 KL to 1 KL.
5	Compatibility and reactivity of hot oil and high boiler to be checked and confirmed
6	High Boiler [residue] to be tested for free carbon and other parameters for further study and analysis.
7	Inspect hot oil valve [if find out] for its operation and integrity point of view.
8	R & D to explore to develop system / methodology to avoid chocking of high boiler.

Investigation Team;

Sr. No.	Name of the Team	Designation	Position
1	Dr. Nilesh Naik	Technical Director	Team Leader
2	Mr. Piyush Mistry	DGM-Health and Safety	Facilitator
3	Dr. Anuj Thakar	Unit Head [Unit-2]	Team member
4	Mr. Milan Naik	Unit Head [Unit-6]	Co-team leader / Process Owner
5	Mr. Satish Patel	Head – Environment	Team Member
6	Mr. Thomas Braganza	Head – Engineering dept	Team Member
7	Mr. Himanshu Bhatt	Head – Project and Purchase	Team Member
8	Mr. Sunil	Operator/ Helper	Team Member
9	Mr. Piyush Patel	Shift Chemist	Team Member

WHY - WHY ANALYSIS

Incident: Fire and Explosion in Plant-1 of Unit-6 resulted in multiple fatalities and injuries.



Note: Last point of each root indicates probable cause of incidents which are to be addressed to derive CAPA.

Annexure-1

Brief Process Description for 2,4 Difluoro Nitro Benzene

Stage 1

Charge 2500kg 2,4DCNB storage tank TF-108 to receiver RC-13104B / RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B by pump TFP-108BB.

Charge fresh/Recover 5200kg Solvent -S from storage tank TF-107 to receiver RC-13104A / RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A.

Start stirring in the reactors and transfer fresh Solvent -S from respective receivers to respective reactors reactor R-13104 / R-14105 / R -14106 / R - 14111 / R-13110 / R-13126.

Start charging of 1575kg KF manually from bags.

Charge 50kg of Catalyst No 37 in reactor. Set Temperature in HMI at 140^{O}C. Start addition of 2,4 DCNB (2500 kg) from respective receivers to respective reactors by maintaining temperature up to 100^{O}C.

Start heating in reactors. Once temperature 170^{O}C achieved, apply normal vacuum EDC-VP-15104 /EDC-VP-15105 / EDC-VP-15106 / EDC-VP-15111 / EDC-VP-15110 / EDC-VP-15126 for reflux for 36 hrs and maintain the temperature between 180^{O}C - 185^{O}C.

Take sample after maintaining 36 Hrs. for QC testing.

Stage 2

Received material in drowning reactors R-12107 / R-12112 / R-12118 ,

Apply vacuum in drowning reactors R-12107 / R-12112 / R-12118 and respective receivers by respective steam Ejector pump SE-15107/RC-15112/SE-15118. Collect the mix material of 2,4 DFNB in respective receivers. Take sample for QC testing.

Then cool down the reactor R-12107 / R-12112 / R-12118 by cooling water in jacket up to temperature 30 to 35^{0}C.

Start filtration through centrifuge.

Stage 3 (Final distillation)

DFNB crude material from storage tank ST-10101, ST-10113, ST-10111 & ST-10107 to reactor D-11102, D-11103 (10KL) by respective pump no.P-10111, P-10107 & P-10113.

Start stirring and charge K2CO3 for neutralize pH. Apply vacuum in respected reactor D-11102, D-11103 (10KL) by respective dry vacuum pump D-VP-12102, D-VP-11103.

When received vacuum up to 750 mmHg then start heating @110 - 120^{0}C in bottom. collect the mix-fraction in RC-12102C/RC-12103C. Give sample for QC analysis for running distillation, if the desired result is achieved then collect the pure material in RC-12102A/RC-12102B/RC-12103A/RC-12103B.

Check QC analysis of bottom remaining material in reactor D-11102 / D-11103 before transferring to storage tank ST-10112

Stage 4

Material of reactor R-14114 transfer to ATFE feed tank ATFE-FT-13102D by pump CP-13114

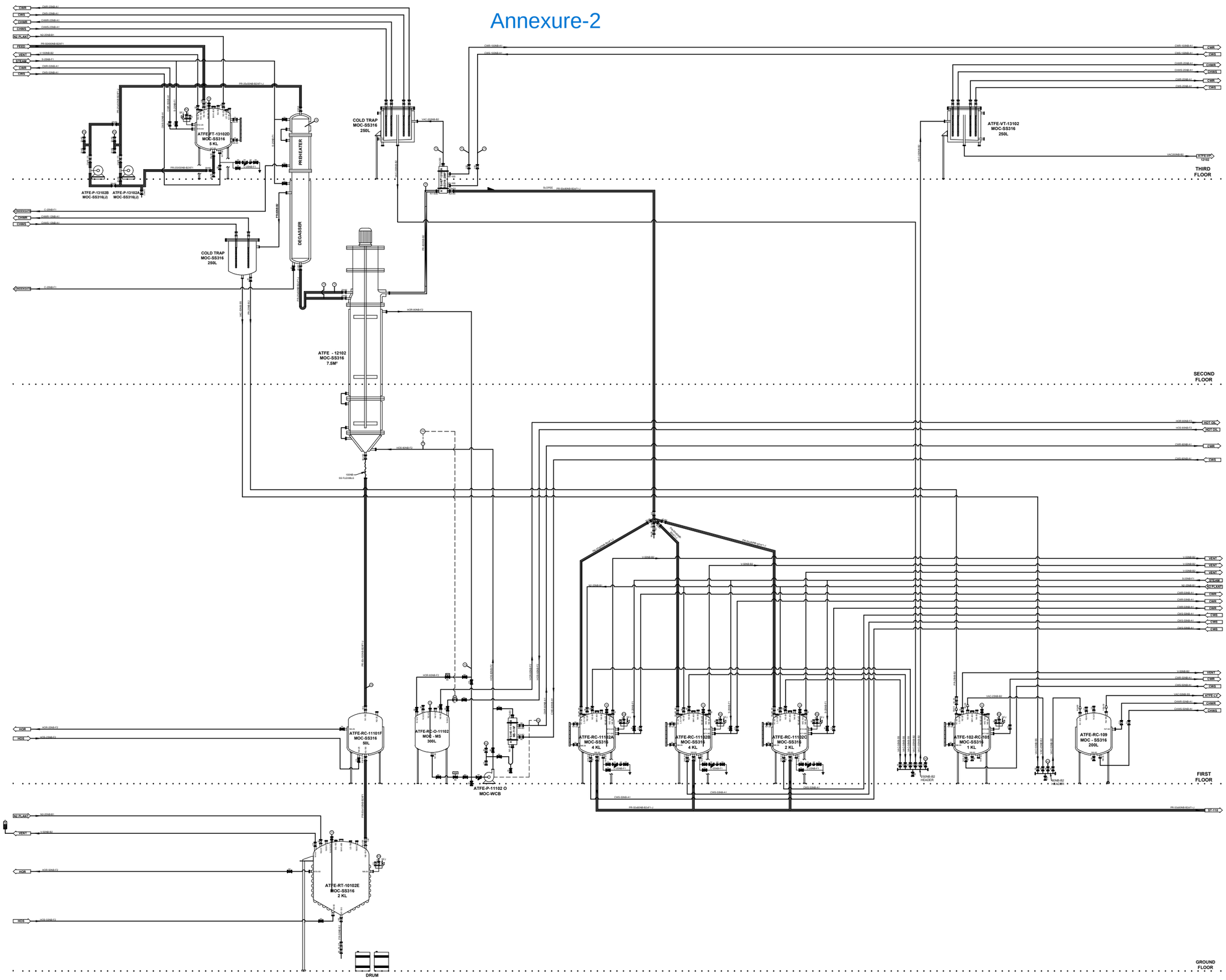
Then apply high vacuum by vacuum pump D-VP-ATFE-12102 and material feeding in ATFE-12102 by dosing pump P-13102A / P-13102B via pre-heater from feed tank ATFE-FT-13102D at temperature 110 ^{0}C- 120^{O}C and maintain bottom temperature of ATFE-12102 up to 180-185^{0}C.

Collect recovered solvent S in receiver ATFE- RC-11102A / ATFE- RC-11102B / ATFE- RC-11102C and transfer the solvent-S to ST-11118 by pump P-11118.

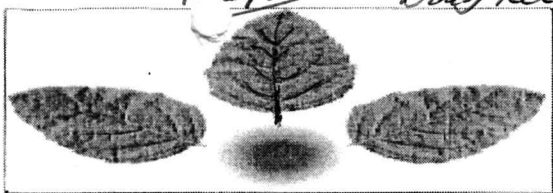
Collect residue in Bottom tank & unload in drum by gravity.

Send residue to hazardous area.

Annexure-2



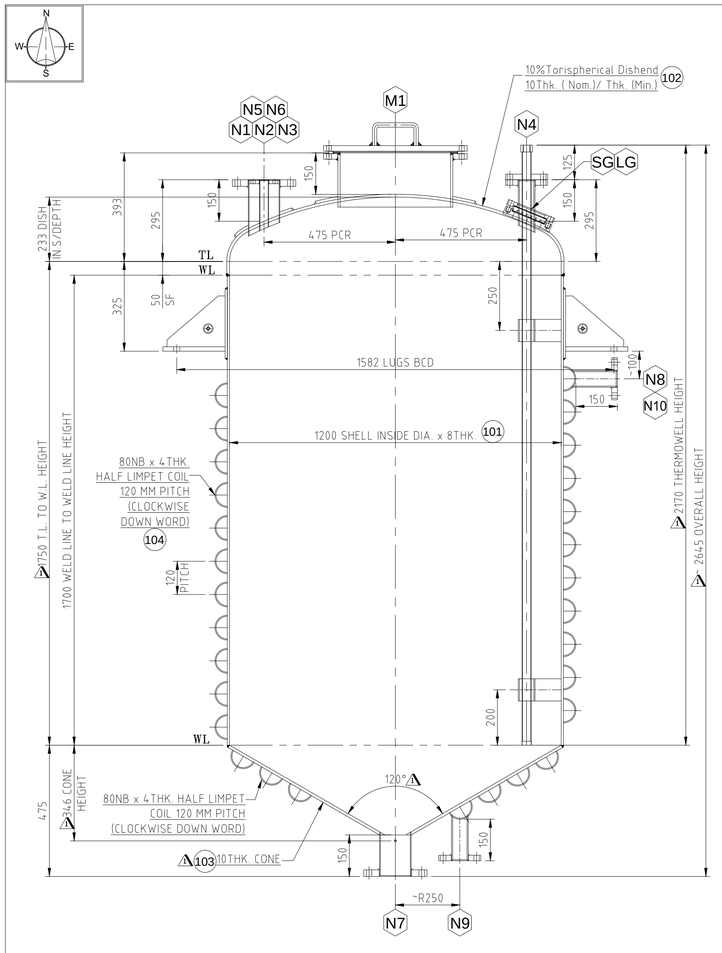
ANUPAM RASAYAN INDIA LTD.	DRN	T.C.PATEL	TITLE :-	(U-6)	DATE 5-12-2020
PLOTNO. 8110,G.I.D.C. INDUSTRIAL ESTATE	CHD		DFNB P & I D		SHT
SACHIN,SURAT-394230	APP	-			REMARK
	SCALE	N.T.S.	REV.NO. R0 R1 R2 R3 R4 R5		DRG.NO :-



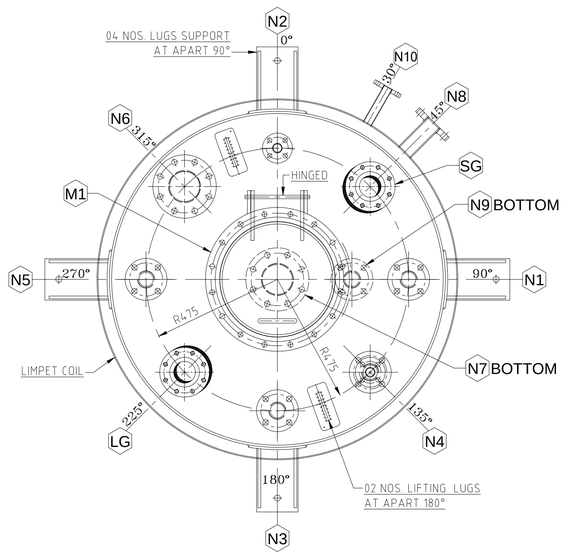
Anupam Rasayan
Plot No.2425 GIDC, Sachin,
Phone No : +91-126-239-899
Fax : +91-261-23

2KL SS 316 Receiver for ATFE Data Sheet

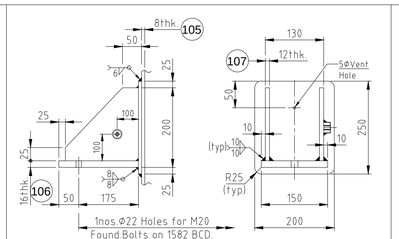
RECIEVER		
Design code	ASME SECTION-VIII,DIV.1 (LATEST)/ AND ALSO GOOD ENGINEERING PRACTICE TO FOLLOW	
Type	Cylindrical Vertical With TOP & BOTTOM Cone End	
	SHELL	LIMPET
SP. GRAVITY.	LIQUID/1.5	STEAM /WATER
FLUID MEDIA	LIQUID	
PH	NEUTRAL	
DESIGN PRESSURE (INT/EXT.) KG/CM2(g)	4.5/F.V.	4.5
DESIGN TEMP.('C)	250	250
WORKING PRESSURE (INT/EXT.) KG/CM2(g)	3/F.V	4
WORKING TEMP.('C)	150	150
TEST PRESSURE KG/CM2 (HYDROLLIC / PNUMETIC)	6	6
REDIOGRAPHY REQUIRED (SHELL/DISH)	SPOT+ALL T-JOINTS/FULL	SPOT+ALL T-JOINTS/FULL
WELD JOINT EFFICIENCY (SHELL/DISH)	0.7/1	0.7/1
CORROSION/ERROSION ALLOWNS (MM)	NIL	1 MM (FOR CS PART ONLY)
CAPACITY	2KL FULL VOLUMN	
QTY	1 no.	
Equip.Tag.No.		
Dish	Top	
MOC	SA 240 TP.316L -JINDAL MAKE	
Size	10% Torispherical x 10 thk	
Cone	Bottom	
MOC	SA 240 TP.316L -JINDAL MAKE X 10mm thk.	
Shell		
MOC	SA 240 TP. 316L -JINDAL MAKE	
Size	1200 IDX 1800 TL TO TL. X 8MM THK	
Limpet on Shell and on cone		
MOC	SS 304	
Size	3" half cut pipe (single pass)	
Nozzle Pipe		
MOC	SA 312 TP316 (SEEMLESS)	
Size	SCH 80 For size<50 NB for Higher sch40 Pipe used	
Nozzle Flange		
MOC	SA 182 F316	
Size	As per ASA#150	
STIFFENERS FOR 40NB & BELLOW		
MOC	SA 240 GR. 316	
SIZE	30W X 6 THK X LG TO SUIT	
MAN HOLE		
MOC	SS316 neck and flange ms-SS 316 cladding with cover	
Size	400NBX10THKX neck with flange and blind cover 16 thk	
MANHOLE DEVIT ARM MANHOLE		
MOC	IS:2062	
SIZE	STD.	
Bolts & Nuts		
MOC	SA193 GR.B7 & SA194 GR.2H	
Lug SUPPORT		
PAD and Base Plate FOR LuG SUPPORT	IS:2062 GR.B	
SIZE		
EARTHING BOSS FOR Lug SUPPORT	40 DIA X 50 LG. (SS304)-2 NOS.	
PAD PLATE FOR SG/LG		
MOC	SA 240 GR.316	
SIZE	SG=100mm LG=100mm	
COVER PLATE FOR SG/LG		
MOC	SA 516 GR.70N	
SIZE	STD.	
Gasket	PTFE	
Stress Relief	NIL	
REQUIRED NOZZLE (ASA 150 #)		
INLET NOZZLE	50NB, QTY-1NO	
PRESSURE GAUGE NOZZLE	25NB ,QTY-1NO	
VACCUM NOZZLE	50NB ,QTY-1NO	
THERMOWELL NOZZLE	80/25 NB, QTY-1NO	
VENT NOZZLE	50NB ,QTY-1NO	
SPARE NOZZLE	100NB ,QTY-1NO	
BOTTOM NOZZLE	100NB ,QTY-1NO	
Limpa: OUTLET NOZZLE (SS 304)	50NB, QTY-1NO	
Limpa: INLET NOZZLE (SS 304)	50NB, QTY-1NO	
Limpa: VENT NOZZLE (SS 304)	25NB, QTY-1NO	
SIGHT GLASS NOZZLE	100NB, QTY-1NO	
LIGHT GLASS NOZZLE	100NB, QTY-1NO	



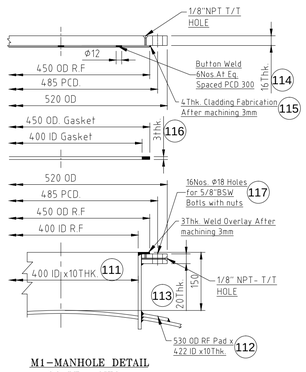
SECTIONAL ELEVATION
Scale :- 1:10



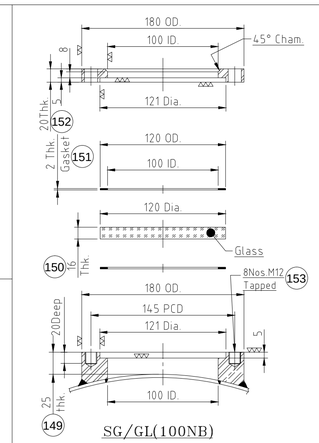
NOZZLE ORIENTATION
Looking from Top



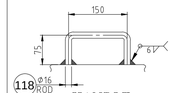
LUG SUPPORT DETAIL



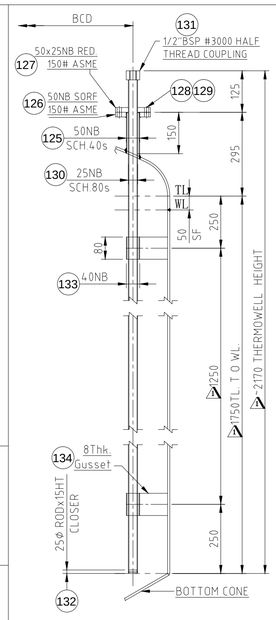
M1-MANHOLE DETAIL
SCALE :-NTS



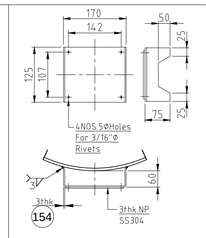
SG/GL(100NB)



HANDLE



N4-THERMOWELL DETAIL
SCALE :-NTS



NAME PLATE BRACKET

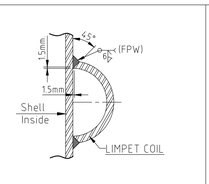
DESIGN DATA		TYPE:- Cylindrical Vertical With Bottom dish & Top dish	
DESIGN CODE :- ASME SEC.VIII, DIV.-I, EDITION 2007 / GOOD ENGINEERING PRACTICE.			
DESIGN BY:-		CLIENT:-	
		SHELL	LIMPET COIL
PROCESS FLUID / (SP.GRAVITY)		LIQUID / 1.5	STEAM / WATER / OIL /1
DESIGN PRESSURE (Int./Ext.)	Kg/cm2 (g)	4.5 / F.V	4.5
DESIGN TEMP.	° C.	250	250
MIN. DESIGN METAL TEMP. (MDMT)	° C.	–	–
WORKING PRESSURE (Min./Max.)	Kg/cm2 (g)	3 / F.V	4
WORKING TEMP. (Min./Max.)	° C.	150	150
TEST PRESSURE (Hydrostatic/Pneumatic)	Kg/cm2 (g)	6	6
RADIOGRAPHY	(Shell/Dish)	SPOT+ALL T-JOINT / FULL	SPOT+ALL T-JOINT / FULL
WELD JOINT EFFICIENCY	(Shell/Dish)	0.7 / 1	0.7 / 1
CORROSION/EROSION ALLOWANCE	MM.	NIL	1 mm CS PART ONLY
POST WELD HEAT TREATMENT		–	–
INSULATION (By Other)	(TYP/THK)		
CAPACITY (Working/Gross)	Ltr.	2 KL FULL VOLUMN	
WIND LOAD	m/s.		
SEISMIC ZONE			
WEIGHT (Empty/Operating/Hydrotest)	Kg.	~1500 Kg	
INSPECTION BY	(CLIENT/TPIA)	CLIENT'S	

NOZZLE SCHEDULE

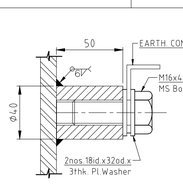
MARK	NOZZLE NECK SIZE DN	NOZZLE NECK SCH.	FANGE STD	FANGE RATING	FANGE TYPE	QTY.	APP. PROJ.	SERVICE	R. F. PAD. (ODxThk)	REMARKS
M1	400 ID	10 THK.	ASME	150 #	SORF	1	150	MAN HOLE	530x10Thk	With HINGD
N1	50 NB	SCH.40s	ASME	150 #	SORF	1	150	INLET		
N2	25 NB	SCH.80s	ASME	150 #	SORF	1	150	PRESSURE GAUGE		
N3	50 NB	SCH.40s	ASME	150 #	SORF	1	150	VACCUM		
N4	50/25 NB	40s/80s	ASME	150 #	SORF	1	150+125	THERMOWELL		With BLRF
N5	50 NB	SCH.40s	ASME	150 #	SORF	1	150	VENT		
N6	100 NB	SCH.40s	ASME	150 #	SORF	1	150	SPARE	220x10Thk	
N7	100 NB	SCH.40s	ASME	150 #	SORF	1	150	BOTTOM	220x10Thk	
N8	50 NB	SCH.40s	ASME	150 #	SORF	1	150	LIMPET COIL OUTLET		
N9	50 NB	SCH.40s	ASME	150 #	SORF	1	150	LIMPET COIL INLET		
N10	25 NB	SCH.80s	ASME	150 #	SORF	1	150	LIMPET COIL VENT		
SG	100 NB	25THK.	150 #	PAD TYP	1	-	SIGHT GLASS			
LG	100 NB	25THK.	150 #	PAD TYP	1	-	LIGHT GLASS			

GENERAL NOTE:-

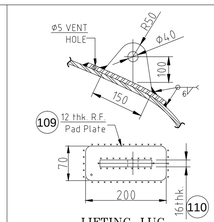
1. ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE SPECIFIED.
2. ALL NOZZLES ABOVE 50NB TO BE PROVIDED WITH RF. PAD AND NOZZLES 40NB & BELOW TO BE STIFFENED WITH 2 NOS. 6 THK .30W STIFFENERS .
3. ALL BOLT HOLES OF FLANGES SHALL STRADDLE THE PRINCIPAL AXIS OF EQUIPMENT.
4. NAME PLATE ,EARTHING BOSS, LIFTING LUG, MANHOLE , SHALL BE AS PER STANDARD ENGINEERING DESIGN
5. ALL NOZZLE PROJECTION ARE FROM EQUIPMENT TAN LINE/ CENTERLINE AS SPECIFIED IN THE DRAWING .
6. ALL SS PARTS SHALL BE PASSIVATED EXTERNALLY AND INTERNALLY EARTHING BOSS TO BE PROVIDED .
7. EARTHING BOSS TO BE PROVIDED .
8. FLANGE STD ASME 150# SORF UNLESS SPECIFIED OTHERWISE.
9. SS-316L LINED FLANGE TO BE CONSIDERED ABOVE 80 NB
10. ALL MS PART IS CLEANED & PAINTED WITH 1 COAT OF HIGH BUILD BERGER MAKE RED OXIDE



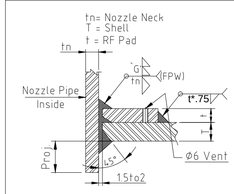
SHELL/DISH TO LIMPET COIL WELD DETAIL-'W10'



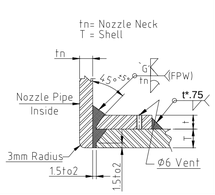
108 EARTH.BOSS DET'L



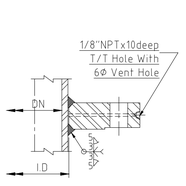
LIFTING LUG



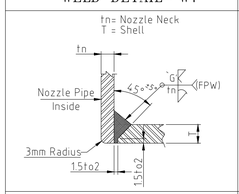
TYP.NOZZLE NECK TO RF PAD SHELL WELD DETAIL-'W7'



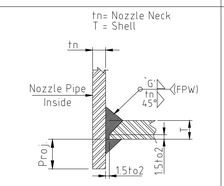
TYP.NOZZLE NECK TO RF PAD SHELL WELD DETAIL-'W8'



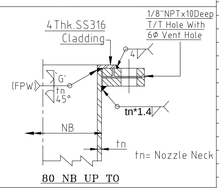
TYP.NOZZLE NECK RED.FLANGE WELD DETAIL-'W9'



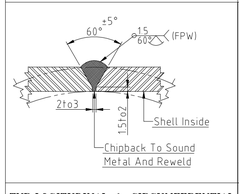
TYP.NOZZLE NECK TO SHELL WELD DETAIL-'W6'



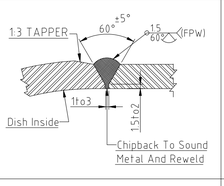
TYP.NOZZLE NECK TO SHELL WELD DETAIL-'W5'



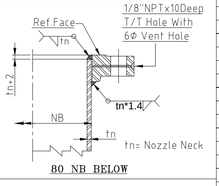
TYP.CLADDING NOZZLE FLANGE WELD DETAIL-'W4'



TYP.LOGITUDINAL & CIRCUMFERENTIAL WELD DETAIL-'W1'



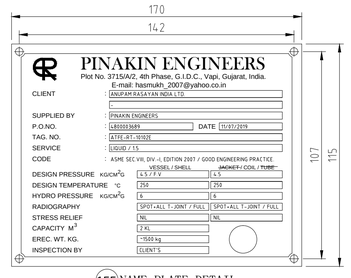
TYP.SHELL TO DISH END WELD DETAIL-'W2'



TYP.NOZZLE FLANGE WELD DETAIL-'W3'

PART NO	DESCRIPTION	QTY.	MATERIAL	SIZE	REMARKE
155	NAME PLATE	1	SS	3THK. x AS PER PINAKIN (STD)	
154	NAME PLATE BRACKET	1	SA 240 Gr 316L	3THK. x AS PER DETAIL	
153	BOLTS SG,LG	16	SA 193 Gr B7 SA 194, Gr 2H	M12 x ~40 LG.	
152	COVER SG,LG	2	IS 2062	18THK. x 100 ID. x 180 OD	
151	GASKET SG,LG	4	PTFE	3THK. x 100 ID x 120 OD	
150	GLASS SG,LG	2	TOUGHENED	16THK. x 120 OD	
149	PAD FLANGE SG,LG	2	SA 240 Gr 316L	25THK. x 180 OD x 100 ID	
148	FLANGE N10	1	SA 182 F 304	25 NB ASME # 150 SORF	
147	NOZZLE PIPE N10	1	SA 312 TP 304	25 NB x SCH.80(SMLS) x~155 LG.	
146	FLANGE N9	1	SA 182 F 304	50 NB ASME # 150 SORF	
145	NOZZLE PIPE N9	1	SA 312 TP 304	50 NB x SCH.40(SMLS) x~155 LG.	
144	FLANGE N8	1	SA 182 F 304	50 NB ASME # 150 SORF	
143	NOZZLE PIPE N8	1	SA 312 TP 304	50 NB x SCH.40(SMLS) x~155 LG.	
142	FLANGE N7	1	IS 2062 Gr B	100 NB ASME # 150 SORF	4Thk.SS316L LINER
141	NOZZLE PIPE N7	1	SA 312 TP 316L	100 NB x SCH.40 (SMLS)x~155 LG.	
140	RF PAD PLATE N7	1	SA 240 Gr 316L	10THK.x 220 OD x 117 ID	
139	FLANGE N6	1	IS 2062 Gr B	100 NB ASME # 150 SORF	4Thk.SS316L LINER
138	NOZZLE PIPE N6	1	SA 312 TP 316L	100 NB x SCH.40 (SMLS)x~205 LG.	
137	RF PAD PLATE N6	1	SA 240 Gr 316L	10THK.x 220 OD x 117 ID	
136	FLANGE N5	1	SA 182 F 316L	50 NB ASME # 150 SORF	
135	NOZZLE PIPE N5	1	SA 312 TP 316L	50 NB x SCH.40(SMLS) x~185 LG.	
134	GUSSET PLATE N4	2	SA 240 Gr 316L	60W x 8 THK. x CUT TO SUIT	
133	NOZZLE SUPPORT PIPE N4	2	SA 312 TP 316L	40 NB x SCH.80s x 60 LG.	
132	CLOSER ROD N4	1	SS 316L	25 OD x 15 HEIGHT	
131	COUPLING N4	1	SS 316L	1/2"BSP x #3000 HALF THREAD COUPLING	
130	NOZZLE PIPE N4	1	SA 312 TP 316L	25 NB x SCH.80(SMLS) x~2170 LG. /1	
129	BOLTS WITH NUTS N4	4	SA 193 Gr B7 SA 194, Gr 2H	5/8"BSW x ~75 LG.	
128	GASKET N4	1	PTFE	3THK. x 50NB #150 (STD)	
127	RED. FLANGE N4	1	SA 182 F 316L	50 NB x 25NB ASME # 150 REDU.	
126	FLANGE N4	1	SA 182 F 316L	50 NB ASME # 150 SORF	
125	NOZZLE PIPE N4	1	SA 312 TP 316L	50 NB x SCH.40(SMLS) x~195 LG.	

BILL OF MATERIAL



155 NAME PLATE DETAIL

PART NO	DESCRIPTION	QTY.	MATERIAL	SIZE	REMARKE
125	FLANGE N3	1	SA 182 F 316L	50 NB ASME # 150 SORF	
124	NOZZLE PIPE N3	1	SA 312 TP 316L	50 NB x SCH.40(SMLS) x~185 LG.	
123	STIFFENERS N2	2	SA 240 Gr 316L	6 THK. x 30 WIDE x CUT TO SUIT	
122	FLANGE N2	1	SA 182 F 316L	25 NB ASME # 150 SORF	
121	NOZZLE PIPE N2	1	SA 312 TP 316L	25 NB x SCH.80(SMLS) x~185 LG.	
120	FLANGE N1	1	SA 182 F 316L	50 NB ASME # 150 SORF	
119	NOZZLE PIPE N1	1	SA 312 TP 316L	50 NB x SCH.40(SMLS) x~185 LG.	
118	HANDLE M1	1	MS	16Ø ROD x AS PER DETAIL	
117	BOLTS WITH NUTS M1	16	SA 193 Gr B7 SA 194, Gr 2H	5/8"BSW x 60 LG.	
116	GASKET M1	1	PTFE	3THK. x AS PER DETAIL	
115	MANHOLE COVER CLADDING M1	1	SA 240 Gr 316L	4THK. x 450 OD	
114	MANHOLE COVER M1	1	IS 2062 Gr B	16THK. x 520 OD	
113	MANHOLE FLANGE M1	1	IS 2062 Gr B	20 THK. x 520 OD x 422 ID	4Thk.SS316L LINER
112	MANHOLE RF PAD M1	1	SA 240 Gr 316L	10 THK. x 530 OD x 422 ID	
111	MANHOLE SHELL M1	1	SA 240 Gr 316L	Ø1288 Circu x ~200 HT x 10 Thk.	
110	LIFTING LUG	2	IS 2062 Gr B	16 THK. x AS PER DETAIL	
109	RF PAD	2	SA 240 Gr 316L	10 THK. x 70 W x 200 LG	
108	EARTHING BOSS	2	SS 304	40 Ø x 50 LG.	
107	LUG SUPPORT GUSSET	8	IS 2062 Gr B	12THK. x AS PER DETAIL	
106	LUG SUPPORT BASE PLATE	4	IS 2062 Gr B	16THK.x 150 W x ~225	
105	LUG SUPPORT RF PAD PLATE	4	SA 240 Gr 316L	8THK. x 200 WIDE x 250 HEIGHT.	
104	HALF LIMPET COIL	-	SS 304	80 NB x 4THK. x~CUT TO SUIT	
103	BOTTOM CONE /1	1	SA 240 Gr 316L	10THK. x 1200 ID x AS PER DRAWING	
102	TOP DISHEND (10% TORISPHERICAL)	1	SA 240 Gr 316L	10THK. x 1200 ID x	
101	SHELL	1	SA 240 Gr 316L	Ø3796 Circu x 1700 HT x 8 Thk.	-

BILL OF MATERIAL

/1 AS BUILT DRAWING

Issue	For	Date	By	Sign.	Rev.no	Revision Note	Date	By	Checked
3	AS BUILT DRAWING	05.09.19	Ritesh.S.P	RSP	/3	Revised as per actual dimension	05.09.19	RSP	
2	Revised and resubmit for approval	20.08.19	Ritesh.S.P	RSP	/2	Revised as per client comment with marked	20.08.19	RSP	
1	Revised and resubmit for approval	03.08.19	Ritesh.S.P	RSP	/1	Revised as per client comment with marked	03.08.19	RSP	
0	Issue for client approval	22.07.19	Ritesh	RSP	/0	Preliminary Checked & Revised	22.07.19	RSP	

Pinakin Engineers & Contractors
Manufacturing & Fabrication of :
Pressure Vessels, Heat Exchangers & Allied Products
Plot No. 3715/A/2, 4th Phase, G.I.D.C., Vapi, Gujarat, India.
E-mail: hasmukh_2007@yahoo.co.in

Design	PE&C	MDS	Client:- ANUPAM RASAYAN INDIA LTD.(SACHIN)
Drawn	Ritesh.S.P	15/07/2019	P.O.No:- 4800003689 Date:- 11/07/2019 Plant:--
Checked	Hasmukh		Tag.No:- ATPE-RT-10102E Ref.Dwg.No:- -
Approved	Client/TPI	-	Tittle:- GENERAL ARRANGEMENT DRAWING FOR (SS 316) SKL RECIEVER WITH LIMPET COIL Qty.:- 01
Scale:- 1:10(As Shown)	Projection		Sh.No:-1 of 1
Job No:- 290			Dwg.No:- 290 / 2019 Rev. /0/1/2/3

ANUPAM RASAYAN INDIA LIMITED

PRELIMINARY INCIDENT INVESTIGATION

Unit	Unit-06	**Plant Name**	Plant-1
Date of Incident	10.09.2022	**Time of Incident**	Approx 22.05 hrs
Exact Location	Plant-1, Ground Floor	**Product line**	2,4-DFNB
System Involved	ATFE	**Equipment Involved**	Receiver no. ATFE RC106
Nos. of Fatalities	05 Nos.	**Nos. of IPs**	19 Nos.

Brief Description of Incident	During distillation, temperature of receiver started to increase while unloading the material. Same had been informed to plant incharge by plant chemist at around 21.40 hrs. Plant incharge was at home and he informed unit head of this condition at around 21.43 hrs. Further, plant incharge went to company from home to oversee the condition. During time, hot material of the receiver caught fire at around 22.05 hrs and further resulted info explosion. Whole plant-1 caught into fire and company's fire team tried to control the fire with the help of internal fire hydrant system and by using foam solution. Since, the situation was moving out of the control, help was taken from nearby fire brigade and informed to police station.
Witness and his statements	**Mr. Sunil :** ATFE process completed at around 16.00 hrs. Mr. Sunil came on duty @ 20.00 hrs and confirm that oil heating valve of receiver were closed. - Further he checked temperature @ 20.00 hrs which was around 145 deg C which was further increased around 147 deg C @ 21.00 hrs. - At around 21.15 hrs, he had observed some abnormal smell and by inspection it came to know that it was from vent of high boiler receiver vent. At that time, temperature was around 180 deg C which was abnormal according to his judgement. - He further observed that other employees started cooling activity and even coordinating plant incharge and resulted in fire and explosion. - He fell down towards new constructed plant and by crawling he reached to new construction area. - He hides himself behind one pillar/ column of new construction area and saved himself during the incident.
Objective evidences collected	Not collected as restriction from authorities and other agencies like insurance.
Brief process Description	Annexure-1 Process description.docx
P&ID of ATFE system	Annexure-2 ATFE-12102 P&ID-1.pdf

ATFE Data sheet	Annexure-3 DWG-290-2019(MDS).pdf
Eng. Drawing of receiver	Annexure-4 DWG-290-2KL RECIEVER WITH LIMI
Why-why Analysis	Attached

Identified Probable Causes	
1	Residue is having chocking nature by which other problem initiated.
2	Hot oil valves for receiver might have malfunction/ pass resulting prolonged heating of high boiler in receiver.
3	Hot oil might have leaked from jacket to insider receiver containing hot high boiler mass.
4	Organic carbon at high temperature ~ 185 deg C might have ignited in presence of air during unloading.

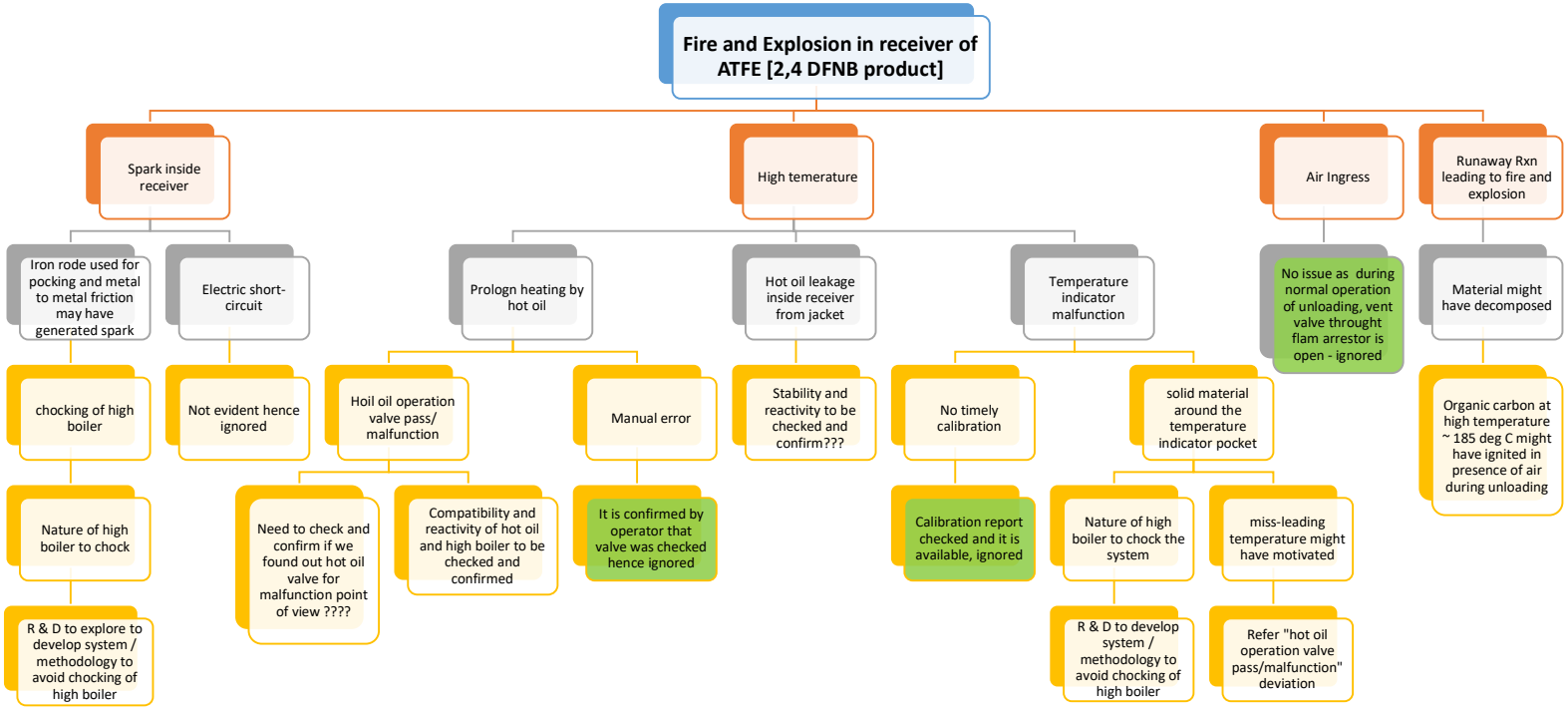
Sr. No.	**Recommendations**
1	Change the utility to be changed from hot oil to steam to avoid high temperature.
2	On/off valve to be provided in steam line and it is to be interlocked with TT of receiver.
3	To control high temperature in abnormal case, cooling facility to receiver shall be provided.
4	To reduce the risk level, receiver capacity shall be reduced from 2 KL to 1 KL.
5	Compatibility and reactivity of hot oil and high boiler to be checked and confirmed
6	High Boiler [residue] to be tested for free carbon and other parameters for further study and analysis.
7	Inspect hot oil valve [if find out] for its operation and integrity point of view.
8	R & D to explore to develop system / methodology to avoid chocking of high boiler.

Investigation Team;

Sr. No.	Name of the Team	Designation	Position
1	Dr. Nilesh Naik	Technical Director	Team Leader
2	Mr. Piyush Mistry	DGM-Health and Safety	Facilitator
3	Dr. Anuj Thakar	Unit Head [Unit-2]	Team member
4	Mr. Milan Naik	Unit Head [Unit-6]	Co-team leader / Process Owner
5	Mr. Satish Patel	Head – Environment	Team Member
6	Mr. Thomas Braganza	Head – Engineering dept	Team Member
7	Mr. Himanshu Bhatt	Head – Project and Purchase	Team Member
8	Mr. Sunil	Operator/ Helper	Team Member
9	Mr. Piyush Patel	Shift Chemist	Team Member

WHY - WHY ANALYSIS

Incident: Fire and Explosion in Plant-1 of Unit-6 resulted in multiple fatalities and injuries.



Note: Last point of each root indicates probable cause of incidents which are to be addressed to derive CAPA.

Annexure-1

Brief Process Description for 2,4 Difluoro Nitro Benzene

Stage 1

Charge 2500kg 2,4DCNB storage tank TF-108 to receiver RC-13104B / RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B by pump TFP-108BB.

Charge fresh/Recover 5200kg Solvent -S from storage tank TF-107 to receiver RC-13104A / RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A.

Start stirring in the reactors and transfer fresh Solvent -S from respective receivers to respective reactors reactor R-13104 / R-14105 / R -14106 / R - 14111 / R-13110 / R-13126.

Start charging of 1575kg KF manually from bags.

Charge 50kg of Catalyst No 37 in reactor. Set Temperature in HMI at 140^{O}C. Start addition of 2,4 DCNB (2500 kg) from respective receivers to respective reactors by maintaining temperature up to 100^{O}C.

Start heating in reactors. Once temperature 170^{O}C achieved, apply normal vacuum EDC-VP-15104 /EDC-VP-15105 / EDC-VP-15106 / EDC-VP-15111 / EDC-VP-15110 / EDC-VP-15126 for reflux for 36 hrs and maintain the temperature between 180^{O}C - 185^{O}C.

Take sample after maintaining 36 Hrs. for QC testing.

Stage 2

Received material in drowning reactors R-12107 / R-12112 / R-12118 ,

Apply vacuum in drowning reactors R-12107 / R-12112 / R-12118 and respective receivers by respective steam Ejector pump SE-15107/RC-15112/SE-15118. Collect the mix material of 2,4 DFNB in respective receivers. Take sample for QC testing.

Then cool down the reactor R-12107 / R-12112 / R-12118 by cooling water in jacket up to temperature 30 to 35^{0}C.

Start filtration through centrifuge.

Stage 3 (Final distillation)

DFNB crude material from storage tank ST-10101, ST-10113, ST-10111 & ST-10107 to reactor D-11102, D-11103 (10KL) by respective pump no.P-10111, P-10107 & P-10113.

Start stirring and charge K2CO3 for neutralize pH. Apply vacuum in respected reactor D-11102, D-11103 (10KL) by respective dry vacuum pump D-VP-12102, D-VP-11103.

When received vacuum up to 750 mmHg then start heating @110 - 120^{0}C in bottom. collect the mix-fraction in RC-12102C/RC-12103C. Give sample for QC analysis for running distillation, if the desired result is achieved then collect the pure material in RC-12102A/RC-12102B/RC-12103A/RC-12103B.

Check QC analysis of bottom remaining material in reactor D-11102 / D-11103 before transferring to storage tank ST-10112

Stage 4

Material of reactor R-14114 transfer to ATFE feed tank ATFE-FT-13102D by pump CP-13114

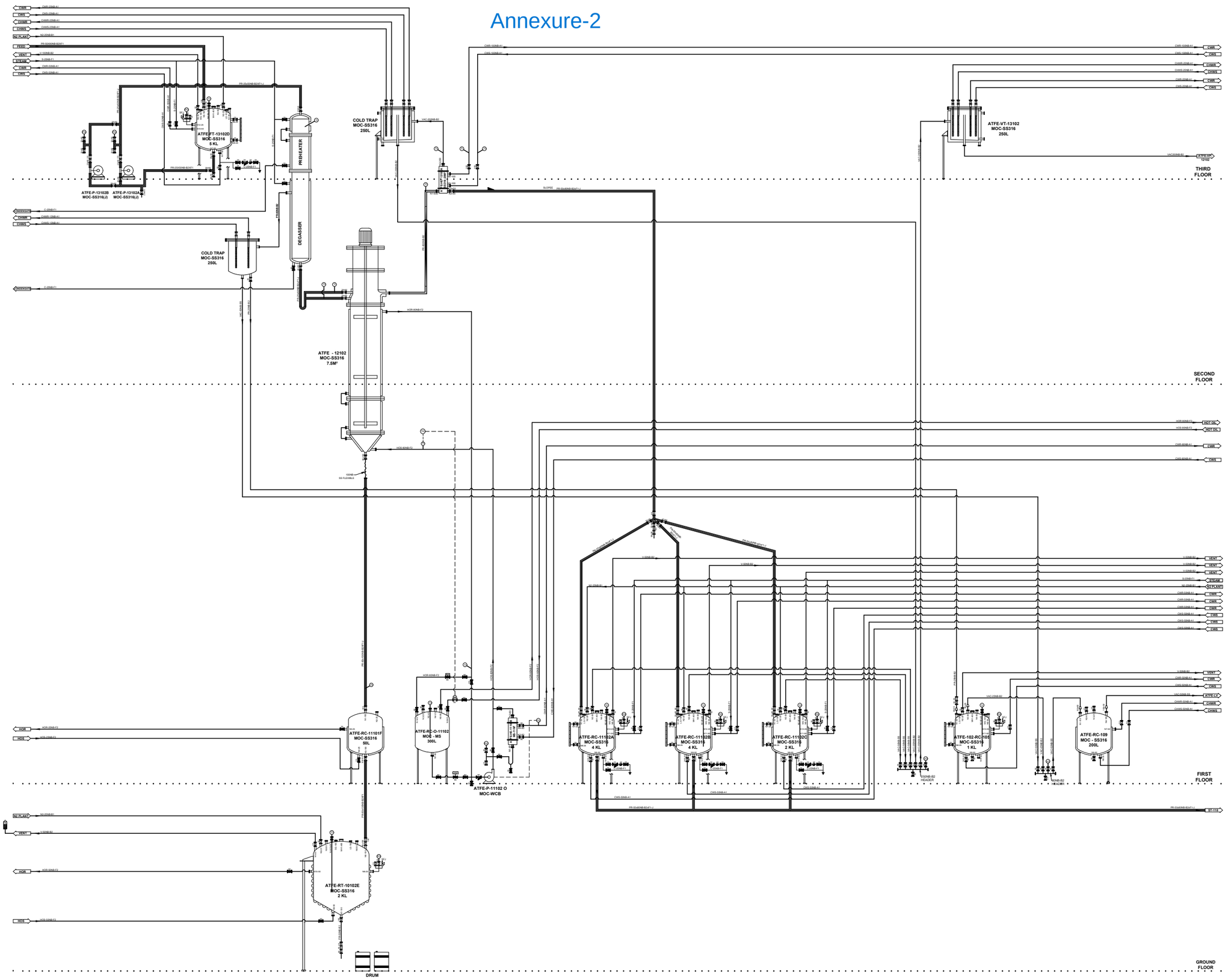
Then apply high vacuum by vacuum pump D-VP-ATFE-12102 and material feeding in ATFE-12102 by dosing pump P-13102A / P-13102B via pre-heater from feed tank ATFE-FT-13102D at temperature 110 ^{0}C- 120^{O}C and maintain bottom temperature of ATFE-12102 up to 180-185^{0}C.

Collect recovered solvent S in receiver ATFE- RC-11102A / ATFE- RC-11102B / ATFE- RC-11102C and transfer the solvent-S to ST-11118 by pump P-11118.

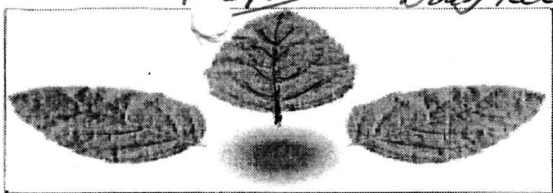
Collect residue in Bottom tank & unload in drum by gravity.

Send residue to hazardous area.

Annexure-2



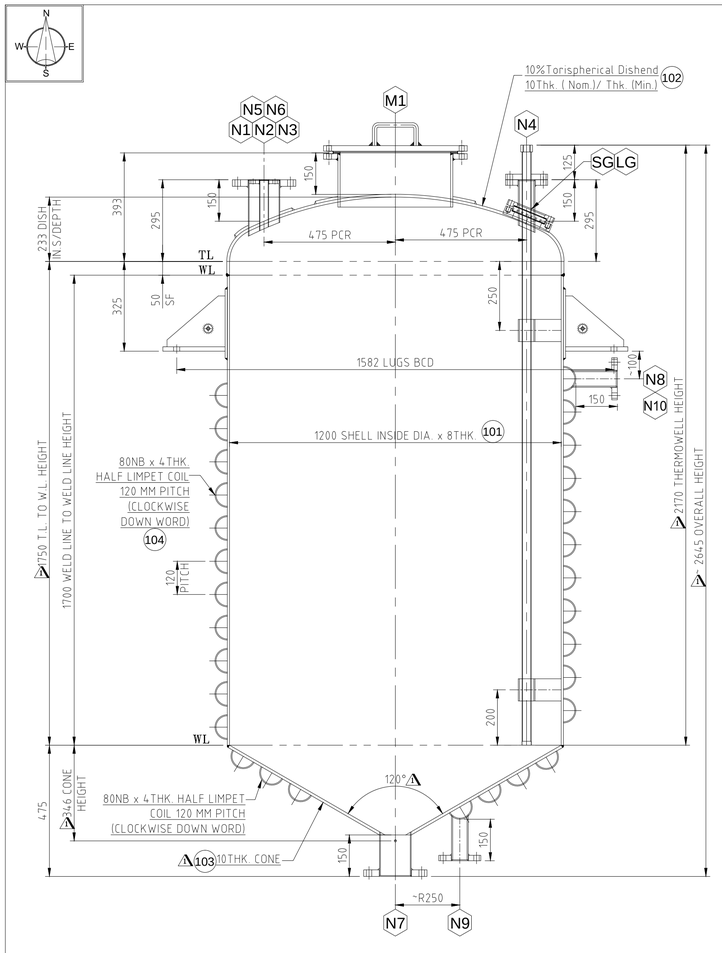
ANUPAM RASAYAN INDIA LTD.		DRN	T.C.PATEL	TITLE :-				(U-6)	DATE	5-12-2020
PLOTNO. 8110,G.I.D.C. INDUSTRIAL ESTATE		CHD		DFNB P & ID					SET	
SACHIN,SURAT-394230		APP	-						REMARK	
		SCALE	N.T.S.	REV.NO.	R0	R1	R2	R3	R4	R5	ORG.NO :-



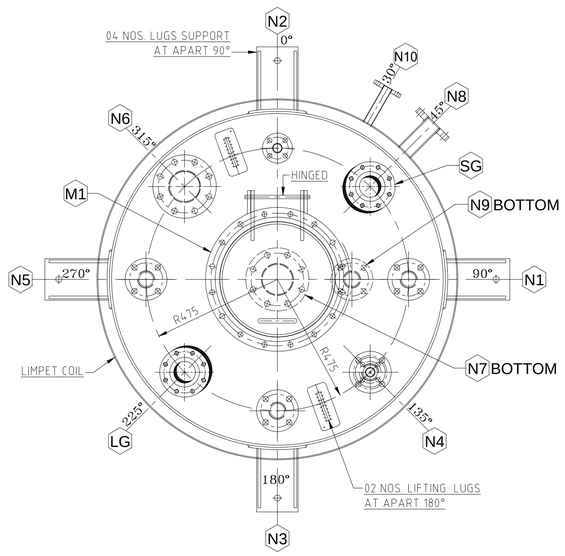
Anupam Rasayan
Plot No.2425 GIDC, Sachin,
Phone No : +91-126-239-899
Fax : +91-261-23

2KL SS 316 Receiver for ATFE Data Sheet

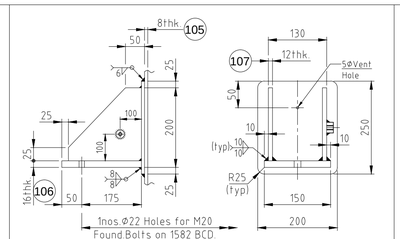
RECIEVER		
Design code	ASME SECTION-VIII,DIV.1 (LATEST)/ AND ALSO GOOD ENGINEERING PRACTICE TO FOLLOW	
Type	Cylindrical Vertical With TOP & BOTTOM Cone End	
	SHELL	LIMPET
SP. GRAVITY.	LIQUID/1.5	STEAM /WATER
FLUID MEDIA	LIQUID	
PH	NEUTRAL	
DESIGN PRESSURE (INT/EXT.) KG/CM2(g)	4.5/F.V.	4.5
DESIGN TEMP.('C)	250	250
WORKING PRESSURE (INT/EXT.) KG/CM2(g)	3/F.V	4
WORKING TEMP.('C)	150	150
TEST PRESSURE KG/CM2 (HYDROLLIC / PNUMETIC)	6	6
REDIOGRAPHY REQUIRED (SHELL/DISH)	SPOT+ALL T-JOINTS/FULL	SPOT+ALL T-JOINTS/FULL
WELD JOINT EFFICIENCY (SHELL/DISH)	0.7/1	0.7/1
CORROSION/ERROSION ALLOWNS (MM)	NIL	1 MM (FOR CS PART ONLY)
CAPACITY	2KL FULL VOLUMN	
QTY	1 no.	
Equip.Tag.No.		
Dish	Top	
MOC	SA 240 TP.316L -JINDAL MAKE	
Size	10% Torispherical x 10 thk	
Cone	Bottom	
MOC	SA 240 TP.316L -JINDAL MAKE X 10mm thk.	
Shell		
MOC	SA 240 TP. 316L -JINDAL MAKE	
Size	1200 IDX 1800 TL TO TL. X 8MM THK	
Limpet on Shell and on cone		
MOC	SS 304	
Size	3" half cut pipe (single pass)	
Nozzle Pipe		
MOC	SA 312 TP316 (SEEMLESS)	
Size	SCH 80 For size<50 NB for Higher sch40 Pipe used	
Nozzle Flange		
MOC	SA 182 F316	
Size	As per ASA#150	
STIFFENERS FOR 40NB & BELLOW		
MOC	SA 240 GR. 316	
SIZE	30W X 6 THK X LG TO SUIT	
MAN HOLE		
MOC	SS316 neck and flange ms-SS 316 cladding with cover	
Size	400NBX10THKX neck with flange and blind cover 16 thk	
MANHOLE DEVIT ARM MANHOLE		
MOC	IS:2062	
SIZE	STD.	
Bolts & Nuts		
MOC	SA193 GR.B7 & SA194 GR.2H	
Lug SUPPORT		
PAD and Base Plate FOR LuG SUPPORT	IS:2062 GR.B	
SIZE		
EARTHING BOSS FOR Lug SUPPORT	40 DIA X 50 LG. (SS304)-2 NOS.	
PAD PLATE FOR SG/LG		
MOC	SA 240 GR.316	
SIZE	SG=100mm LG=100mm	
COVER PLATE FOR SG/LG		
MOC	SA 516 GR.70N	
SIZE	STD.	
Gasket	PTFE	
Stress Relief	NIL	
REQUIRED NOZZLE (ASA 150 #)		
INLET NOZZLE	50NB, QTY-1NO	
PRESSURE GAUGE NOZZLE	25NB ,QTY-1NO	
VACCUM NOZZLE	50NB ,QTY-1NO	
THERMOWELL NOZZLE	80/25 NB, QTY-1NO	
VENT NOZZLE	50NB ,QTY-1NO	
SPARE NOZZLE	100NB ,QTY-1NO	
BOTTOM NOZZLE	100NB ,QTY-1NO	
Limpa: OUTLET NOZZLE (SS 304)	50NB, QTY-1NO	
Limpa: INLET NOZZLE (SS 304)	50NB, QTY-1NO	
Limpa: VENT NOZZLE (SS 304)	25NB, QTY-1NO	
SIGHT GLASS NOZZLE	100NB, QTY-1NO	
LIGHT GLASS NOZZLE	100NB, QTY-1NO	



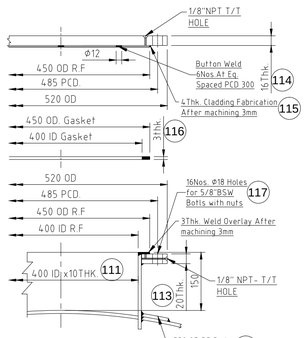
SECTIONAL ELEVATION
Scale :- 1:10



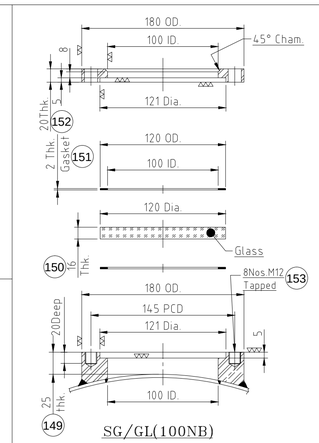
NOZZLE ORIENTATION
Looking from Top



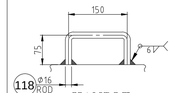
LUG SUPPORT DETAIL



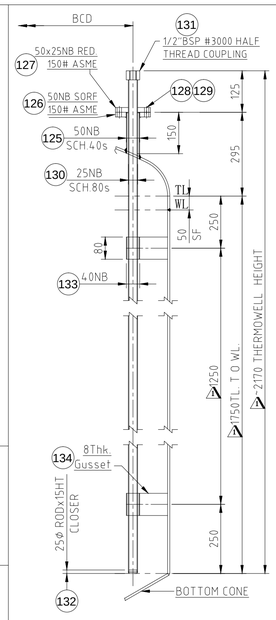
M1-MANHOLE DETAIL
SCALE :-NTS



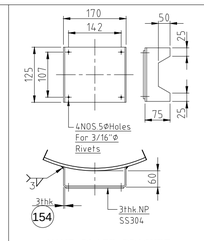
SG/GL(100NB)



HANDLE



N4-THERMOWELL DETAIL
SCALE :-NTS



NAME PLATE BRACKET

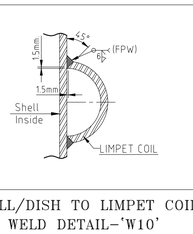
DESIGN DATA		TYPE:- Cylindrical Vertical With Bottom dish & Top dish	
DESIGN CODE :- ASME SEC.VIII, DIV.-I, EDITION 2007 / GOOD ENGINEERING PRACTICE.			
DESIGN BY:-		CLIENT:-	
		SHELL	LIMPET COIL
PROCESS FLUID / (SP.GRAVITY)		LIQUID / 1.5	STEAM / WATER / OIL /2
DESIGN PRESSURE (Int./Ext.)	Kg/cm2 (g)	4.5 / F.V	4.5
DESIGN TEMP.	° C.	250	250
MIN. DESIGN METAL TEMP. (MDMT)	° C.	–	–
WORKING PRESSURE (Min./Max.)	Kg/cm2 (g)	3 / F.V	4
WORKING TEMP. (Min./Max.)	° C.	150	150
TEST PRESSURE (Hydrostatic/Pneumatic)	Kg/cm2 (g)	6	6
RADIOGRAPHY	(Shell/Dish)	SPOT+ALL T-JOINT / FULL	SPOT+ALL T-JOINT / FULL
WELD JOINT EFFICIENCY	(Shell/Dish)	0.7 / 1	0.7 / 1
CORROSION/EROSION ALLOWANCE	MM.	NIL	1 mm CS PART ONLY
POST WELD HEAT TREATMENT		–	–
INSULATION (By Other)	(TYP/THK)		
CAPACITY (Working/Gross)	Ltr.	2 KL FULL VOLUMN	
WIND LOAD	m/s.		
SEISMIC ZONE			
WEIGHT (Empty/Operating/Hydrotest)	Kg.	~1500 Kg	
INSPECTION BY	(CLIENT/TPIA)	CLIENT'S	

NOZZLE SCHEDULE

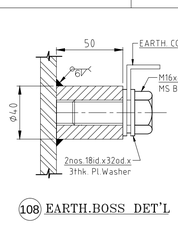
MARK	NOZZLE NECK SIZE DN	NOZZLE NECK SCH.	FANGE STD	FANGE RATING	FANGE TYPE	QTY.	APP. PROJ.	SERVICE	R. F. PAD. (ODxThk)	REMARKS
M1	400 ID	10 THK.	ASME	150 #	SORF	1	150	MAN HOLE	530x10Thk	With HINGD
N1	50 NB	SCH.40s	ASME	150 #	SORF	1	150	INLET		
N2	25 NB	SCH.80s	ASME	150 #	SORF	1	150	PRESSURE GAUGE		
N3	50 NB	SCH.40s	ASME	150 #	SORF	1	150	VACCUM		
N4	50/25 NB	40s/80s	ASME	150 #	SORF	1	150+125	THERMOWELL		With BLRF
N5	50 NB	SCH.40s	ASME	150 #	SORF	1	150	VENT		
N6	100 NB	SCH.40s	ASME	150 #	SORF	1	150	SPARE	220x10Thk	
N7	100 NB	SCH.40s	ASME	150 #	SORF	1	150	BOTTOM	220x10Thk	
N8	50 NB	SCH.40s	ASME	150 #	SORF	1	150	LIMPET COIL OUTLET		
N9	50 NB	SCH.40s	ASME	150 #	SORF	1	150	LIMPET COIL INLET		
N10	25 NB	SCH.80s	ASME	150 #	SORF	1	150	LIMPET COIL VENT		
SG	100 NB	25THK.	150 #	PAD TYP	1	-	SIGHT GLASS			
LG	100 NB	25THK.	150 #	PAD TYP	1	-	LIGHT GLASS			

GENERAL NOTE:-

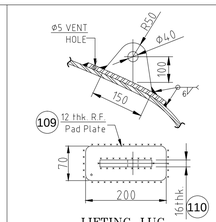
1. ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE SPECIFIED.
2. ALL NOZZLES ABOVE 50NB TO BE PROVIDED WITH RF. PAD AND NOZZLES 40NB & BELOW TO BE STIFFENED WITH 2 NOS. 6 THK .30W STIFFENERS .
3. ALL BOLT HOLES OF FLANGES SHALL STRADDLE THE PRINCIPAL AXIS OF EQUIPMENT.
4. NAME PLATE ,EARTHING BOSS, LIFTING LUG, MANHOLE , SHALL BE AS PER STANDARD ENGINEERING DESIGN
5. ALL NOZZLE PROJECTION ARE FROM EQUIPMENT TAN LINE/ CENTERLINE AS SPECIFIED IN THE DRAWING .
6. ALL SS PARTS SHALL BE PASSIVATED EXTERNALLY AND INTERNALLY EARTHING BOSS TO BE PROVIDED .
7. EARTHING BOSS TO BE PROVIDED .
8. FLANGE STD ASME 150# SORF UNLESS SPECIFIED OTHERWISE.
9. SS-316L LINED FLANGE TO BE CONSIDERED ABOVE 80 NB
10. ALL MS PART IS CLEANED & PAINTED WITH 1 COAT OF HIGH BUILD BERGER MAKE RED OXIDE



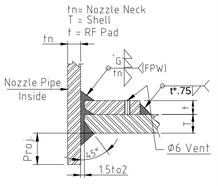
SHELL/DISH TO LIMPET COIL WELD DETAIL-'W10'



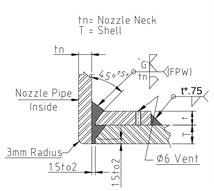
108 EARTH.BOSS DET'L



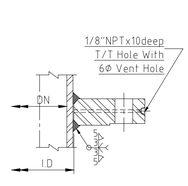
LIFTING LUG



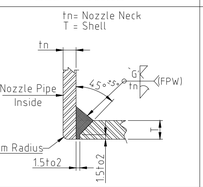
TYP.NOZZLE NECK TO RF PAD SHELL WELD DETAIL-'W7'



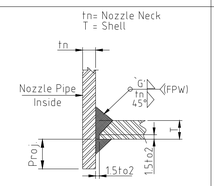
TYP.NOZZLE NECK TO RF PAD SHELL WELD DETAIL-'W8'



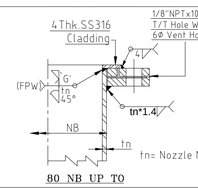
TYP.NOZZLE NECK RED.FLANGE WELD DETAIL-'W9'



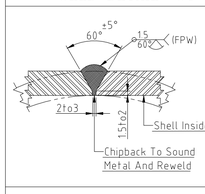
TYP.NOZZLE NECK TO SHELL WELD DETAIL-'W6'



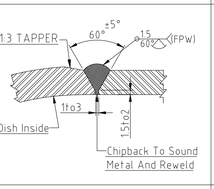
TYP.NOZZLE NECK TO SHELL WELD DETAIL-'W5'



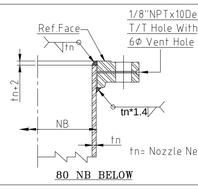
TYP.CLADDING NOZZLE FLANGE WELD DETAIL-'W4'



TYP.LOGITUDINAL & CIRCUMFERENTIAL WELD DETAIL-'W1'



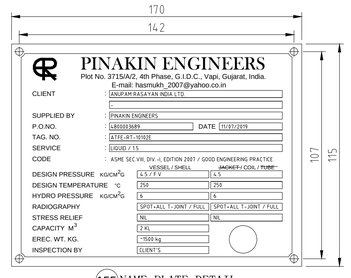
TYP.SHELL TO DISH END WELD DETAIL-'W2'



TYP.NOZZLE FLANGE WELD DETAIL-'W3'

PART NO	DESCRIPTION	QTY.	MATERIAL	SIZE	REMARKE
155	NAME PLATE	1	SS	3THK. x AS PER PINAKIN (STD)	
154	NAME PLATE BRACKET	1	SA 240 Gr 316L	3THK. x AS PER DETAIL	
153	BOLTS SG,LG	16	SA 193 Gr B7 SA 194, Gr 2H	M12 x ~40 LG.	
152	COVER SG,LG	2	IS 2062	18THK. x 100 ID. x 180 OD	
151	GASKET SG,LG	4	PTFE	3THK. x 100 ID x 120 OD	
150	GLASS SG,LG	2	TOUGHENED	16THK. x 120 OD	
149	PAD FLANGE SG,LG	2	SA 240 Gr 316L	25THK. x 180 OD x 100 ID	
148	FLANGE N10	1	SA 182 F 304	25 NB ASME # 150 SORF	
147	NOZZLE PIPE N10	1	SA 312 TP 304	25 NB x SCH.80(SMLS) x~155 LG.	
146	FLANGE N9	1	SA 182 F 304	50 NB ASME # 150 SORF	
145	NOZZLE PIPE N9	1	SA 312 TP 304	50 NB x SCH.40(SMLS) x~155 LG.	
144	FLANGE N8	1	SA 182 F 304	50 NB ASME # 150 SORF	
143	NOZZLE PIPE N8	1	SA 312 TP 304	50 NB x SCH.40(SMLS) x~155 LG.	
142	FLANGE N7	1	IS 2062 Gr B	100 NB ASME # 150 SORF	4Thk.SS316L LINER
141	NOZZLE PIPE N7	1	SA 312 TP 316L	100 NB x SCH.40 (SMLS)x~155 LG.	
140	RF PAD PLATE N7	1	SA 240 Gr 316L	10THK.x 220 OD x 117 ID	
139	FLANGE N6	1	IS 2062 Gr B	100 NB ASME # 150 SORF	4Thk.SS316L LINER
138	NOZZLE PIPE N6	1	SA 312 TP 316L	100 NB x SCH.40 (SMLS)x~205 LG.	
137	RF PAD PLATE N6	1	SA 240 Gr 316L	10THK.x 220 OD x 117 ID	
136	FLANGE N5	1	SA 182 F 316L	50 NB ASME # 150 SORF	
135	NOZZLE PIPE N5	1	SA 312 TP 316L	50 NB x SCH.40(SMLS) x~185 LG.	
134	GUSSET PLATE N4	2	SA 240 Gr 316L	60W x 8 THK. x CUT TO SUIT	
133	NOZZLE SUPPORT PIPE N4	2	SA 312 TP 316L	40 NB x SCH.80s x 60 LG.	
132	CLOSER ROD N4	1	SS 316L	25 OD x 15 HEIGHT	
131	COUPLING N4	1	SS 316L	1/2"BSP x #3000 HALF THREAD COUPLING	
130	NOZZLE PIPE N4	1	SA 312 TP 316L	25 NB x SCH.80(SMLS) x~2170 LG. /1	
129	BOLTS WITH NUTS N4	4	SA 193 Gr B7 SA 194, Gr 2H	5/8"BSW x ~75 LG.	
128	GASKET N4	1	PTFE	3THK. x 50NB #150 (STD)	
127	RED. FLANGE N4	1	SA 182 F 316L	50 NB x 25NB ASME # 150 REDU.	
126	FLANGE N4	1	SA 182 F 316L	50 NB ASME # 150 SORF	
125	NOZZLE PIPE N4	1	SA 312 TP 316L	50 NB x SCH.40(SMLS) x~195 LG.	

BILL OF MATERIAL



155 NAME PLATE DETAIL

PART NO	DESCRIPTION	QTY.	MATERIAL	SIZE	REMARKE
125	FLANGE N3	1	SA 182 F 316L	50 NB ASME # 150 SORF	
124	NOZZLE PIPE N3	1	SA 312 TP 316L	50 NB x SCH.40(SMLS) x~185 LG.	
123	STIFFENERS N2	2	SA 240 Gr 316L	6 THK. x 30 WIDE x CUT TO SUIT	
122	FLANGE N2	1	SA 182 F 316L	25 NB ASME # 150 SORF	
121	NOZZLE PIPE N2	1	SA 312 TP 316L	25 NB x SCH.80(SMLS) x~185 LG.	
120	FLANGE N1	1	SA 182 F 316L	50 NB ASME # 150 SORF	
119	NOZZLE PIPE N1	1	SA 312 TP 316L	50 NB x SCH.40(SMLS) x~185 LG.	
118	HANDLE M1	1	MS	16Ø ROD x AS PER DETAIL	
117	BOLTS WITH NUTS M1	16	SA 193 Gr B7 SA 194, Gr 2H	5/8"BSW x 60 LG.	
116	GASKET M1	1	PTFE	3THK. x AS PER DETAIL	
115	MANHOLE COVER CLADDING M1	1	SA 240 Gr 316L	4THK. x 450 OD	
114	MANHOLE COVER M1	1	IS 2062 Gr B	16THK. x 520 OD	
113	MANHOLE FLANGE M1	1	IS 2062 Gr B	20 THK. x 520 OD x 422 ID	4Thk.SS316L LINER
112	MANHOLE RF PAD M1	1	SA 240 Gr 316L	10 THK. x 530 OD x 422 ID	
111	MANHOLE SHELL M1	1	SA 240 Gr 316L	Ø1288 Circu.x ~200 HT x 10 Thk.	
110	LIFTING LUG	2	IS 2062 Gr B	16 THK. x AS PER DETAIL	
109	RF PAD	2	SA 240 Gr 316L	10 THK. x 70 W x 200 LG	
108	EARTHING BOSS	2	SS 304	40 Φ x 50 LG.	
107	LUG SUPPORT GUSSET	8	IS 2062 Gr B	12THK. x AS PER DETAIL	
106	LUG SUPPORT BASE PLATE	4	IS 2062 Gr B	16THK.x 150 W x ~225	
105	LUG SUPPORT RF PAD PLATE	4	SA 240 Gr 316L	8THK. x 200 WIDE x 250 HEIGHT.	
104	HALF LIMPET COIL	-	SS 304	80 NB x 4THK. x~CUT TO SUIT	
103	BOTTOM CONE /1	1	SA 240 Gr 316L	10THK. x 1200 ID x AS PER DRAWING	
102	TOP DISHEND (10% TORISPHERICAL)	1	SA 240 Gr 316L	10THK. x 1200 ID x	
101	SHELL	1	SA 240 Gr 316L	Ø3796 Circu.x 1700 HT x 8 Thk.	-

BILL OF MATERIAL

/3 AS BUILT DRAWING

Issue	For	Date	By	Sign.	Rev.no	Revision Note	Date	By	Checked
3	AS BUILT DRAWING	05.09.19	Ritesh.S.P	RSP	/3	Revised as per actual dimension	05.09.19	RSP	
2	Revised and resubmit for approval	20.08.19	Ritesh.S.P	RSP	/2	Revised as per client comment with marked	20.08.19	RSP	
1	Revised and resubmit for approval	03.08.19	Ritesh.S.P	RSP	/1	Revised as per client comment with marked	03.08.19	RSP	
0	Issue for client approval	22.07.19	Ritesh	RSP	/0	Preliminary Checked & Revised	22.07.19	RSP	

Pinakin Engineers & Contractors
Manufacturing & Fabrication of :
Pressure Vessels, Heat Exchangers & Allied Products
Plot No. 3715/A/2, 4th Phase, G.I.D.C., Vapi, Gujarat, India.
E-mail: hasmukh_2007@yahoo.co.in

Design	PE&C	MDS	Client:- ANUPAM RASAYAN INDIA LTD.(SACHIN)
Drawn	Ritesh.S.P	15/07/2019	P.O.No:- 4800003689 Date:- 11/07/2019 Plant:--
Checked	Hasmukh		Tag.No:- ATPE-RT-10102E Ref.Dwg.No:- -
Approved	Client/TPI	-	Tittle:- GENERAL ARRANGEMENT DRAWING FOR (SS 316) SKL RECIEVER WITH LIMPET COIL Qty.:- 01
Scale:- 1:10(As Shown)	Projection		Sh.No:-1 of 1
Job No:- 290			Dwg.No:- 290 / 2019 Rev. 0 1 2 3

ANNEXURE - R-8

Anupam Rasayan India Ltd.

List of Discharged Employees

SR.NO	Hospital Name	Name of the Employee	Admission Date	Discharge
1	Apple	Vishal Jasubhai Diyora	10-09-22	16-09-22
2	Apple	Kaushal Virendrabhai Gohil	10-09-22	15-09-22
3	Apple	Jatin Thakorbhai Patel	10-09-22	15-09-22
4	Apple	Rakesh Danabhai Ladumor	10-09-22	13-09-22
5	Apple	Jaykumar Kishorbhai Desai	10-09-22	15-09-22
6	Apple	Rakesh Rajendra Prasad Soni	10-09-22	14-09-22
7	Apple	Sachin Dilip Ingle	10-09-22	13-09-22
8	Apple	Gajanand Ramesh Ramaker	10-09-22	14-09-22
9	Apple	Ajit Devnarayan Sing	10-09-22	17-09-22
10	Apple	Girendra Sharda Jha	10-09-22	17-09-22
11	Apple	Sahil Vimal Vesuwala	10-09-22	15-09-22
12	Unique	Gurudayal Nathilal Singh	10-09-22	13-09-22
13	Unique	Shubham Yuvraj Idhate	10-09-22	12-09-22
14	Unique	Vinaykumar Kamalkishor Kushwahaa	10-09-22	12-09-22
15	Unique	Arun Santosh Patil	10-09-22	16-09-22
16	Unique	Akshaykumar Ajitbhai Patel	10-09-22	13-09-22
17	Unique	Jitendra Dinanath Rajbhar	10-09-22	13-09-22

Maitreya
Multi Super Speciality Hospital

DISCHARGE SUMMARY

Name :VISHAL JASUBHAI DIYORA	Age/Sex 27 Yrs./Male	UHID : 13129
Dr. Name : DR. HIREN DESAI DR. VINESH SHAH	IPD No : I/0922/1348	
Discharge Type : Improved	Room Type : Micu	
DOA & Time : 11/09/2022 12:11 am	DOD & Time : 16/09/2022 4:00 pm	
DOS 1 :12/09/2022		

Diagnosis : **20% FLAME BURNS OVER FACE, RIGHT UPPER LIMB LEFT UPPER LIMB & BACK WITH INHALATION BURNS WITH MULTIPLE WOUNDS WITH FRACTURE OF LEFT ULNA OLECRANON DUE TO CHEMICAL TANK BLAST.**

History and Clinical Summary : A 27 years old male came with alleged H/O flame burns with inhalation burns due to chemical tank blast at work place (Anupam Fasayan India LTD) at around 10:15pm on 10/09/2022 and he sustained burns over face, both upper limbs, back with fracture left elbow painful swelling with multiple wounds all over body. He was primarily treated at Sanjivani hospital, Sachin and then was brought here for further management.
O/E:- oriented, vitals-stable, flame burns over [face (9%), left upper limb (6%), right upper limb (1%), back (4%)-total 20 %] with inhalation burns +, multiple wounds over body with left elbow painful swelling +.
He was investigated / evaluated and below mentioned medications started. His X-Ray s/o left ulna olecranon fracture for that he was referred to Dr. Aniruddha Solanki and plan for surgery. Burns dressings were done regularly. After receiving fitness from Physician & consent from relatives, he was taken up below mentioned surgery. He was also referred to Opthalmologist for eye assessment who ruled out the eye injury and started eye drops & ointment as per his advice. Patient is stable now, vitals-normal and gets discharged.

Medical Rx : Inj.Pauro, Inj.Presto, Inj.Ondem, Inj.Ivcetamol, Inj.Contramal, IV fluids, Inj.Amikin, Metrogyl gel, Inj.Optineuron, Moxicip eye drops, Refresh eye gel, Ocuspo eye ointment, Cap. Omez D, Tab.Ultracet.

Radiological Investigations : Attached with file.

Surgical Note : Burns dressings by Dr. Hiren Desai on 11/09/2022, 12/09/2022, 13/09/2022, 15/09/2022.

Close fracture left Olecranon-fixed with one 6.5mm CC screw with spike washer, tricep & small fragment tie with fibre wire by Dr.Aniruddha Solanki on 12/09/2022.

Laboratory Investigations : Attached with file.

Condition On Discharge : Patient is oriented, vitals-stable, fair both upper limbs dressings in situ with left elbow pouch in situ.

How To Obtain Urgent Care

In case of any complaints, contact Apple-Maitreya hospital. Emergency contact No.: 0261-6696060, 0261-6696061.

Apple Maitreya
Multi Super Speciality Hospital

DISCHARGE SUMMARY

Medicine Name	GenericName	Frequency	Remarks1	Total Days	Total
TAB. CEFIXIM 200MG		1-0-1	-	7	14
TAB. ORTIZ 0		1-0-1		7	14
TAB. PRO 40		1-0-1	-	7	14
TAB. SUBLOCAL 100MG		1-0-1	-	15	30
INTRAVENOUS		5-6 times a day (OVER FACT)	-	0	0
REFRESH TEAR DROPS 0.5%(W/V)		1-1-1-1-1-1 DROP		0	0
NORTOP EYE DROPS		1-1 DROP	-	0	0
[illegible] OINTMENT		2 TIMES A DAY		0	0

Advice On Discharge/ On Follow up : : Burns dressing on 17/09/2022 at Apple Maitreya hospital
Lok sitflow dressing on 20/09/2022 at Dr. Aniruddha Solanki's hospital.

Follow UP :With Dr.Hiren Desai on 17/9/2022 at 11am.
Dr.Aniruddha Solanki on 20/9/2022 after prior appointment.

GENERAL INSTRUCTION :

All the Medicines with their importance as well as their side effects has been explained to me (Patient / Relative) in my own language & I agree that I have understood it well and shall follow the same

[illegible]

Prepare By : [illegible]

DR. HIREN DESAI

Signature

Apple Maitreya
Multi Super Speciality Hospital

DISCHARGE SUMMARY

Name :KAUSHAL VIRENDRABHAI GOHIL	Age/Sex 25 Yrs./Male	UHID : 13131
Dr. Name : DR. HIREN DESAI DR. VINESH SHAH	IPD No : I/0922/1350	
Discharge Type : Improved	Room Type : Micu	
DOA & Time : 11/09/2022 12:57 am	DOD & Time : 15/09/2022 3:00 pm	

Diagnosis : **MULTIPLE SUPERFICIAL WOUNDS OVER RIGHT HAND, LEFT FOREARM, LEFT LEG THROUGH FLYING OBJECTS FROM CHEMICAL TANK BLAST IN CHEMICAL FACTORY WITH LEFT LUNG LOWER LOBE LACERATIONS WITH LEFT LEG STRESS BONE EDEMA.**

History and Clinical Summary : A 25 years old male patient came with alleged h/o injury all over body through flying objects in chemical factory due to tank blast at his work place (Anupam Rasayan India LTD) at around 10:15pm on 10/09/2022. He had complaint of right chest pain, left leg pain & multiple abrations over body. He was primarily treated at Sanjivani hospital, Sachin then was brought here for further management.
O/E: Oriented, vitals-stable, multiple small superficial wounds over right hand, left forearm & left leg.
He was investigated / evaluated and below mentioned medications. His HRCT lungs revealed right lower lobe lacerations and was referred to Dr.Alpesh Parmar and was treated according to his advice. He had persistent left leg pain, can not bear weight on leg hence he was evaluated by Orthopedic doctor, left leg MRI done which revealed grade II/II stress bone edema and advises to rest the left leg for 15-20 days (non weight bearing walking). As per need dressings done. Patient is stable now, vitals normal and gets discharged.

Medical Rx : Inj.Tezro, Inj.Presto, Inj.Ondan, Inj.Ivcetamol, Inj.Centramol, Syp.Dilo DX, IV Fluid, Cap.Omez, Tab.Combiflam, Syp.Dilo Dx, Inj.Opticeuron.

Radiological Investigations : Attached with file.

Laboratory Investigations : Attached with file.

Condition On Discharge : Patient is oriented, vitals-stable, fair dressings over right hand, right arm, left arm & left leg in situ.

How To Obtain Urgent Care

In case of any complaints, contact Apple-Maitreya hospital, Emergency contact No.: 0261-6696060, 0261-6696061.

Medicine Name	GenericName	Frequency	Remarks1	Total Days	Total
[illegible]		1-0-1		5	10
CAP. OMEZ 20MG		1-0-1	-	5	10
TAB. COMBIFALM		1-1-1	-	5	15
SYP. DILO Dx		5ml-5ml-5ml .. hll stock	-	0	0

Apple Maitreya
Multi Super Speciality Hospital

DISCHARGE SUMMARY

Advice On Discharge/ On Follow up : : Dressing every 3rd day.

Follow UP : **with Dr.Hiren Desai on 17/09/2022 after prior appointment.**

GENERAL INSTRUCTION :

All the Medicines with their importance as well as their side effects has been explained to me (Patient / Relative) in my own language & I agree that I have understood it well and shall follow the same.

મારી / અમારી / સંબંધી / આપી બાબત આ દવાઓ અને તેની આડઅસરો વિશે મને / અમને સમજાવવામાં આવ્યું છે અને તેને મારી / અમારી / સંબંધી ભાષામાં મને / અમને સમજાવવામાં આવ્યું છે.

તારીખ : સમય : સંબંધ : સહી/છાપ:

Prepare By : ICU Third Floor

DR. HIREN DESAI

Signature

Apple Maitreya
Multi Super Specality Hospital

DISCHARGE SUMMARY

Name : JATIN THAKORBHAI PATEL		Age/Sex : [illegible] Yrs /Male	UHID : [illegible]
Dr. Name : DR. HIREN DESAI DR. VINESH SHAH		IPD No : I/0922/1351	
Discharge Type : Improved		Room Type : Male	
DOA & Time : 11/09/2022 1:11 am		DOD & Time : 16/09/2022 5:00 pm	

Diagnosis : **ALLEGED H/O INJURIES OVER RIGHT SIDE OF CHEST, RIGHT THIGH & RIGHT UPPER LIMB THROUGH FLYING OBJECTS FROM CHEMICAL TANK BLAST (MULTIPLE WOUNDS OVER RIGHT THIGH, RIGHT UPPER LIMB WITH RING FINGER, RIGHT SIDE OF CHEST INJURY (RIGHT HAEMOPNEUMOTHORAX WITH LUNG CONTUSIONS WITH FRACTURE 4TH & 5TH RIBS)).**

History and Clinical Summary : A 26 years old male came with alleged H/o injuries over right side of chest, right thigh & right upper limb through flying objects from chemical tank blast at work place (Anupam Rasayan India LTD) at around 10:45pm on 10/09/2022. He was primarily treated at Sarpavi Hospital, Sachin and then was brought here for further management.
O/E - oriented, vitals stable, right side of chest [illegible] tenderness + Right thigh [illegible] over right thigh [illegible] Right arm with [illegible] dressing [illegible] & right side of chest
He was investigated / evaluated and below mentioned medications started. His CBCT scans showed right haemopneumothorax with right lung contusions and for that he was referred to Dr. Alpesh Parmar (CTVS) for [illegible] and was kept under conservatively according to his advice [illegible] dressing done. His follow up X-ray chest shows improvement [illegible] vitals normal and pain decreased.

Medical Rx : [illegible] Tab Pantop [illegible] Inj Pantanac [illegible] Tab Ultracet [illegible] Tab Ultracet [illegible] Inj Emeplar Aq

Radiological Investigations : [illegible]

Laboratory Investigations : Attached with file.

Condition On Discharge : Patient [illegible] vitals stable, [illegible] right arm [illegible] dressing in situ

How To Obtain Urgent Care

In case of any complaints, contact Apple-Maitreya hospital. Emergency contact No.: 0261-6696060, 0761-6696061.

Medicine Name	GenericName	Frequency	Remarks	Total Days	Total
[illegible]		0-0-1		[illegible]	[illegible]
TAB VOVERAN SR		0-0-1		5	10
CAP OMEZ 20MG		1-0-0		5	10

Advice On Discharge/ On Follow up : Right arm / hand dressing as per advice.

Apple Maitreya
Multi Super Speciality Hospital
Vidhan Bhavan, Ring Road, Surat
Phone : (0261) 4000000
24x7 Helpline No. : 91 79 701 000

DISCHARGE SUMMARY

Follow UP : With Dr. Hiren Desai and Dr. Alpesh Parmar on 20/09/2022 at 11am with appointment.

GENERAL INSTRUCTION :

All the instructions with their importance as well as their side effects has been explained to me (Patient / Relative) in my own language & I agree that I have understood it well and shall follow the same.

(દર્દી / સગાંનું) નામ આપેલ સૂચનાઓ તેના મહત્વ તેમજ આડઅસરો મને (દર્દી / સગાંને) મારી પોતાની ભાષામાં સમજાવવામાં આવેલ છે. મને સારી રીતે સમજાયું છે. અને હું તેનું પાલન કરીશ.

તારીખ : સમય : સહી : નામ :

Prepare By : Second Floor

DR. HIREN DESAI

Signature

MAITREYA HOSPITAL PVT. LTD. SURAT

Apple Maitreya
Multi Super Speciality Hospital

DISCHARGE SUMMARY

Name : RAKESH DANABHAI LADUMOR		Age/Sex : [illegible]	UHID : [illegible]
Dr. Name : DR. HIREN DESAI DR. VINESH SHAH		IPD No : 1/0922/1352	
Discharge Type : Improved		Room Type : Male	
DOA & Time : 11/09/2022 1:20 am		DOD & Time : 13/09/2022 2:12 pm	

Diagnosis : 8% FLAME BURNS OVER LEFT SIDE FACE WITH EAR, LEFT UPPER LIMB & LEFT LOWER LIMB WITH INHALATION BURNS WITH LEFT FLANK WOUND
HBSAG +VE

History and Clinical Summary : A 28 year old male (HbsAg positive) came with alleged h/o flame with chemical burns due to chemical tank blast at work place (Anupam Rasayan India LTD) at around 01:15pm on 10/09/2022 and he sustained burns over face & left hands. He was primarily treated in [illegible] hospital, Sachin and then was brought here for further management.
O/E :- oriented, vitals stable, flame burns over [illegible] left upper limb (4%) left facial face with ear (2%) and left lower limb (3%) total 8 %, with inhalation burns with wound over left flank.
He was investigated / evaluated and [illegible] per need dressings were done. Patient is stable, ambulatory and gets discharged.

Medical Rx : Inj.Tetanus, Inj.Pantop, Inj.Ondem, Inj.[illegible], Inj.[illegible], IV fluids, Nebulization

Radiological Investigations : Attached with file

Laboratory Investigations : Attached with file

Condition On Discharge : Patient is oriented, vitals stable, fair [illegible] and dressing is done

How To Obtain Urgent Care

In case of any complaints, contact Apple-Maitreya hospital. Emergency contact No.: 0261-6696060, 0261-6696061

Medicine Name	GenericName	Frequency	Remarks	Total Days	Total
TAB.CEFTUM 500MG		[illegible]			
TAB.COMBIFLAM		[illegible]			
CAP.PANTOP [illegible]		[illegible]			
METROGYL GEL FOR FA		[illegible] EACH			

Advice On Discharge/ On Follow up : Dressing as per advice
Apply Metrogyl [illegible] over face

Follow UP : with Dr. Hiren Desai 15/09/2022 prior appointment.

Maitreya
Multi Super Specialty Hospital

DISCHARGE SUMMARY

GENERAL INSTRUCTION :

All the Medicines in their importance as well as their quantity ... Patient / Relatives ... before ... and ... should be used ...

... should ... as ...

Date : ... ...

Prepare By : ... Ward / Floor

DR. HIREN DESAI

Signature

MAITREYA HOSPITAL

Apple Maitreya
Multi Super Speciality Hospital
Udhna Darwaja, Ring Road, Surat.
Phone : (0261) 6696000, 6696096
24x7 Helpline No.: 9727 700 600

DISCHARGE SUMMARY

Name : JAYKUMAR KISHORBHAI DESAI	Age/Sex 27 Yrs./Male	UHID : 13134
Dr. Name : DR. HIREN DESAI DR. VINESH SHAH	IPD No : I/0922/1353	
Discharge Type : Improved	Room Type : Micu	
DOA & Time : 11/09/2022 1:40 am	DOD & Time : 19/09/2022 5:00 pm	

Diagnosis : 8% FLAME BURNS OVER RIGHT UPPER LIMB & FACE WITH INHALATION BURNS WITH MULTIPLE WOUNDS OVER CHEST, ABDOMEN, PUBIC AREA, SCALP, RIGHT UPPER LIMB, RIGHT LOWER LIMB THROUGH FLYING OBJECTS IN CHEMICAL FACTORY DUE TO CHEMICAL TANK BLAST.

History and Clinical Summary : A 27 years old male came with alleged H/O flame burns with inhalation burns due to chemical tank blast at work place (Anupam Lavasan India LTD) at around 10:15pm on 10/09/2022 and he sustained burns over face & right upper limb with multiple wounds all over body. He was primarily treated at Sanjivani hospital, Sachin and then was brought here for further management. O/E:-oriented, vitals-stable, flame burns over [face (3%), right upper limb (5%)-total 8 %] with inhalation burns +; multiple wounds over scalp (sutured outside), right upper arm (sutured outside), abdomen , chest, pubic area & left lower limb.
He was investigated / evaluated and below mentioned medications started. As per need dressings were done. He was referred to Dr Bhavin Patel (Opthalmologist) for eye assessment who ruled out the eye injury and started eye drops & ointment as per his advice. Patient is stable now, vitals-normal and gets discharged.

Medical Rx : Inj.Peuro, Inj Presto, Inj Ondan, Inj.Ivcetamol, Inj.Centramol, Inj.TT, Metrogyl Gel, Ciplox eyedrops, IV Fluids, Silverex ointment, Cap Cinnex, Inj Optineuron, Tab.Combiflam, Moxicip eye drops, Refresh eye gel, Oflox eye gel

Radiological Investigations : Attached with file.

Laboratory Investigations : Attached with file.

Condition On Discharge : Patient is oriented, vitals stable, right upper limb dressing in situ

How To Obtain Urgent Care

In case of any complaints, contact Apple-Maitreya hospital. Emergency contact No.: 0261-6696060, 0261-6696061.

Apple Maitreya
Multi Super Specialty Hospital
Udhna Darwaja, Ring Road, Surat.
Phone : (0261) 6696040, 6696096
24x7 Helpline No.: 9727 700 600

DISCHARGE SUMMARY

Medicine Name	GenericName	Frequency	Remarks1	Total Days	Total
TAB. FEBRO 500MG		1-0-1		5	10
CAP. OMEZ 20MG		1-0-1		5	10
TAB. COMBIFALM		1-1-1		5	15
MOXICIP EYE DROPS		1-1-1-1 DROP		0	0
TEBIE EYE DROPS		1-1-1-1 DROP		0	0
OCCUPOL EYE OINTMENT		2 times a day	-	0	0
METROGYL GEL OVER FACE		6-8 times a day	-	0	0
SYP.CREMAFFIN 20ML		at night for constipation		0	0

Advice On Discharge/ On Follow up : : Right upper limb dressing as per advice.
Metrogyl gel over face 6-8 times a day

Follow UP :with Dr.Hiren Desai 19 /09/2022 prior appointment.

GENERAL INSTRUCTION :

All the Medicines with their importance as well as their side effects has been explained to me [illegible] in my own language & I agree that I have understood it well and shall follow the same.

મેં દવાઓ / સૂચનાઓ : મારી ભાષા માં દવાઓની અગત્યતા તથા તેની આડ અસરો વિષે સમજણ આપવામાં આવેલ છે. જે મેં બરાબર સમજી લીધેલ છે અને તેનો અમલ કરીશ છે. એમાં મારી સહમતિ છે.

તારીખ : સમય : સ્થળ : સહી :

Prepare By : ICU Second Floor

DR. HIREN DESAI

Signature

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Multi Super Speciality Hospital

Udhna Darwaja, Ring Road, Surat.
Phone : (0261) 6696000, 6696096
24x7 Helpline No.: 9727 700 600

DISCHARGE SUMMARY

Name : RAKESH RAJENDRA SONI	**Age/Sex** 38 Yrs./Male	**UHID** : 13135
Dr. Name : DR. HIREN DESAI DR. VINESH SHAH	**IPD No : I/0922/1354**	
Discharge Type : Improved	**Room Type** : Micu	
DOA & Time : 11/09/2022 2:01 am	**DOD & Time** : 14/09/2022 2:11 pm	

Diagnosis : **ALLEGED H/O RIGHT THIGH, RIGHT SIDE OF BACK & LEFT FRONTO-PARIETAL BLUNT INJURY THROUGH FLYING OBJECTS FROM CHEMICAL TANK BLAST**

History and Clinical Summary : A 38 years old male came with alleged H/O right thigh, right side of back & left forehead blunt injury through flying objects from chemical tank blast at work place (Anupam Rasayan India LTD) at around 10:15pm on 10/09/2022. He was primarily treated at Sanjivani hospital, Sachin and then was brought here for further management.
O/E:- oriented, vitals-stable, swelling over right thigh with tenderness +, mild tenderness over right back & swelling over left fronto-parietal region +.
He was investigated / evaluated and below mentioned medications started. His X-ray right femur & USG abdomen - normal. Patient is stable, vitals-normal and gets discharged.

Medical Rx : Inj.Feuro, Inj.Presto, Inj.Onden, Inj.Ivcetamol, Inj.Contramal, IV Fluids.

Radiological Investigations : Attached with file.

Surgical Note : ----------

Laboratory Investigations : Attached with file.

Condition On Discharge : Patient is oriented, vitals-stable, right thigh tenderness -decreasing.

How To Obtain Urgent Care

In case of any complaints, contact Apple-Maitreya hospital. Emergency contact No.: 0261-6696060, 0261-6696061.

Medicine Name	GenericName	Frequency	Remarks1	Total Days	Total
TAB.CEFTUM 500MG		1-0-1	-	5	10
CAP.OMEZ 40MG		1-0-1	-	5	10
TAB.COMBIFLAM		1-1-1	-	5	15

Follow UP : **with Dr. Hiren Desai on 17/9/2022 prior appointment.**

GENERAL INSTRUCTION :

All the Medicines with their importance as well as their side effects has been explained to me (Patient / Relative) in my own language & I agree that I have undersood it well and shall follow the same.

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PATIENT SAFETY & QUALITY OF CARE
NABH
CERTIFIED

DISCHARGE SUMMARY

મને (દર્દી / સંબંધી) મારી ભાષા માં બધી જ દવાઓની અગત્યતા અને આડઅસરો વિષે સમજાવવામાં આવેલુ છે. આ વિષે મને સારી રીતે સમજણ પડી છે. અને તે અનુસરીશ.

સહી : નામ : સંબંધ : તારીખ:

Prepare By : ICU Second Floor

DR. HIREN DESAI

Signature

APPLE MAITREYA HOSPITAL PRAKALP SURAT

Apple Maitreya
Multi Super Speciality Hospital
Udhna Darwaja, Ring Road, Surat.
Phone : (0261) 669 6000, 6696096
24x7 Helpline No.: 7777 700 800

DISCHARGE SUMMARY

Name : SACHIN DILIP INGLE		Age/Sex : 21 Yrs./Male	UHID : [illegible]
Dr. Name : DR. HIREN DESAI DR. VINESH SHAH		IPD No : 1/0922/1356	
Discharge Type : Improved		Room Type : Male	
DOA & Time : 11/09/2022 3:05 am		DOD & Time : 13/09/2022 2:03 pm	

Diagnosis	: BLUNT INJURY OVER RIGHT SIDE OF CHEST, LEFT LEG & RIGHT SIDE FACE
History and Clinical Summary	: A 21 years old male came with alleged H/O sustained blunt injuries over left side of chest, left leg & right side of face through metal bangle at around 10:15pm on 10/09/2022 at work place (Anupam Rasayan India LTD) while he was rescuing another persons and one person's metal bangle (kadu) hit him accidently. He was primarily treated at Sanjivani hospital, Sachin then was brought here for further management. O/E:- consions, vitals stable, swelling over left side of chest & left leg, small lacerations over right side of face. He was investigated & evaluated and started below mentioned medications. He responds well. Now he is stable, vitals-normal, mild pain at left side of chest & and gets discharged.
Medical Rx	: Inj.Fresta, Inj.Ondan, Inj.Contramal, IV fluids, Inj Dynapar Aq.
Radiological Investigations	: Attached with file.
Laboratory Investigations	: Attached with file.
Condition On Discharge	: Patient is oriented, vitals-Stable.

How To Obtain Urgent Care

In case of any complaints contact, Apple-Maitreya hospital. Emergency contact No.: 0261-6696060, 0261-6696061

Medicine Name	GenericName	Frequency	Remarks1	Total Days	Total
TAB.COMBIFLAM		1-1-1		5	15
CAP.OMEZ 40MG		1-0-1		5	10

Advice On Discharge/ On Follow up : : Takes medicine regularly

Follow UP : With Dr.Hiren Desai on 17/9/22 after prior appointment.

GENERAL INSTRUCTION :

All the Medicines with their importance as well as their side effects has been explained to me (Patient / Relative) in my own language & I agree that I have understood it well and shall follow the same.

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Phone : (0261) 669 7000, 6699666
24x7 Helpline No : 9727 700 600

DISCHARGE SUMMARY

Prepare By : 4th FLOOR Incharge			DR. HIREN DESAI

Signature

Apple Maitreya
Multi Super Speciality Hospital
Udhna Darwaja, Ring Road, Surat.
Phone : (0261) 6696000, 6696090
24x7 Helpline No.: 9727 700 800

DISCHARGE SUMMARY

Name : GAJANAN RAMESH RAMEKAR	Age/Sex 34 Yrs./Male	UHID : 13139
Dr. Name : DR. HIREN DESAI DR. VINESH SHAH	IPD No : 1/0922/1357	
Discharge Type : Improved	Room Type : Micu	
DOA & Time : 11/09/2022 3:14 am	DOD & Time : 14/09/2022 2:13 pm	

Diagnosis : RIGHT FOOT MULTIPLE SMLL WOUNDS WITH RIGHT GREAT TOE INJURY THROUGH FLYING OBJECTS.
GRAVES DISEASE.

History and Clinical Summary : A 34 years old male came with alleged h/o right foot injury through flying objects from chemical tank blast at his work place (Anupam Rasayan India LTD) at around 10:15pm on 10/09/2022. He had complaint of right foot/great toe pain +. He was primarily treated at Sanjivani hospital, Sachin then was brought here for further management.
O/E: conscious, vitals-stable, multiple small wounds over right foot with right great toe injury +.
He was investigated / evaluated and below mentioned medications started. As per need right foot dressing done.during stay he had complaints of pain neck his USG Neck S/O bilateral thyroiditid and ?nodule.he refered to dr.Pradip dalvadi-endocrinologist] evaluated and treated accordingly.He is stable now, vitals normal and gets discharged.

Medical Rx : Inj.Feuro, Inj.Presto, Inj.Ondan, Contranal, IV Fluids., Tab.Shelcal, Tab.Neomercazole, Tab.Ciplar LA.

Radiological Investigations : Attached with file.

Laboratory Investigations : Attached with file.

Condition On Discharge : Patient is oriented, vitals stable, fair right great toe dressing in situ

How To Obtain Urgent Care

In case of any complaints contact, Apple-Maitreya hospital. Emergency contact No.: 0261-6696060, 0261-6696061

Medicine Name	GenericName	Frequency	Remarks1	Total Days	Total
TAB.CEFTUM 500MG		1-0-1		5	10
TAB.COMBIFLAM		1-1-1	-	5	15
CAP.OMEZ 40MG		1-0-1	-	5	10
Tab.NEOMERCAZOLE 20mg		1-0-1.	-	30	60
TAB.CILAR LA		1-0-1.	-	30	60
TAB.SHALCAL HD		0-0-1	-	30	30

Advice On Discharge/ On Follow up : Takes medicane regularly.
T3,T4,TSH do on 12/10/2022.

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Phone : (0261) 6666000, 6666666
24x7 Helpline No.: 9727 700 800

DISCHARGE SUMMARY

Follow UP : With Dr.Hiren Desai on /9/22 after prior appointment and Dr.Pardip dalwadi on 13/10/2022 with prior appointment.

GENERAL INSTRUCTION :

All the Medicines with their importance as well as their side effects has been explained to me (Patient / Relative) in my own language & I agree that I have understood it well and shall follow the same

મને (દર્દી / સંબંધી) મારી ભાષા માં દવાઓ અને તેની આડ અસરો અંગે સમજાવી આપવામાં આવેલ છે. અને મને તે સમજાઈ ગયેલ છે. અને હું તેનું પાલન કરીશ.

તારીખ : સમય : સંબંધ : સહી :

Prepare By : ICU Second Floor

DR. HIREN DESAI

Signature

APPLE MAITREYA HOSPITAL PRAKALP SURAT

Maitre'a

Multi Super Speciality Hospital

DISCHARGE SUMMARY

Name : AJITKUMAR DEVNANDAN RAY		Age/Sex : 34 Yrs./Male	UHID : 13140
Dr. Name : DR. HIREN DESAI DR. VINESH SHAH		IPD No : I/0922/1358	
Discharge Type : Improved		Room Type : Male	
DOA & Time : 11/09/2022 8:23 am		DOD & Time : 17/09/2022 5:00 pm	

Diagnosis	: 17% FLAME BURNS OVER FACE WITH EARS, LEFT UPPER LIMB & RIGHT UPPER LIMB WITH INHALATION BURNS IN CHEMICAL FACTORY DUE TO CHEMICAL TANK BLAST.
History and Clinical Summary	: A [illegible] male patient with alleged H/O flame burn injuries with inhalation injury due to chemical tank blast at work place (Anupam [illegible] India LLP) at around [illegible] on 10/09/2022 and he sustained burns over face, ears & both upper limbs. He was primarily treated at Sanjivani Hospital, Sachin and then was brought here for further management. On [illegible] oriented, vitals stable, flame burns over [illegible], right upper limb [illegible] left upper limb [illegible] total 17 %] with inhalation burns He was investigated / evaluated and below mentioned medications started. Burns dressings were done regularly. He was also referred to Opthalmologist for eye assessment who ruled out the eye injury and started eye drops & ointment as per his advice. Patient is stable, vitals normal and gets discharged.
Medical Rx	: Inj Levo, Inj Pipzo, Inj Linezo, Inj Ivermol, Inj PPI, IV Fluids, Metrogyl gel, Silver sulfadiazine cream, Inj Optineuron, Moxicip eye drops, Betnesb eye gel, Oxynorm eye ointment, Cap. Omez, Tab Cetrizilium.
Radiological Investigations	: Attached with file.
Surgical Note	: Burns Dressing by Dr. Hiren Desai on 11/09/2022, 13/09/2022, 15/09/2022 & on 17/09/2022
Laboratory Investigations	: Attached with file.
Condition On Discharge	: Patient is oriented, vitals stable, [illegible] burns dressings [illegible]
Note To Obtain Urgent Care	

In case of any complaints, contact Apple-Maitreya hospital. Emergency contact No.: 0261-6696060, 0261-6696061.

Apna Maitreya
Multi Super Speciality Hospital

DISCHARGE SUMMARY

Medicine Name	GenericName	Frequency	Remarks1	Total Days	Total
TAB. FEURO 500MG		1-0-1		5	10
CAP. OMEZ 20MG		1-0-1	-	5	10
TAB. COMBIFLAM		1-0-1	-	5	15
CIPCIP EYE DROPS		1-1-1-1 DROP	-	0	0
REFRESH TEARS DROPS 2 DROPS		1-1-1-1 DROP	-	0	0
OCCUFOL EYE OINTMENT		2 TIMES A DAY		0	0
MEMOSYL GEL		2 TIMES A DAY (OVER TAB.)	-	1	1
TAB DOLO		1-0-1	-	5	10

Advice On Discharge/ On Follow up : Bilateral upper limbs dressing 20/9/2022.

Follow UP : with Dr. Hiren Desai 20/9/2022 prior appointment.

GENERAL INSTRUCTION :

All the Medicines with their importance as well as their side effects has been explained to me (Patient / Relatives) in my own language & I agree that I have understood it well and shall follow the same.

Prepare By : ICU Second Floor

DR. HIREN DESAI

Signature

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Phone : (0261) 6696000, 6696060
24x7 Helpline No.: 9727 700 600

DISCHARGE SUMMARY

Name : GIRENDRA SHARDHA JHA	Age/Sex 40 Yrs./Male	UHID : 13141
Dr. Name : DR. HIREN DESAI	IPD No : I/0922/1359	
Discharge Type : Improved	Room Type : Micu	
DOA & Time : 11/09/2022 3:30 am	DOD & Time : 17/09/2022 5:00 pm	

Diagnosis : 15% FLAME BURNS OVER FACE, RIGHT UPPER LIMB & LEFT UPPER LIMB WITH INHALATION BURNS IN CHEMICAL FACTORY DUE TO CHEMICAL TANK BLAST

History and Clinical Summary : A 40 years old male came with alleged H/O flame burns with inhalation burns due to chemical tank blast at work place (Anupam Rasayan India LTD) at around 10:15pm on 10/09/2022 and he sustained burns over face & both upper limbs. He was primarily treated at Sanjivani hospital, Sachin and then was brought here for further management.
O/E:- oriented, vitals-stable, flame burns over [face (6%), right upper limb (6%), left upper limb (3%) -total 15 %] with inhalation burns +.
He was investigated / evaluated and below mentioned medications started. As per need dressings were done. Patient is stable, v tals-normal and gets discharged.

Medical Rx : Inj.Feuro, Inj.Presto, Inj.Onden, Inj.Contramal, IV Fluids, Metrogyl gel, Silvorex ointment, Inj.Amican, Cap.Omez, Inj.Optineuron, Tab.Feuro.

Radiological Investigations : Attached with file.

Surgical Note : Burns dressing by Dr. Hiren Desai on 11/09/2022, 12/09/2022, 14/09/2022, 15/09/2022 & on 17/09/2022.

Laboratory Investigations : Attached with file.

Condition On Discharge : Patient is oriented, vitals-stable, fair right upper limb & left elbow dressings in situ.

How To Obtain Urgent Care

In case of any complaints, contact Apple-Maitreya hospital. Emergency contact No.: 0261-6696060, 0261-6696061.

Medicine Name	GenericName	Frequency	Remarks1	Total Days	Total
TAB. FEURO 500MG		1-0-1	-	5	10
CAP. OMEZ 20MG		1-0-1	-	5	10
TAB. CONBIFAM		1-1-1	-	5	15
[illegible]		2-4 times a day	-	0	0
TAB.OIO-1		1-0-1	-	5	10

Advice On Discharge/ On Follow up : Right & left upper limbs dressing 20/9/2022.

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Phone : (0261) 6696000, 6696066
24x7 Helpline No.: 9727 700 600

DISCHARGE SUMMARY

Follow UP : with Dr. Hiren Desai 20/9/2022 prior appointment.

GENERAL INSTRUCTION :

All the Medicines with their importance as well as their side effects has been explained to me (Patient / Relative) in my own language & I agree that I have undersood it well and shall follow the same.

મને (દર્દી / સંબંધી) મારી ભાષા માં બધી જ દવાઓની સમજણ અને આડસરો વિશે સમજાવવામાં આવેલ છે. આ વિશે મને મારી રીતે સમજણ પડી છે. અને તે અનુસરીશ.

સહી : ભાષા : સંબંધ : તારીખ:

Prepare By : 2nd Second Floor

DR. HIREN DESAI

Signature

APPLE MAITREYA HOSPITAL LLP SURAT

Apple Maitreya
Multi Super Speciality Hospital
Vidhan Tapovan, Near Head Post
Patel Stadium Rd, Varachha
Ph: 0261-6696060, 6696061
Mob: Helpline No: 97277 00 000

DISCHARGE SUMMARY

Name : SAHIL VIMAL VESUWALA	**Age/Sex** 24 Yrs./Male	**UHID** : 13151
Dr. Name : DR. HIREN DESAI DR. VINESH SHAH	**IPD No** : I/0922/1363	
Discharge Type : Improved	**Room Type** : Micu	
DOA & Time : 11/09/2022 6:50 pm	**DOD & Time** : 19/09/2022 5:00 pm	

Diagnosis : **8% FLAME BURN OVER RIGHT SIDE OF FACE, RIGHT UPPER & LOWER LIMBS WITH INHALATION BURNS IN CHEMICAL FACTORY DUE TO CHEMICAL TANK BLAST.**

History and Clinical Summary : A 24 years old male patient admitted with alleged history of flame burns at chemical factory due to blast tank while he was working at 10.15PM on 10/9/2022. He was primary treated at Navjivan hospital. O/E conscious, vitals stable, flame burns over [face (4.5%), right upper limb (4%), right lower limb (0.5%) total 8 %] with inhalation burns. He was investigated / evaluated and below mentioned medications started. As per need dressings were done. He was referred to Opthalmologist for eye assessment who ruled out the eye injury and started eye drops & ointment as per his advice. Patient is stable now, vitals-normal and gets discharged.

Medical Rx : Inj.Neuro, Inj.Presto, Inj.Ondan, Inj.Ivecotanat, Metrogyl Gel, IV Fluids, Silverex ointment, Cap.Omez, Inj.Ointeuron, Tab. as per Rx

Radiological Investigations : Attached with file.

Laboratory Investigations : Attached with file.

Condition On Discharge : Patient is oriented, vitals stable, right forearm dressing in situ

How To Obtain Urgent Care

In case of any complaints, contact Apple-Maitreya hospital. Emergency contact No.: 0261-6696060, 0261-6696061.

Medicine Name	GenericName	Frequency	Remarks1	Total Days	Total
TAB. PANTOP 500MG		1-0-1		5	10
SYP. COMBIFLAM		1-1-1		5	15
CAP. OMEZ 20MG		1-0-1		5	10
METROGYL DG GEL L/A		3 TIMES A DAY		0	0

Advice On Discharge/ On Follow up : Dressing over right upper limb and face as per advice. Metrogyl gel over face 3 times a day

Follow UP : **with Dr.Hiren Desai 19 /09/2022 prior appointment.**

Apple Maitreya
Multi Super Speciality Hospital
Udhna Darwaja, Ring Road, Surat.
Phone : (0261) 4000000, 2000000
24x7 Helpline No.: 0727 700 800

DISCHARGE SUMMARY

GENERAL INSTRUCTION :

All the Medicines with their importance as well as their side effects has been explained to me (Patient / Relative) in my own language & I agree that I have understood it well and shall follow the same.

Prepare By : ICU Second Floor

DR. HIREN DESAI

Signature

SURAT

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Discharge Summary

Name : **Guru Dayal Singh**	Age/Sex :**30 Yrs. Male**
Dr. Name : **Dr. Samir Gami & Dr. Haresh Vastarpara**	Ward: **2FL-GW-GW-2027** Reg No. :**I/0922/101**
	UHID CODE :**GDS-010**
Other Dr: **TO DR. BHARAT SUTARIYA**	
DOA : **11-Sep-2022**	DOD : **13-Sep-2022**
Admission Time : **1:10:32 AM**	

Diagnosis	:**BURN INJURY**
Clinical Summary	: **A 30 YEAR MALE PATIENT CAME WITH A/H/O- BURN AT ANUPAM RASAYAN FACTORY, SACHIN DUE TO FIRE AT 9:00PM ON 11/09/2022 THEN PATIENT SHIFTED TO SANJIVANI HOSPITAL- TAKEN PRIMARY TREATMENT AND NOW CAME HERE FOR FURTHER MANAGEMENT WITH C/O- LEFT FOREHEAD SWELLING, RIGHT SIDE ABDOMINAL PAIN, RIGHT LOWER LIMB PAIN. AND SWELLING, VITAL ON ADMISSION T-N, PULSE - 77/MIN , BP- 118/70 MM OF HG, SPO2- 95% ON RA. S/E: C.V.S-S1S2+, G.I.T- ABDOMEN SOFT, RESPI- AEBE, C.N.S-CONCIOUS AND ORIENTED. L/A: SWELLING AND PAIN IN RIGHT LEG. PATIENT CAME WITH ABOVE MENTION COMPLAIN, AND ADMITTED IN WARD UNDER DR SAMIR GTAMI, DR HARESH VASTARPARA, WHERE RELAVENT INVESTIGATION DONE, AND MEDICAL MANAGEMENT DONE ACC. TO INVESTIGATION. REFERENCE GIVEN TO DR. BHARAT SUTARIYA ATTAIN BY HIM AND ADVICE FOLLOWED, PATIENT GRADUALLY IMPROVED , HEMODYNAMACALLY STABLE SO DICHARGE WITH ORAL MEDICATION AS PER ADVICE.**
Treatment Given	: **MLC DONE, INJ CEFTRIAXONE 2GM, INJ DYNAPAR 1AMP, INJ PANTOP 40MG, INJ EMSET 4MG, IVF, TAB ENZOFLAM, TAB PHLOGAM, IVF,**
Radiological Investigations And Others	: **-ECG, X-RAY RIGHT LOWER LIMB, USG CHEST, USG ABDOMEN + KUB, ALL REPORTS ARE ATTACHED WITH FILE**
Laboratory Investigations	: **-CBC, RBS, S.ELECTROLYTE, ALL REPORTS ARE ATTACHED WITH FILE**
Rx (Treatment Advise)	: **TAB ZIFI 200MG P/O 1-----0-----1 X 5DAYS TAB ENZOFLAM P/O 1----0----1 X 5DAYS TAB PHLOGM P/O 1----0----1 X 5DAYS TAB PAN 40MG P/O 1----0----1 X 5DAYS**
Condition On Discharge	: **-HEMODYNAMICALY STABLE**
When To Obtain Urgent Care	: **IN CASE OF PAIN AT LEG , ABDOMINAL PAIN, SWLLING.**

Discharge Summary

How To Obtain urgent Care	: **Emergency +91-9426645559 ,0261-6776608**
Follow up	: **AFTER 5DAYS TO DR DIVYESH VAIDYA**
Diet Advice	: **-FD+HPD**

Dr. Samir Gami & Dr. Haresh Vastarpara
Signature

Clinical Assistant Name: DR BHUMIKA, DR CHARMI

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Discharge Summary

Name : **Shubham Yuvraj Idhate**	Age/Sex :24 Yrs. Male
Dr. Name : **Dr. Samir Gami & Dr. Haresh Vastarpara**	Ward: 2FL-GW-GW-2013 Reg No. :I/0922/103
	UHID CODE :SYI-001
Other Dr: **DR BHARAT SUTHARIA**	
DOA : **11-Sep-2022**	DOD : 12-Sep-2022
Admission Time : **2:38:18 AM**	

Diagnosis	:A/H/O:BURN INJURY
Clinical Summary	: A 24 YEARS OLD MALE PATEINT CAME WITH A/H/O- BURN AT ANUPAM RASAYAN , SACHIN AT 9:00 PM ON 10/9/22.SO THAT PATIENT SHIFTED OUT AT SANJIVANI HOSPITAL , THERE TAKEN PRIMARY TREATMENT AND THEN NOW CAME HERE FOR FURTHER MANAGEMENT AT 2:45 AM ON 11/9/22. C/O- LEFT SIDE KNEE LEG PAIN, BURNING SENSATION ALL OVER BODY, BODYACHE . PATIENTS VITAL ON ADMISSION T-N, PULSE - 97/MIN , BP- 110/70 MM OF HG, RR- 24/MIN , SPO2- 100% ON RA. S/E: C.V.S-S1S2+, G.I.T- ABDOMEN SOFT, RESPI- AEB C.N.S-CONCIOUS AND ORIENTED. LOCAL EXAMINATION - LEFT LEG PAIN. PATIENT CAME WITH ABOVE MENTION COMPLAIN, AND ADMITTED IN WARD WHERE RELAVENT INVESTIGATIOI DONE, AND MEDICAL MANAGEMENT DONE ACC. TO INVESTIGATION , REFRENCE GIVEN TO DR BHARAT SUTHARIYA FOR LEFT FOOT PAIN, AND HE ADVISE THAT LEFT FOOT IS NORMAL NO ANY FRATCTUR OR DISLOCTION IS PRESENT. PATIENT GRADUALLY IMPROVED , HEMODYNAMACALLY STABLE SO DICHARGE WITH ORAL MEDICATION.
Treatment Given	: MLC INFORMED AT SACHIN GIDC ,IV FUILD,INJ CEFTRIAXONE 2GM, INJ PAN 40MG, INJ EMSET 4MG, INJ DYNAPAR-AQ,TAB ULTRASET SEMI, TAB ENZOFLAM
Radiological Investigations And Others	: -X-RAY HIL TP/XL AND FOOT AP/LAT (LEFT SIDE) REPORT IS ATTACHED TO FILE AND HANDOVER TO RELATIVE
Laboratory Investigations	: -CBC, S.CREATININE, S.ELECTROLYTE, RBS, SGPT ALL REPORTS ARE ATTACHED TO FILE AND HANDOVER TO RELATIVE .

Discharge Summary

Rx (Treatment Advise)	: ON DISCHARGE- TAB ZIFI 200 P/O 1----0-----1 X 5 DAYS X 10:00AM--0--10:00PM TAB OCID 40MG, P/O 1-----0-----1 X 5 DAYS X BEFORE MEAL X 6:00AM---0---6:00PM TAB ENZOFLAM P/O 1---0-----1 X 5 DAYS X 10:00AM---0---10:00PM
Condition On Discharge	: -HAEMODYNAMICALLY STABLE
When To Obtain Urgent Care	: SEVERE PAIN AND BURNING SENSATION
How To Obtain urgent Care	: Emergency +91-9426645559 ,0261-6776608
Follow up	: AFTER 15 DAYS TO DR SAMIR GAMI
Diet Advice	: -SOFT DEIT+LIQUID DEIT+HIGH PROTEIN DEIT

Dr. Samir Gami & Dr. Haresh
Vastarpara
Signature

Clinical Assistant Name: DR.RUCHITA/DR.SIDDHI/DR BHUMIKA

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Discharge Summary

Name : Vinay - Kushwaha	Age/Sex :28 Yrs. Male
Dr. Name : Dr. Samir Gami & Dr. Haresh Vastarpara	Ward: 2FL-GW-GW-2014 Reg No. :I/0922/104
	UHID CODE. :V-K-048
Other Dr: DR SAMIR GAMI AND DR HARESH VASTRAPARA	
DOA : 11-Sep-2022	DOD : 12-Sep-2022
Admission Time : 2:47:04 AM	

Diagnosis	:A/H/O: BURN INJURY
Clinical Summary	: A 28 YEAR MALE PATIENT CAME WITH A/H/O- BURN AT ANUPAM RASAYAN , SACHIN AT 9:00 PM ON 10/9/22.SO THAT PATIENT SHIFTED OUT AT SANJIVANI HOSPITAL , THERE TAKEN PRIMARY TREATMENT AND THEN NOW CAME HERE FOR FURTHER MANAGEMENT AT 2:45 AM ON 11/9/22. C/O- BACKPAIN , MILD STRECH ON BACK SIDE, BREATHLESSNESS. PATIENTS VITAL ON ADMISSION T-N, PULSE - 92/MIN , BP- 110/90 MM OF HG, RR- 24/MIN , SPO2- 100% ON RA. S/E: C.V.S-S1S2+, G.I.T- ABDOMEN SOFT, RESPI- AEB C.N.S-CONCIOUS AND ORIENTED. LOCAL EXAMINATION - STRECH ON BACK SIDE. PATIENT CAME WITH ABOVE MENTION COMPLAIN, AND ADMITTED IN WARD WHERE RELAVENT INVESTIGATION DONE, AND MEDICAL MANAGEMENT DONE ACC. TO INVESTIGATION , PATIENT GRADUALLY IMPROVED , HEMODYNAMACALLY STABLE SO DICHARGE WITH ORAL MEDICATION.
Treatment Given	: MLC SACHIN POLICE STATION GIDC INJ MONOCEF 2GM IV BD INJ PAN 40MG IV BD INJ EMSET 4MG TDS INJ DYNAPAR AQ IV STAT IV FLUID
Radiological Investigations And Others	: ALL REPORTS ARE ATTCHED WITH FILE HANDOVER TO RELATIVE =CHEST X-RAY
Laboratory Investigations	: ALL REPORTS ARE ATTCHED WITH FILE HANDOVER TO RELATIVE =CBC, S.CREAT, S.ELECROLYTE, RBS
Rx (Treatment Advise)	: ON DISCHARGE .... TAB ZIFI 200MG P/O 1-0-1 FOR 5 DAYS X 10:00AM---0---10:00PM TAB PAN 40 MG P/O 1-0-1 FOR 5 DAYS X BEFORE MEAL X 6:00AM---0---6:00PM TAB LANOL-ER P/O 1---1----1 X 6:00AM---2:00PM----10:00PM X 3 DAYS

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Discharge Summary

Condition On Discharge	: **PATIENT HEMODYNAMACLLY STABLE,CONCIOUS & ORIENTED ,F/V/C,E4V5M6**
When To Obtain Urgent Care	: **SEVERE PAIN AND BURNING SENSATION**
How To Obtain urgent Care	: **Emergency +91-9426645559 ,0261-6776608**
Follow up	: **AFTER 15 DAYS TO DR SAMIR GAMI**
Diet Advice	: **-FULL DEIT+HIGH PROTEIN EIT**

Dr. Samir Gami & Dr. Haresh Vastarpara
Signature

Clinical Assistant Name: DR SIDDHI /DR RUCHITA /DR NENSI , DR HASMUKH

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Discharge Summary

Name : **Arun Santosh Patil** Age/Sex :**52 Yrs. Male**

Dr. Name : **Dr. Samir Gami & Dr. Haresh Vastarpara** Ward: **2FL-GW-GW-2025** Reg No. :**I/0922/105**

UHID CODE :**ASP-107**

Other Dr: **TO DR. VITRAG SHAH/ DR. JIGAR PATEL**

DOA : **11-Sep-2022** DOD : **16-Sep-2022**

Admission Time : **3:01:50 AM**

Diagnosis : **BURN INJURY**

Clinical Summary : **A 52 YEARS OLD MALE PATIENT CAME WITH A/H/C BURNS INJURY A MASS CASUALITY AT ANUPAM RASAYAN FACTORY DUE TO FIRE AT 9PM ON 10/9/22 THEN PATIENT SHIFTED TO SANJIVANI HOSPITAL FOR PRIMARY TREATMENT THEN CAME TO UNIQUE HOSPITAL AT 2: 45AM 11/9/22 FOR FURTHER MANAGEMENT, DRESSING DONE ON OUTSIDE (SANJIVANI)**
C/O- BURNING SANSATION ALL OVER BODY, HEADACHE, SWELLING OVER THE FACE AND EYE, ALL 4 LIMBS MOVEMENT
ON ADMISSION VITALS: T- 97.8F, P- 95/MIN, BP- 110/70 MMHG, RR- 24/MIN, SPO2- 98% ON RA
S/E: CVS- S1S2 N, P/A- SOFT, RS- NAD, CNS- CONCIOUS AND ORIENTED, GCS- E4V5M6, POWER- 4/5 4/5, L/A: BURNING SENSATION - UPPER LIMB, FACE, SWELLING OF EYE
PATIENT ADMITTED IN ICU FOR FURTHER MANAGEMENT AS PER ADVICE BY DR. SAMIR GAMI/ DR. HARESH VASTRAPARA.REFF.GIVEN TO DR.VITRAG SHAH,ATTAIN BY HIM,ADVICE FOLLOWS ACC.AFTER ALL ADVICED MEDICATION AND CARE GRADUALLY GENERAL CONDITION OF PATIENT IS IMPROVING SO SHIFTED TO WARD.IN WARD STAY ALL ADVICED MEDICATION AND CARE GIVEN ,PATIENT HAVING BRADYCARDIA SO REF.GIVEN TO DR.DEVANG DESAI FOR 2D ECHO,ATTAIN BY HIM ,2D ECHO S/O-NO DIASTOLIC DYSFUNCTION,IVC NOT CONGESTED.DRESSING OF BURN DONE BY DR.VITRAG SHAH UNDER L/A ON DATE 14/09/2022.AT PRESENT PATIENT IS VITALLY AND HEMODYNAMICALLY STABLE SO DISCHARGE GIVEN WITH FOLLOWING MEDICATIONS.

Treatment Given : **INJ PANTOP 40MG, INJ EMSET 4MG, INJ MONOCEF 2GM, INJ PCM 1GM, IVF**

Radiological Investigations And Others : **-ECG, 2D ECHO, ALL REPORTS ARE ATTACHED WITH FILE**

Laboratory Investigations : **-CBC, S.CREATININE, S. ELECTROLYTE, RBS, ABG,HIV,HBSAG,HCV= ALL REPORTS ARE ATTACHED WITH FILE**

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Discharge Summary

Rx (Treatment Advise)	: **TAB.MORTEGA P/O 1---0---1 X 15 DAYS** **TAB.RAFRON-TOTAL P/O 1---0---1 X 15 DAYS** **TAB.ULTRACET-SEMI P/O 1---0---1 X 15 DAYS** **SYP.CREMAFFIN PLUS 30ML P/O HS X 5 DAYS**
Condition On Discharge	: **HAEMODYNAMICALLY STABLE,DRESSING IN SITU.DRESSING DONE ALTERNATE DAY.**
When To Obtain Urgent Care	: **SEVERE PAIN, BURNING SENSATION**
How To Obtain urgent Care	: **Emergency +91-9426645559 ,0261-6776608**
Follow up	: **TO DR DIVYESH VAIDYA AFTER 5 DAYS**
Diet Advice	: **FULL DEIT+HIGH PROTEIN DEIT**

Dr. Samir Gami & Dr. Haresh

Clinical Assistant Name: DR BHUMIKA

Vastarpara
Signature

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Discharge Summary

Name : **Akshay Ajitbhai Patel**	Age/Sex :**22 Yrs. Male**
Dr. Name : **Dr. Samir Gami & Dr. Haresh Vastarpara**	Ward: **2FL-GW-GW-2017** Reg No. :**I/0922/107**
	UHID CODE :**AAP-091**
Other Dr: **DR CHINTAN DALAL**	
DOA : **11-Sep-2022**	DOD : **13-Sep-2022**
Admission Time : **03:32:11 AM**	

Diagnosis : **BURN INJURY**

Clinical Summary : **A 22 YEAR OLD MALE PATIENT CAME WITH A/H/O- BURN INJURY AT ANUPAM RASAYAN FACTORY, SACHIN DUE TO FIRE AT 9:00 PM ON 10/09/2022. SO THAT PATIENT SHIFTED OUT AT SANJIVANI HOSPITAL- TAKEN PRIMARY TREATMENT AND NOW CAME HERE FOR FURTHER MANAGEMENT AT 2:45 AM ON 11/09/2022.**
C/O- LEFT SIDE FACE BURNING, LEFT HAND BURN AND WHOLE NECK SWELLING AND ON RIGHT HAND 2STICHES WERE TAKEN FROM OUTSIDE .
ON ADMISSION VITAL= T-N, PULSE - 92/MIN , BP- 110/75 MM OF HG, RR- 24/MIN , SPO2- 98% ON RA. S/E: C.V.S-S1S2+, G.I.T-ABDOMEN SOFT, RESPI- AEBE, C.N.S-CONCIOUS AND ORIENTED. LOCAL EXAMINATION - FACE SWELLING.
PATIENT CAME WITH ABOVE MENTION COMPLAIN, AND ADMITTED IN WARD UNDER DR SAMIR GAMI/DR HARESH VASTARPARA, WHERE RELAVENT INVESTIGATION DONE, AND MEDICAL MANAGEMENT DONE ACC. TO INVESTIGATION ,
REF GIVEN TO DR CHINTAN DALAL I/V/O LEFT EYE REDNESS, BURNING SENSATION, WATERY EYE. ATTAIN BY HIM, ADVICED FOLLOWED, TX CONSERVATIVE,
PATIENT GRADUALLY IMPROVED , HEMODYNAMACALLY STABLE SO DICHARGE WITH ORAL MEDICATION.

Treatment Given : **MLC DONE,**
INJ MONOCEF 2GM, INJ PAN 40MG, INJ EMSET 4MG, INJ DYNAPAR-AQ, IVF, REFRESH EYE DROPS, H P GEL E.O, MOXIGEN LP E.D.

Radiological Investigations And Others : **CXR REPORT IS ATTACHED TO FILE**

Laboratory Investigations : **CBC, S.CREATININE, S.ELECTROLYTE, RBS REPORTS ARE ATTACHED TO FILE**

Discharge Summary

Rx (Treatment Advise)	: TAB ZIFI 200MG P/O 1 0 1 X 5DAYS TAB DOLO 650MG P/O SOS IF PAIN TAB PAN 40MG P/O 1-----0-----1 X 5DAYS REFRESH EYE DROPS 5 TIMES/DAY X 10DAYS H P GEL EYE OINTMENT LEFT EYE 0------1------0------1 X10DAYS MOXIGEN LP EYE DROPS FOR BOTH EYES X 1------1------1-----1 10DAYS
Condition On Discharge	: HAEMODYNAMICALLY STABLE, STITCH REMOVAL IN FOLLOW UP
When To Obtain Urgent Care	: SEVERE PAIN AND BURNING SENSATION
How To Obtain urgent Care	: Emergency +91-9426645559 ,0261-6776608
Follow up	: TO DR DIVYESH VAIDYA AFTER 5DAYS
Diet Advice	: FULL DEIT+HIGH PROTEIN DEIT

Dr. Samir Gami & Dr. Haresh Vastarpara
Signature

Clinical Assistant Name: DR BHUMIKA, DR CHARMI

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Discharge Summary

Name : Jitendra Dinanath Rajbhar		Age/Sex	:35 Yrs. Male
Dr. Name : Dr. Samir Gami & Dr. Haresh Vastarpara	Ward: 2FL-GW-GW-2028	Reg No.	:I/0922/108
		UHID CODE	:JDR-010
Other Dr:			
DOA : 11-Sep-2022		DOD : 13-Sep-2022	
Admission Time : 03:57:49 AM			

Diagnosis	:BURN INJURY
Clinical Summary	: A 35 YEAR OLD MALE PATIENT CAME WITH A/H/O- BURN AT ANUPAM RASAYAN FACTORY, SACHIN AT 9:00 PM ON 10/09/2022 DUE TO FIRE AT PLACE .SO THAT PATIENT SHIFTED OUT AT SANJIVANI HOSPITAL- TAKEN PRIMARY TREATMENT AND NOW CAME HERE FOR FURTHER MANAGEMENT AT 2:45 AM ON 11/09/2022. C/O-LEFT SIDE ABDOMINAL PAIN, FACE BURN, BURNING SENSATION ALL OVER FACE. VITAL ON ADMISSION T-N, PULSE - 71/MIN , BP- 110/60 MM OF HG, RR- 24/MIN , SPO2- 96% ON RA. S/E: C.V.S-S1S2+, G.I.T-ABDOMEN SOFT, RESPI- AEBE, C.N.S-CONCIOUS AND ORIENTED. LOCAL EXAMINATION - FACE SWELLING . PATIENT CAME WITH ABOVE MENTION COMPLAIN, AND ADMITTED IN ICU UNDER CARE OF DR SAMIR GAMI, DR HARESH VASTARPARA, WHERE RELAVENT INVESTIGATION DONE, AND MEDICAL MANAGEMENT DONE ACC. USG ABDOMEN DONE S/O MILD SUBCUTANEOUS EDEMA IN ANTERIOR ABDOMINAL WALL IN LEFT LUMBAR REGION, , MEDICAL MX DONE, AS PATIENT WAS VITALLY STABLE SHIFTED TO GENERAL WARD. PATIENT GRADUALLY IMPROVED , HEMODYNAMACALLY STABLE SO DICHARGE WITH ORAL MEDICATION.
Treatment Given	: MLC DONE, INJ MONOCEF 2GM, INJ EMSET 4MG, INJ PAN 40MG, INJ DYNAPAR-AQ 1GM, INJ PCM 1GM, INJ DEXTROS 25% (100ML), IVF
Radiological Investigations And Others	: -USG ABDOMEN, CXR, 2-D ECHO, REPORTS ARE ATTACHED WITH FILE.
Laboratory Investigations	: -CBC, S.CREATININE, S.ELECTROLYTE, RBS REPORTS ARE ATTACHED WITH FILE
Rx (Treatment Advise)	: TAB ZIFI 200MG P/O 1----0----1 X 5DAYS TAB PAN 40 MG P/O 1-----0-----1 X 5DAYS TAB DOLO 650MG P/O 1-----1-----1 X 5DAYS
Condition On Discharge	: HAEMODYNAMICALLY STABLE,

Discharge Summary

When To Obtain Urgent Care	: **SEVERE PAIN , BURNING SENSATION**
How To Obtain urgent Care	: **Emergency +91-9426645559 ,0261-6776608**
Follow up	: **TO DR DIVYESH VAIDYA AFTE 5DAYS**
Diet Advice	: **FULL DEIT+HIGH PROTEIN DEIT**

Dr. Samir Gami & Dr. Haresh Vastarpara
Signature

Clinical Assistant Name: DR BHUMIKA, DR CHARMI

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સંયુક્ત નિયામક, ઔદ્યોગિક સલામતી અને સ્વાસ્થ્યની કચેરી, સુરત રીજીયન, સુરત
"બી બ્લોક", દફ્ઠો માળ, જીલ્લા સેવા સદન-૨, અઠવાલાઈન્સ, સુરત.
ફોન નં.૦૨૬૧-૨૬૫૩૫૦૨, ફેક્સ નં.૦૨૬૧-૨૬૫૩૫૦૧

રજી.પો.એ.ડી./ હાથોહાથ

ક્રમાંક/સં.નિ/ઔ.સ.સ્વ./સુ.રીજી/ ૫૨૪૯ /૨૦૨૨

તા. / /૨૦૨૨

પ્રતિ,

કબ્જેદારશ્રી

અનુપમ રસાયણ ઇંડિયા લી. (યુનીટ-VI)

પ્લોટ નં.૨૪૨૩ અને ૨૪૨૫, જી.આઇ.ડી.સી.,સચીન, સુરત.

વિષય :-કારખાના અધિનિયમ-૧૯૪૮ ની કલમ ૪૦(૨) હેઠળ બંધના હુકમ બાબત.

(૧) તા.૧૧/૦૯/૨૦૨૨ ના રોજ નીચે સહી કરનારે કારખાનામાં તા.૧૦/૦૯/૨૦૨૨ ના રોજ બીજી શીફ્ટમાં બનેલ આગના બનાવની તપાસ અર્થે શ્રી આર.એ.પટેલ, સંયુકત નિયામક, ઔદ્યોગિક સલામતી અને સ્વાસ્થ્ય, સુરત, કુ.એસ.એચ.પટેલ, મદદનીશ નિયામક, ઔદ્યોગિક સલામતી અને સ્વાસ્થ્ય, સુરત, શ્રી વી.વી.ચૌહાણ, ઔદ્યોગિક સલામતી અને સ્વાસ્થ્ય અધિકારી, સુરત તથા શ્રી વી.એ.હળવદીયા, ઔદ્યોગિક સલામતી અને સ્વાસ્થ્ય અધિકારી, સુરત સાથે મુલાકાત લીધી.

(૨) કારખાનાનુ લાયસન્સ નં.૩૭૯૫૮ થી મંજુર થયેલ છે. જે ૨૫૦ કામદાર અને ૨૦૦૦ હોર્સપાવર માટે વર્ષ-૨૦૨૮ સુધી રિન્યુ થયેલ છે. કારખાનાના મકાન બાંધકામ અને મશીનરી અંગેના નકશા નં.૬૪૧૨ થી તા.૧૯/૦૭/૨૦૧૯ ના રોજ મંજુર થયેલ હોવાનુ કચેરીના રેકોર્ડ જોતા જણાય છે. કારખાનાના બાંધકામની મજબુતાઇ અંગેનુ સ્ટેબીલીટી સર્ટીફીકેટ નમુના નં.૧(એ) માં નિયામકશ્રી, ઔદ્યોગિક સલામતી અને સ્વાસ્થ્ય ગુજરાત રાજ્ય અમદાવાદ માન્ય સક્ષમ વ્યક્તિ પાસેથી તા.૨૨/૦૬/૨૦૧૯ ના રોજ મેળવેલ છે.

(૩) કારખાનામાં ૨,૪ ડાયક્લોરો નાઇટ્રો બેંઝીન(DNFB), પોટેશીયમ ફ્લોરાઇડ, PEG 400 કેટાલીસ્ટ અને સલ્ફોલીન અને અન્ય જરૂરી રસાયણોનો રોમટીરીયલ તરીકે ઉપયોગ કરીને હેલેક્ષ, ડિસ્ટીલેશન અને ફિલ્ટરેશન પ્રોસેસ કરીને ૨,૪, ડાયક્લોરો નાઇટ્રો બેંઝીન નામનુ એગ્રો ઇન્ટરમીડીયેટ બનાવવાની ઉત્પાદન પ્રક્રિયા કરવામાં આવે છે.

(૪) કારખાનામાં ૨,૪, ડાયક્લોરો નાઇટ્રો બેંઝીન નામનુ એગ્રો ઇન્ટરમીડીયેટ બનાવવાની ઉત્પાદન પ્રક્રિયા કરવામાં આવે છે. આ પ્રોસેસ દરમ્યાન નિકળેલ ફ્રુડ પ્રોડકટના મધર લિકરમાથી એજીટેટેડ થીન ફિલ્મ ઇવેપોરેટર્સમાં ૨,૪ ડાયક્લોરો નાઇટ્રો બેંઝીન પ્રમાણવાળા સોલ્વન્ટ તથા હાઇબોઇલરને વેક્યુમ ડિસ્ટીલેશન પ્રોસેસ દ્વારા સેપરેટ કરવાની પ્રોસેસ પુર્ણ કર્યા પછી રીસીવરમાં લીધેલ હાઇબોઇલર રસાયણને બનાવના દિવસે એટલે કે તા.૧૦/૯/૨૦૨૨ ના રોજ બીજી શિફ્ટમાં જી.આઇ. ડ્રમ (૨૦૦ લીટર) માં ખાલી કરવાની કામગીરી વખતે રીસીવરમાં તાપમાન વધેલ અને રીસીવરની વેન્ટમાં ધુમાડો જોવા મળતા કારખાનાની ફાયર ટીમ દ્વારા ફાયર હાઇડ્રંટ સિસ્ટમની મદદથી કુલીંગ કરવાની કામગીરી ચાલુ કરેલ તે સમયે તાપમાનમાં વધારો થતા ત્યા હાજર શ્રમયોગીઓને બહાર નિકળવા જણાવેલ જે સમયે રિસીવરમાં અચાનક ધડાકો થતા ૦૪ શ્રમયોગીઓનુ અવસાન થયેલ છે તથા ૨૦ શ્રમયોગીઓ ઇજા પામેલ છે. જેઓ ખાનગી હોસ્પીટલમાં હાલ સારવાર હેઠળ છે.

કારખાનામાં પ્રોડકશન વિભાગના બિલ્ડીંગ ના સ્ટ્રકચર અને તેના પર મુકેલ રીએકટર, મશીનરી તથા ઇલેકટ્રીક વાયરીંગને આ આગ/ ધડાકાના કારણે નુકશાન થયેલ છે. તેમજ બિલ્ડીંગમાં આવેલ રિએકશન વેસલ, સ્ટોરેજ વેસલ અને પાઇપીંગમાં રહેલ જોખમી કેમિકલના કારણે તેમજ તેમાં ઉપયોગમાં લેવાતાં રસાયણોની MSDS નો અભ્યાસ કરતાં જોખમી પ્રકારના ઝેરી ગુણધર્મવાળા હોઈ ત્યા શ્રમયોગીઓ પાસે કામ કરાવવામાં આવે તો માનવ જીંન્દગીને તાત્કાલીક ભય ઉભો થાય તેમ છે. આથી હું શ્રી એ.વી.ગોસ્વામી, મદદનીશ નિયામક, ઔદ્યોગિક સલામતી અને સ્વાસ્થ્ય, સુરત કારખાના ધારા-૧૯૪૮ ની કલમ- ૮ હેઠળ નિમાયેલ કારખાના નિરીક્ષક ઉકત ધારાની કલમ-૯ હેઠળ મને મળેલ સત્તાની રૂએ કારખાનાધારા ૧૯૪૮ ની કલમ-૪૦(૨) હેઠળ કારખાનામાં નીચેના સલામતીના પગલા લીધા સિવાય કારખાનામાં ઉત્પાદન પ્રક્રિયા કરવાનો મનાઇ ફરમાવતો હુકમ કરૂ છુ.

સલામતીના પગલા :-

1) કારખાનાના નુકશાન પામેલ તમામ બાંધકામનુ સમારકામ/ નવિનીકરણ કરાવી તેનો કારખાના તરીકે ઉપયોગ કરતા પહેલા બાંધકામની મજબુતાઇ અંગેનુ સ્ટેબીલીટી સર્ટીફીકેટ ગુજરાત કારખાનાના નિયમો-૧૯૬૩ ના નિયમ-૩(સી) હેઠળ ફોર્મ નં.૧-એ પ્રમાણે નિયામકશ્રી, ઔદ્યોગિક સલામતી અને સ્વાસ્થ્ય ગુજરાત રાજ્ય અમદાવાદ માન્ય કોમ્પીટન્ટ પર્સન પાસેથી મેળવીને રજુ કરવુ.
2) આગ ધડાકાને કારણે કારખાનાનાં ઇલેક્ટ્રીક કેબલ્સ તથા ઇલેક્ટ્રિક ફિટીંગ્સને નુકશાન થયેલ છે જેને યોગ્ય સુપરવીઝનમાં વ્યક્તિની દેખરેખની નીચે સલામત રીતે દુર કરી તેની જગ્યાએ નવા ફ્લેમપ્રુફ ઇલેક્ટ્રીક કેબલ્સ તથા ફીટીંગ્સ લગાવી તે વાપરવા લાયક છે તે બાબતનું સરકાર માન્ય ઇલેકટ્રીક સુપરવાઇઝર પાસેથી સર્ટીફીકેટ મેળવી રજુ કરવું.
3) કારખાનાની પ્રોસેસનો રી-હેઝોપ સ્ટડી નિષ્ણાંત વ્યક્તિ/ એજન્સી પાસે કરાવી તેમાં જણાવેલ સુચનોનાં પાલન અંગેનો રિપોર્ટ અત્રેની કચેરીએ રજુ કરવો.
4) કારખાનામાં સદર અકસ્માતના કારણે ક્ષતિગ્રસ્ત થયેલ સ્ટ્રકચર/બિલ્ડીંગ, મશીનરી વિગેરેના કાટમાળને ખસેડવાની તથા તેને રીપેર/ રિસ્ટ્રેથનીંગ કરવાની કામગીરી વર્ક પરમીટ સિસ્ટમ દ્વારા કરવી અને પ્રોસેસ વેસલ તથા રીએકટરમાં રહેલ રસાયણોને સલામત રીતે ખાલી કરી નિકાલ કરવાની કામગીરી યોગ્ય સુપરવીઝનમાં ભારતીય ધારાધોરણો/ ઇન્ટરનેશનલ સ્ટાન્ડર્ડ મુજબના યોગ્ય અને પુરતા કામને અનુરૂપ સ્વ રક્ષણાત્મક સાધનો પહેરીને પુર્ણ કરવી.

(૫) કારખાનામાં અમારી મુલાકાત સમયે શ્રી મિલન નાયક- ફેકટરી મેનેજર હાજર છે. તેમના જણાવ્યા અનુસાર કબ્જેદારશ્રી આનંદ સુરેશભાઇ દેસાઇ છે. આમા કોઇ ફેરફાર હોય તો દિન-૭ માં લેખીતમાં પુરાવા સહિત ખુલાસો રજુ કરવો.

(૬) આ રીમાર્કસ વિઝિટ બુક ફોર્મ નં.૩૧ માં લગાવીને જાણ કરશો.

સ્થળ :- સુરત

તા:-૧૮/૦૯/૨૦૨૨

(એ.વી.ગોસ્વામી)
મદદનીશ નિયામક
ઔદ્યોગિક સલામતી અને સ્વાસ્થ્ય,
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સંયુક્ત નિયામક, ઔદ્યોગિક સલામતી અને સ્વાસ્થ્યની કચેરી,
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"બી બ્લોક", છઠ્ઠો માળ, જીલ્લા સેવા સદન-૨, અઠવાલાઈન્સ, સુરત
ફોન નં.૦૨૬૧-૨૬૫૩૫૦૨ ફેક્સ નં.૦૨૬૧-૨૬૫૩૫૦૧

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ક્રમાંક/સં.નિ/ઔ.સ.સ્વ./સુ.રીજી/ પપલ્ન/૨૦૨૨

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પ્રતિ,

કબ્જેદારશ્રી / વ્યવસ્થાપકશ્રી
અનુપમ રસાયણ ઇંડિયા લી. (યુનીટ-VI)
પ્લોટ નં.૨૪૨૩ અને ૨૪૨૫, જી.આઇ.ડી.સી.,સચીન, સુરત.

વિષય:- તા.૧૦/૦૯/૨૦૨૨ ના રોજ બનેલ આગ/ ધડાકા ના બનાવ સંદર્ભે માહિતી આપવા બાબત.

મહાશયશ્રી,

ઉપરોકત વિષય પરત્વે જણાવવાનુ કે, કારખાનામાં પ્રોડકશન વિભાગમાં આવેલ એજીટેટેડ થીન ફીલીંગ ઇવેપોરેટર્સમાં ફુડ પ્રોડકટના મધર લીકરમાથી સોલ્વન્ટ અને હાઇબોઇલર ને અલગ કરવાની પ્રોસેસ પુર્ણ થયા બાદ ગ્રાઉન્ડ ફ્લોર પર આવેલ રીસીવર (હોલ્ડીંગ ટેન્ક) માં લીધેલ હાઇબોઇલર ને જી.આઇ.મટીરીયલના ૨૦૦ લીટર ક્ષમતાવાળા ડ્રમમાં અનલોડ કરવાની કામગીરી વખતે રીસીવરમાં અચાનક તાપમાન વધવાથી રીસીવરમાં થયેલ આગ/ ધડાકાના પ્રાણઘાતક અકસ્માત બનાવ અન્વયે નીચે મુજબના ટેસ્ટ રીપોર્ટ્સ તથા જરૂરી માહિતી સત્વરે પુરી પાડવા જણાવવામાં આવે છે.

(૧) એજીટેટેડ થીન ફિલ્મ ઇવેપોરેટર્સ (ATFE) માં વપરાતી હીટીંગ ઓઇલની કોઇલનો લીક ટેસ્ટ થર્ડ પાર્ટી પાસે કરાવી રજુ કરવો.

(૨) રીસીવર (હોલ્ડીંગ ટેન્ક) અથવા એજીટેટેડ થીન ફિલ્મ ઇવેપોરેટર્સ (ATFE) ના બોટમ ભાગમાં ડેડ રહેલ રેસીડ્યુ હાઇબોઇલરનો Differential Scanning Calorimetry Test, Reaction Calorimetry Test અને Chemical Composition of HighBoiler Test.

(3) સદર અકસ્માત બનાવ અગાઉ થર્મીકફ્લુઇડ હિટરમાં વપરાતા ઓઇલ, હિટીંગ કોઇલ અને ઓઇલ લેવલની ચકાસણી કંપની દ્વારા તેમજ થર્ડ પાર્ટી પાસે કરાવ્યાનો રીપોર્ટ તથા અકસ્માત બનાવ બન્યા બાદ હાલની સ્થિતિએ થર્મીકફ્લુઇડ હિટરમાં વપરાતા ઓઇલના લેવલની ચકાસણી થર્ડ પાર્ટી પાસે કરાવી રીપોર્ટ રજુ કરવો.

મદદનીશ નિયામક
ઔદ્યોગિક સલામતી અને સ્વાસ્થ્ય,
સુરત

To,
Owner/ Manager
Anupam Rasayan Idea Ltd. (Unit-VI),
Plot No.2423 & 2425 GIDC, Sachin, Surat,

Subject:- Matter of giving information regarding the incident of blast on 10/09/2022

Sir,

In reference to the above topic, we would like to instruct you to submit following test reports and necessary information immediately for the fatal accident of fire explosion in the receiver due to sudden rise in temperature during the unloading operation of the high boiler taken in the receiver (holding tank) on the ground floor into a 200 liter capacity drum of GI material after completing the process of separating the solvent and high boiler from the mother liquor of the Crude product in the agitated thin film evaporators in the production department of the factory.

(1) Submit leak test of heating oil coil used in Agitated Thin Film Evaporators (ATFE) done by third party.

(2) Differential Scanning Calorimetry Test, Reaction Calorimetry Test and Chemical Composition of HighBoiler Test of Residue Highboiler dead in the bottom part of receiver (holding tank) or agitated Thin Film Evaporators (ATFE).

(3) Submit the third party report of the oil level used in the thermal fluid heater before the accident, and the report of checking the oil heating coil and oil level used in the thermal fluid heater done by the company and the third party and after the accident.

Assistant Director,

Industrial Health & Safety

GUJARAT POLLUTION CONTROL BOARD
PARYAVARAN BHAVAN, SECTOR 10-A,
GANDHINAGAR - 382010,
(T) 079-23232152

GPCB

RPAD

DIRECTION UNDER SECTION 31(A) OF THE AIR (PREVENTION AND CONTROL OF POLLUTION) ACT - 1981 [HEREINAFTER REFERRED TO AS THE "AIR ACT"] AS AMENDED FROM TIME TO TIME.

WHEREAS you are having an industrial plant at Plot no. 2425, Road No. 2, GIDC Sachin, Sachin - 394230, Tal: Palsana, Dist. Surat.

AND WHEREAS the Gujarat Pollution Control Board has granted Consolidated Consent and Authorization (CC & A) under the provisions of the Environmental Acts/Rules by its Consent Order No. AWH-104795 which is valid up to 30/06/2024.

AND WHEREAS, during the inspection of your industrial plant on 11/09/2022 (9:45 Hrs) under Section-24 of the Air Act by the authorized officers of the Board with reference to Fire Incident occurred on dated: 10/09/2022 (@ 22:00 Hrs) following was observed:

1. Production process for manufacturing of 2, 4-Diflouro nitro benzene and distillation of solvent Sulfolane were going on at the time of incident within production plant section-I.
2. Blast/Fire incident occurred in receiver of distillation vessel due to unknown reason.
3. Total Four persons died (1 on the spot + other 3 person were missing at the time of incident and later they found dead in the morning during rescue operation dt. 11/09/2022) and twenty persons are injured due to Blast/Fire incident.
4. Looking at the category of the plant and the use of solvent in the plant it can be said that at the time of blast/fire incident in addition to smoke, VOC's may have been liberated and considering the same status of air quality at the time of incident can be considered as severe/emergency.
5. Production plant section-I and glass windows of the production plant is found damaged due to Blast/Fire incident occurred.

AND WHEREAS, three days notice as per law of natural justice was issued by inspecting officer at the time of inspection and you have failed to submit compliance for the same.

UNDER THE CIRCUMSTANCES, I, M. R. Macwana, Unit Head, Surat of Gujarat Pollution Control Board is directed to issue the closure directions under Section 31(A) of The Air (Prevention and Control of Pollution) Act-1981 as under:

I. This order shall be effective with **immediate effect**.
II. If your plant runs on captive power plant or DG-Set, than you shall stop them also.
III. To direct the concerned authority to stop supply of electricity immediately.
IV. To comply with DISH direction and submit its compliance report.
V. To submit safety Audit report, HAZOP study report & PLI policy.
VI. To collect & dispose generated wastewater, burned/Partially burned material due to fire incident in a scientific manner and submit details.

Outward No: 68517, 10/10/2022

Clean Gujarat Green Gujarat
Website : https://gpcb.gujarat.gov.in

Pay Rs. 1 Crore as Interim Environment Damage Compensation by RTGS/NEFT immediately in following A/C:

A	Name of Payee	GUJARAT POLLUTION CONTROL BOARD
B	Bank Account Number	10325062238
C	Type of Account	CURRENT
D	Bank	STATE BANK OF INDIA
E	Branch	GANDHINAGAR ZONAL BRANCH
F	Branch Address	SECTOR-10 /B, INFRONT OF NEW SACHIVALAYA, GANDHINAGAR-382010
G	IFSC Code	SBIN0001355

Details regarding action taken in this regard shall be communicated on following mail especially with UTR No.

1) rh-gpcb-surat@gujarat.gov.in
2) ro-gpcb-ace5@gujarat.gov.in
3) ro-gpcb-surat@gujarat.gov.in

If the above directions are not complied, you are liable for prosecution under Section 37 of the Air (Prevention and Control of Pollution) Act-1981 which provides punishment with imprisonment for a term not less than one year and six months and may extend to six years and with fine.

This order is issuec after approval of competent authority.

For and on behalf of
Gujarat Pollution Control Board

(M. R. Macwana)
Unit Head, Surat

NO: GPCB/CCA-SRT-2195(2)/ID_50114/ Date:

To,
M/s. Anupam Rasayan India Ltd. (Unit-6)
Plot no. 2425, Road No. 2, GIDC Sachin,
Sachin - 394230,
Tal: Palsana, Dist. Surat.

COPY TO:

1. Managing Director,
   Dakshin Gujarat Vij Co. Ltd.
   Nana Varachha Roac,
   Kapodara, Surat-395 006.
   Dist.: Surat
2. The Executive Engineer, (O&M)
   Surat Rural Division,
   DGVCL, Surat-R Dn.
   Nana Varachha Road,
   Nr. Gajjar Petrol Pump,
   Dist: Surat - 395006

Outward No: 683517 Date: 16/09/2022

You are request to disconnect the supply of Electricity (except single phase) with **immediate effect** to industrial plant M/s. Anupam Rasayan India Ltd. (Unit-6) located at Plot no. 2425, Road No. 2, GIDC Sachin, Sachin - 394230, Tal: Palsana, Dist. Surat and intimate to us accordingly.

GUJARAT POLLUTION CONTROL BOARD
PARYAVARAN BHAVAN, SECTOR 10-A,
GANDHINAGAR - 382010,
(T) 079-23232152

GPCB

3. Notified Area authority, Sachin GIDC,
Unnati Building, Plot No.: 5719,
Road No.: 6, GIDC Sachin,
Surat -394230

With a request to disconnect the supply of Water and drainage connection with the **immediate effect** of the industrial plant of M/s. Anupam Rasayan India Ltd. (Unit-6) located at Plot no. 2425, Road No. 2, GIDC Sachin, Sachin - 394230, Tal: Palsana, Dist. Surat and intimate to us accordingly.

For and on behalf of
GUJARAT POLLUTION CONTROL BOARD

(M. R. Macwana)
Unit Head, Surat

Outward No: 683517, 16/09/2022

Anupam Rasayan India Ltd.
No.8110, Sachin G.I.D.C. Estate, Sachin,
Surat, Gujarat 394230

PAYMENT ADVICE

Beneficiary details:
Gujarat pollution Control Board
Gandhinagar 382010
Paryavaran Bhavan, Sector 10-A
gandhinagar382010
INDIA

Payment Doc No: 15000052742022
Value date: 18.09.2022
Bank Ref No: 609231004357

Dear Sir/Madam,

We have credited a payment to your A/c 10325062238 NUMBER with for Rs 10000000.00 against the below mentioned payment details

DATE	INV ref	DOC NO	GROSS AMT	TAX	AMOUNT (INR)
17.09.2022		1500005274	10,000,000.00	0.00	10,000,000.00
Amount INR ONE CRORE Rupees					
Remarks : Advance Paid					

This is system generated advice thus require no signature

ગુજરાત પ્રદુષણ નિયંત્રણ બોર્ડ, સુરત

પ્રાદેશિક કચેરી, સુરત

પ્લોટ નં.: ૧૧-૧૨/૨,૩, જી.આઈ.ડી.સી. , પાંડેસરા, સુરત- ૩૯૪ ૨૨૧(ગુજરાત)

ફોન નં. (૦૨૬૧) ૨૪૪૨૬૬૬

ISO - 9001 - 2008 & ISO - 1401-2004 Certified Organisation

Website : www.gpcb.gov.in XGN website : http://gpcbxgn.gujarat.gov.in

E-mail : ro-gpcb-sura@gujarat.gov.in GST No. : 24SRTG00481F1DK

તપાસ માટે દાખલ થવાની સૂચના (નોટીસ)

નં : 5014

પાણી અધિનિયમ 1974 ની કલમ – 23, હવા અધિનિયમ ની 1981 ની કલમ–24 અને પર્યાવરણ (સુરક્ષા) અધિનિયમ – 1986 ની કલમ–10 હેઠળ અમોને મળેલ સત્તાની રૂએ અમો નીચે સહી કરનાર અમોને જરૂરી લાગે તેની સહાય લઈને તમામ સમયે નીચેના હેતુઓ માટે આપની જગ્યામાં દાખલ થવાનો અને તપાસ કરવાનો અધિકાર ધરાવીએ છીએ.

(૧) અમોને સોંપેલા રાજ્ય બોર્ડ/કેન્દ્ર સરકારનાં કાર્ય બજાવવાના હેતુ માટે,

(૨) આવા કોઈ કાર્યો બજાવવાના છે કે કેમ અને તેમ હોય તો કઈ રીતે તે બજાવવાના છે અથવા આ અધિનિયમ અથવા તે હેઠળ કરેલા નિયમોની અથવા આ અધિનિયમ હેઠળ બજાવેલી કોઈ નોટીસની, કરેલા કોઈ હુકમની, આદેશની અથવા આપેલા કોઈ અધિકારપત્રની કોઈ જોગવાઈનું પાલન કરવામાં આવી રહ્યું છે કે પાલન કરવામાં આવ્યું છે કે કેમ તે નક્કી કરવાના હેતુ માટે,

(૩) કોઈ સાધન સામગ્રી, ઔદ્યોગિક પ્લાન્ટ, રેકર્ડ, રજીસ્ટર, દસ્તાવેજ અથવા અન્ય કોઈ મહત્વની વસ્તુની તપાસ કરવા અને તેની કસોટી કરવાના હેતુ માટે અથવા જે જગામાં તેને એમ માનવાને કારણ હોય કે આ કાયદા કે તે હેઠળ કરેલા નિયમો મુજબ કોઈ ગુનો કરાવામાં આવ્યો છે અથવા થવાની તૈયારીમાં છે. તેવી કોઈ જગ્યાની ઝડતી લેવા માટે અને તેને એમ માનવાને કારણ હોય કે આ કાયદા કે તે હેઠળ કરેલા નિયમો હેઠળ શિક્ષાપાત્ર કોઈ ગુનો કર્યાનો પુરાવો, તેવા સાધન સામગ્રી, ઔદ્યોગિક પ્લાન્ટ, રેકર્ડ, રજીસ્ટર, દસ્તાવેજ અથવા અન્ય મહત્વની વસ્તુ કબજે લેવા માટે અમે નીચે જણાવેલ સમયે દાખલ થઈએ છીએ

ઉદ્યોગ/કારખાનામાં દાખલ થવાનો સમય : 09:45 કલાક તા 11 / 09 / 2022

અમારી સાથે મુલાકાત સમયે સહાય માટે નીચેના અધિકારીશ્રી / કર્મચારીશ્રી હાજર રહેલા છે.

ક્રમ	અધિકારીશ્રી / કર્મચારીશ્રી	હોદ્દો
(૧)	V. A. Prajapati	AEE
(૨)		
(૩)		

પ્રતિશ્રી,

M/s. Anupam Rasayan India Ltd. (Unit 6)
Plot no. 2425, GIDC, Sachin
Ta. Chorasi, Dist. Surat.

સહી _____

અધિકારીનું નામ N. M. KAVAV

હોદ્દો S.O.

આ સુચના (નોટીસ) મેળવનારની સહી :

(Mr. Jatin B Patel, Env. Head)

Anupam Rasayan India Ltd. Authorised SURAT

ગુજરાત પ્રદુષણ નિયંત્રણ બોર્ડ, સુરત

પ્રાદેશિક કચેરી, સુરત
Plot No. 11-12/2,3, G.I.D.C. Pandesara, Dist.: Surat 394221
Phone: (0261) 2442696. Fax.: (0261) 2429733
E-mail ID (Regional Officer) :ro-gpcb-sura@gujarat.gov.in
E-mail ID (Unit Head) : uh-gpcb-sura@gujarat.gov.in
Website : http://gpcbxgn.gujarat.gov.in

સ્થળ તપાસની નિરિક્ષણ નોંધ

21.10494 | 72.857014

આઈ.ડી નં:.....50774..... કેટેગરી/સ્કેલ:.....R...../.....L..... Latitude/Longitude:...../.....

શ્રીમાન,

આપશ્રી ને જણાવવાનું કે, આજ તા.11/09/22 ના રોજ આપશ્રીના એકમની મુલાકાત લઈ સ્થળ તપાસ કરી ઈન્સ્પેકશન કરેલ છે જે દરમ્યાન હવા/પાણી/જોખમી કચરા/.....ના...../..0../..1../..0. નમુના પૃથ્થકરણ અર્થે એકત્રીત કરેલ છે.

આપશ્રીના એકમની મુલાકાત દરમ્યાન પર્યાવરણીય કાયદાઓ ના સંદર્ભે ત્રુટીઓ/ક્ષતિઓ જોવા/જાણવા મળેલ છે, જે આધારે પડતર અરજી સંદર્ભે નિર્ણય લેતા પહેલા અને/અથવા કાયદાકીય પગલા લેતા અને/અથવા પર્યાવરણ નુકશાન વળતર લેતા પહેલા કુદરતી ન્યાયના સિધ્ધાંત મુજબ આપશ્રીને સાંભળવાની તક પુરી પાડવાના હેતુથી અત્રે લેખિતમાં સ્થળસ્થિતિ/મુદ્દાઓ/સૂચનાઓ આપવામાં આવે છે.

આ પરત્વે આપશ્રી નીચે લેખિતમાં રજુઆત કરી શકો છો અથવા લેખિત ખુલાસો/સ્પષ્ટતા/પુર્તતા અહેવાલ કામકાજના દિન-03 માં બોર્ડની વડી કચેરી,ગાંધીનગર તેમજ અત્રેની કચેરીને લેખિતમાં અથવા XGN પર અથવા Email થી રજુ કરવા નોટીસ આપવામાં આવે છે.

સ્થળ તપાસ દરમ્યાન જોવા મળેલ સ્થળ સ્થિતિ/ત્રુટીઓ/ક્ષતિઓ/ખામીઓ:

૧.) તારીખ 10/09/2022 ના રોજ રાત્રે એકમમાં બનેલ Blast | આગની ઘટના દરમ્યાન કરેલ વ્યક્તિઓના મૃત્યુ થવા પામેલ છે તેમજ કેટલા વ્યક્તિઓને ઈજા થયેલ છે તે અંગેની સંપુર્ણ વિગતો આધારભુત પુરાવા સાથે રજુ કરવી.

(2) તેમના પ્રોડકશન પ્લાન્ટ વિભાગ-1 માં આવેલ ડીસ્ટીલેશન વેસલના ફીસીવરમાં Blast | આગની ઘટના સંદર્ભે જરૂરી માહિતી DISH ના રીપોર્ટ સાથે રજુ કરવી.

3) Blast | આગની ઘટનામાં આગને નિયંત્રણ અર્થે વપરાયેલ ફાયર ફાયટર | વપરાયેલ ફોમ વિગેરેની વિગતો રજુ કરવી.

(4) ફાયર ફાઈટીંગ દરમ્યાન વપરાયેલ પાણીના કારણે ઘટના સ્થળે જમા થયેલ ગંદા પાણીના પણ નમુના એકત્ર કરવામાં આવેલ, આવા ગંદા પાણીને ETP માં ડાયવર્ટ કરી યોગ્ય ટ્રીટમેન્ટ બાદ પર્યાવરણીય સુરક્ષા અર્થે CETP ખાતે મોકલાવવા સુચન છે તેમજ આ સંદર્ભે કરેલ કાર્યવાહી અંગેનો અહેવાલ રજુ કરવો.

5) આગ | Blast ની ઘટના સંદર્ભે બની ગયેલ | અર્ધ બની ગયેલ જે સોલીડ મટીરીયલ એકત્ર થાય તેને પર્યાવરણીય નિયમ મુજબ નિકાલ કરી, કરેલ કાર્યવાહી અંગેનો અહેવાલ રજુ કરવો.

6) એકમની પ્રેસમાં સંગ્રહેલ કેમીકલ્સ | રો મટીરીયલ્સ | ફીનીશ્ડ પ્રોડકટ અંગેની વિ. રજુ કરવી.

જી.પ્ર.નિ.બોર્ડના નામે અને વતી, (અધિકારીઓના નામ,હોદ્દો,સહી):	વી.પ્રે.પ્રજાપતી (AEE) / પ્રણ.પ્રિન.કાર (SO)
મુલાકાત લેવામાં આવેલ હોય તે એકમના પ્રતિનિધીની રજૂઆતઃ (જે લાગુ પડે તેની સામે જ સહી કરવી)	
(૧) આ સ્થળસ્થિતિ/સુચનાઓ સાથે હું , નીચે સહી કરનાર સંપૂર્ણ સહમત છું.	ના
(૨) જેમા દર્શાવેલ સ્થળસ્થિતિ/સુચનાઓમાંથી મુદ્દા નં.....સાથે હું નીચે સહી કરનાર અસહમત છું. જેના માટે મારી નીચે પ્રમાણેની રજુઆત છે.:	
એકમના પ્રતિનિધી / ઓ નોંધ મેળવનાર નામ, હોદ્દો અને સહી :	શ્રી મહિપતભાઈ વી. પટેલ (Dy ENV Head)
સરનામું:	અનુપમ રસાયણ ઈન્ડીયા લી. (Unit-6), પ્લોટ નં 2425, સેક્ટર-2, GIDC પાંડેસરા, સુરત.

Anupam Rasayan India Ltd. Authorised SURAT

GPCB has instructed/ soughed following details from Anupam Rasayan India Ltd. (unit 6) in regards to fire/ Blast explosion occurred on 10th September, 2022.

1. Provide complete & reliable details along with required proof for the fatality & injuries due to blast/ Fire explosion occurred on 10th September, 2022 in the factory premises.
2. Provide the details along with DISH report for the blast/ Fire explosion occurred in the receiver of distillation vessel located at plant 1 of production unit.
3. Provide the details about the Foam/ Firefighting agents used for the controlling of Fire during the incident.
4. Sample of the contaminated water has been taken which was accumulated due to its usage during the fire fighting. It is instructed to divert this contaminated water into ETP for the required treatment and finally disposed into the CETP for the environmental protection. Also present the report for the action taken in this regard.
5. Collect the burnt/ partially burnt solid materials and dispose it as per environmental guidelines. Also present the report for the action taken in this regard.
6. Provide the details about the stored chemicals/ Raw materials/ Finished Products in the premises of the unit.

ગુજરાત પ્રદુષણ નિયંત્રણ બોર્ડ, સુરત

પ્રાદેશિક કચેરી, સુરત

પ્લોટ નં.: ૧૧-૧૨/૨,૩, જી.આઈ.ડી.સી. , પાંડેસરા, સુરત- ૩૯૪ ૨૨૧(ગુજરાત)
ફોન નં. (૦૨૬૧) ૨૪૪૨૬૬૬

ISO - 9001 - 2008 & ISO - 1401-2004 Certified Organisation

Website : www.gpcb.gov.in XGN website : http://gpcbxgn.gujarat.gov.in
E-mail : ro-gpcb-sura@gujarat.gov.in GST No. : 24SRTG00481F1DK

તપાસ માટે દાખલ થવાની સૂચના (નોટીસ)

નં : 5014

પાણી અધિનિયમ 1974 ની કલમ – 23, હવા અધિનિયમ ની 1981 ની કલમ–24 અને પર્યાવરણ (સુરક્ષા) અધિનિયમ – 1986 ની કલમ–10 હેઠળ અમોને મળેલ સત્તાની રૂએ અમો નીચે સહી કરનાર અમોને જરૂરી લાગે તેની સહાય લઈને તમામ સમયે નીચેના હેતુઓ માટે આપની જગ્યામાં દાખલ થવાનો અને તપાસ કરવાનો અધિકાર ધરાવીએ છીએ.

(૧) અમોને સોંપેલા રાજ્ય બોર્ડ/કેન્દ્ર સરકારનાં કાર્ય બજાવવાના હેતુ માટે,

(૨) આવા કોઈ કાર્યો બજાવવાના છે કે કેમ અને તેમ હોય તો કઈ રીતે તે બજાવવાના છે અથવા આ અધિનિયમ અથવા તે હેઠળ કરેલા નિયમોની અથવા આ અધિનિયમ હેઠળ બજાવેલી કોઈ નોટીસની, કરેલા કોઈ હુકમની, આદેશની અથવા આપેલા કોઈ અધિકારપત્રની કોઈ જોગવાઈનું પાલન કરવામાં આવી રહ્યું છે કે પાલન કરવામાં આવ્યું છે કે કેમ તે નક્કી કરવાના હેતુ માટે,

(૩) કોઈ સાધન સામગ્રી, ઔદ્યોગિક પ્લાન્ટ, રેકર્ડ, રજીસ્ટર, દસ્તાવેજ અથવા અન્ય કોઈ મહત્વની વસ્તુની તપાસ કરવા અને તેની કસોટી કરવાના હેતુ માટે અથવા જે જગામાં તેને એમ માનવાને કારણ હોય કે આ કાયદા કે તે હેઠળ કરેલા નિયમો મુજબ કોઈ ગુનો કરાવામાં આવ્યો છે અથવા થવાની તૈયારીમાં છે. તેવી કોઈ જગ્યાની ઝડતી લેવા માટે અને તેને એમ માનવાને કારણ હોય કે આ કાયદા કે તે હેઠળ કરેલા નિયમો હેઠળ શિક્ષાપાત્ર કોઈ ગુનો કર્યાનો પુરાવો, તેવા સાધન સામગ્રી, ઔદ્યોગિક પ્લાન્ટ, રેકર્ડ, રજીસ્ટર, દસ્તાવેજ અથવા અન્ય મહત્વની વસ્તુ કબજે લેવા માટે અમે નીચે જણાવેલ સમયે દાખલ થઈએ છીએ

ઉદ્યોગ/કારખાનામાં દાખલ થવાનો સમય : ..... કલાક તા ..... / ..... / .....
અમારી સાથે મુલાકાત સમયે સહાય માટે નીચેના અધિકારીશ્રી / કર્મચારીશ્રી હાજર રહેલા છે.

ક્રમ	અધિકારીશ્રી / કર્મચારીશ્રી	હોદ્દો
(૧)	V. A. Prajapati	AEE
(૨)		
(૩)		

પ્રતિશ્રી,
M/s. Anupam Rasayan India Ltd. (Unit 6)
Plot no. 2425, GIDC, Sachin
Ta. Chorasi, Dist. Surat.

સહી _____

અધિકારીનું નામ N. M. KAVAV

હોદ્દો S.O.

આ સુચના (નોટીસ) મેળવનારની સહી : _____

(Mr. Jatin B Patel, Env. Head)

Anupam Rasayan India Ltd. Authorised SURAT

ગુજરાત પ્રદુષણ નિયંત્રણ બોર્ડ, સુરત

પ્રાદેશિક કચેરી, સુરત
Plot No. 11-12/2,3, G.I.D.C. Pandesara, Dist.: Surat 394221
Phone: (0261) 2442696. Fax.: (0261) 2429733
E-mail ID (Regional Officer) :ro-gpcb-sura@gujarat.gov.in
E-mail ID (Unit Head) : uh-gpcb-sura@gujarat.gov.in
Website : http://gpcbxgn.gujarat.gov.in

સ્થળ તપાસની નિરિક્ષણ નોંધ

21.10494 | 72.857014

આઈ.ડી નં:.....50774..... કેટેગરી/સ્કેલ:.....R...../.....1..... Latitude/Longitude:...../.....

શ્રીમાન,

આપશ્રી ને જણાવવાનું કે, આજ તા.11/09/22 ના રોજ આપશ્રીના એકમની મુલાકાત લઈ સ્થળ તપાસ કરી ઈન્સ્પેકશન કરેલ છે જે દરમ્યાન હવા/પાણી/જોખમી કચરા/.....ના...../..0../..1../..0. નમુના પૃથ્થકરણ અર્થે એકત્રીત કરેલ છે.

આપશ્રીના એકમની મુલાકાત દરમ્યાન પર્યાવરણીય કાયદાઓ ના સંદર્ભે ત્રુટીઓ/ક્ષતિઓ જોવા/જાણવા મળેલ છે, જે આધારે પડતર અરજી સંદર્ભે નિર્ણય લેતા પહેલા અને/અથવા કાયદાકીય પગલા લેતા અને/અથવા પર્યાવરણ નુકશાન વળતર લેતા પહેલા કુદરતી ન્યાયના સિધ્ધાંત મુજબ આપશ્રીને સાંભળવાની તક પુરી પાડવાના હેતુથી અત્રે લેખિતમાં સ્થળસ્થિતિ/મુદ્દાઓ/સૂચનાઓ આપવામાં આવે છે.

આ પરત્વે આપશ્રી નીચે લેખિતમાં રજુઆત કરી શકો છો અથવા લેખિત ખુલાસો/સ્પષ્ટતા/પુર્તતા અહેવાલ કામકાજના દિન-03 માં બોર્ડની વડી કચેરી,ગાંધીનગર તેમજ અત્રેની કચેરીને લેખિતમાં અથવા XGN પર અથવા Email થી રજુ કરવા નોટીસ આપવામાં આવે છે.

સ્થળ તપાસ દરમ્યાન જોવા મળેલ સ્થળ સ્થિતિ/ત્રુટીઓ/ક્ષતિઓ/ખામીઓ:

૧.) તારીખ 10/09/2022 ના રોજ રાત્રે એકમમાં બનેલ Gujarat / Jharna દરમ્યાન કરેલા વ્યકિતઓના મૃત્યુ થવા પામેલ છે તેનુ કરેલા વ્યકિતઓને શું થયેલ છે તે અંગેની સંપુર્ણ વિગતો આધારભૂત પુરાવા સાથે રજુ કરવી.

(2) તેમના પ્રોડકશન પ્લાન્ટ વિભાગ-1 માં આવેલ ડીસ્ટીલેશન વેસલના ટીસીવરમાં Gujarat / Jharna ની ઘટના સંદર્ભે જરૂરી માહિતી DISH ના રીપોર્ટ સહિત રજુ કરવી.

3) Gujarat / Jharna ની ઘટનામાં ઝાગને નિયંત્રણ કરવા વપરાયેલ ફોયર ફોયરન / વપરાયેલ ફોમ વિગેરેની વિગતો રજુ કરવી.

(4) ફોયર ફાઈટીંગ દરમ્યાન વપરાયેલ પાણીના કારણે ઘટના સ્થળે જમા થયેલ ગંદા પાણીનો પુરો નમૂનો એકત્ર કરવામાં આવેલ, આવા ગંદા પાણીને ETP માં ડાયવર્ટ કરી યોગ્ય ટ્રીટમેન્ટ બાદ પર્યાવરણીય સુરક્ષા અર્થે CETP ખાતે મોકલાવવા સુચન છે તેમજ આ સંદર્ભે કરેલ કાર્યવાહી અંગેનો અહેવાલ રજુ કરવો.

5) ઝાગ / Gujarat ની ઘટના સંદર્ભે બની ગયેલ / અર્ધે બની ગયેલ જે સોલીડ મટીરીયલ એકત્ર થાય તેને પર્યાવરણીય નિયમ મુજબ નિકાલ કરી, કરેલ કાર્યવાહી અંગેનો અહેવાલ રજુ કરવો.

6) એકમની પ્રેસમાં સંગ્રહેલ કેમીકલ્સ / રો મટીરીયલ્સ / ફીનીશ્ડ પ્રોડકટ અંગેની વિ. રજુ કરવી.

ગુ.પ્ર.નિ.બોર્ડના નામે અને વતી, (અધિકારીઓના નામ,હોદ્દો,સહી): વી.પ્રે.પ્રજાપતી (AEE) / પ્રા.પ્રા.કાવ (SO)

મુલાકાત લેવામાં આવેલ હોય તે એકમના પ્રતિનિધીની રજૂઆતઃ (જે લાગુ પડે તેની સામે જ સહી કરવી)	
(૧) આ સ્થળસ્થિતિ/સુચનાઓ સાથે હું , નીચે સહી કરનાર સંપૂર્ણ સહમત છું.	
(૨) જેમા દર્શાવેલ સ્થળસ્થિતિ/સુચનાઓમાંથી મુદ્દા નં.....સાથે હું નીચે સહી કરનાર અસહમત છું. જેના માટે મારી નીચે પ્રમાણેની રજુઆત છે.:	

Anupam Rasayan India Ltd. Authorised SURAT

એકમના પ્રતિનિધી / આ નોંધ મેળવનાર નામ, હોદ્દો અને સહી : શ્રી મહિપાલ વી. પટેલ (GM ENV Head)

સરનામું: અનુપમ રસાયણ ઇન્ડીયા લી. (Unit-6), પ્લોટ નં 2425, સેક્ટર-2, GIDC પાંડેસરા, સુરત.

ANNEXURE - R-11

ANUPAM RASAYAN INDIA LTD. (UNIT-VI)

CIN – U24231GJ2003PLC042988

Ref.: GPCB/297/2022/667 **GPCB ID : 50114** Date: 19/09/2022

To

The Regional Officer,

Gujarat Pollution Control Board,

Plot no. 11-12/2, 3,

G. I. D. C. Pandesara,

Surat - 394221.

Sub: Reply of observation and suggestion given by the board during the Inspection of our unit

Ref.: Notice of Entry and Inspection on 24/08/2022

Respected Madam,

GPCB officers were visited our unit on dated 24/08/2022 and have noted the below point during the time of inspection, our reply along with compliance are as under…

1) **Blast/fire incident was occurred at night of 10/09/2022 hence Require to submit all details of total dead persons and total injured persons with supporting documents.**

Reply:

Total 4 fatality occurred due to the Blast. Also 20 workers got injured. All of the injured workers has been shifted to nearby hospital and treatment was started immediately.

2) **Require to submit necessary details of Blast/fire incident was occurred in receiver of distillation vessel at production plant unit – 1 along with DISH report.**

Reply:

Please find attached herewith DISH report with all necessary details vide **Annexure – 1**; for your ready reference.

HEAD OFFICE
8110, GIDC industrial Estate,
Sachin, Surat – 394230
Gujarat, India

TELEPHONES :
Tel. (W-1) : +91-261-2398991 - 95
Fax (O) :+91-261-2398996
E-mail : office@anupamrasayan.com
Website : www.anupamrasayan.com

WORK UNIT VI :
Plot No. 2423, 2425,
GIDC,Sachin, Surat – 394230
Gujarat, India

ANUPAM RASAYAN INDIA LTD. (UNIT-VI)
CIN – U24231GJ2003PLC042988

3) **Require to submit details of fire fighter/ foam which was used during the control of Blast/fire incident.**

Reply: 275 KL water & 2355 kg Foam were utilised from Anupam Rasayan Fire Hydrant system. Detailed bifurcation is as follow.

Source	Water (Lit)	Foam (Kg)
Anupam Rasayan India Ltd.	200000	1200
Sachin Industrial Estate	25000	115
Hojiwala Industrial Estate, Sachin	5000	40
Surat Municipal Corporation	45000	1000
Total	**275000 Lit.**	**2355 Kgs.**

4) **Due to Water was consumed During time of firefighting, taken one waste water sample for analysis which was collected at incident place. Require to divert such waste water in to ETP, give proper treatment and sent to CETP for environmental safety and submit the such report of the same.**

Reply:

We have already transferred all waste water (252.330 KL) in to ETP and after giving proper treatment effluent was send to CETP of M/s. GECL for the treatment and final disposal. Statement of Manifest details, copy of the Manifest & of each tanker are enclose herewith vide **Annexure – 2**; for your ready reference.

5) **Require to dispose collected burnt/semi burnt solid material during time of Blast/fire incident as per environment rule and submit the such report of the same.**

Reply:

We assure to board that, we will dispose the collected burnt/semi burnt solid material as per environment rules and will submit the records to the board.

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Gujarat, India

ANUPAM RASAYAN INDIA LTD. (UNIT-VI)

CIN – U24231GJ2003PLC042988

6) **Require to submit details of storage of chemicals/raw materials/finished product at your unit.**

Reply: Please find below detailed list of storage of chemicals/raw materials/finished product

Sr. No.	Chemicals	Quantity (MT)
1	Sulphuric Acid	8.0
2	Potassium Fluoride (KF)	28.0
3	2,4 Di Chloro Nitro Benzene	Can be assess only after the FSL permission for the accidental spot access.
4	2,4 Di Fluoro Nitro Benzene	
5	Solvent S (Sulfolane)	

We hope above is as per your requirement.

Thanking you.

Yours sincerely,

For, **Anupam Rasayan India Ltd. (Unit - 6)**

Anupam Rasayan India Ltd. Authorised * SURAT *

Satish Patel

(EHS Head)

Encl.: Annexure – 1: DISH report

Annexure –2: Copy of the Manifest of each tanker

C C to. : Mr. M. R. Macwana (Environmental Engineer), GPCB - Gandhinagar

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Gujarat, India

ANNEXURE-1

સંયુક્ત નિયામક, ઔદ્યોગિક સલામતી અને સ્વાસ્થ્યની કચેરી, સુરત રીજીયન, સુરત
"બી બ્લોક", ૬ઠ્ઠો માળ, જીલ્લા સેવા સદન-૨, અડવાલાઈન્સ, સુરત.
ફોન નં.૦૨૬૧-૨૬૫૩૫૦૨, ફેક્સ નં.૦૨૬૧-૨૬૫૩૫૦૧

રજી.પો.એ.ડી./ હાથોહાથ

ક્રમાંક/સં.નિ/ઔ.સ.સ્વ./સુ.રીજી/ 4225 /૨૦૨૨

તા. / /૨૦૨૨

પ્રતિ,

કબ્જેદારશ્રી

અનુપમ રસાયણ ઇંડિયા લી. (યુનીટ-VI)

પ્લોટ નં.૨૪૨૩ અને ૨૪૨૫, જી.આઇ.ડી.સી.,સચીન, સુરત.

વિષય :-કારખાના અધિનિયમ-૧૯૪૮ ની કલમ ૪૦(૨) હેઠળ બંધના હુકમ બાબત.

(૧) તા.૧૧/૦૯/૨૦૨૨ ના રોજ નીચે સહી કરનારે કારખાનામાં તા.૧૦/૦૯/૨૦૨૨ ના રોજ બીજી શીફ્ટમાં બનેલ આગના બનાવની તપાસ અર્થે શ્રી આર.એ.પટેલ, સંયુકત નિયામક, ઔદ્યોગિક સલામતી અને સ્વાસ્થ્ય, સુરત, કુ.એસ.એચ.પટેલ, મદદનીશ નિયામક, ઔદ્યોગિક સલામતી અને સ્વાસ્થ્ય, સુરત, શ્રી વી.વી.ચૌહાણ, ઔદ્યોગિક સલામતી અને સ્વાસ્થ્ય અધિકારી, સુરત તથા શ્રી વી.એ.હળવદીયા, ઔદ્યોગિક સલામતી અને સ્વાસ્થ્ય અધિકારી, સુરત સાથે મુલાકાત લીધી.

(૨) કારખાનાનુ લાયસન્સ નં.૩૭૯૫૮ થી મંજુર થયેલ છે. જે ૨૫૦ કામદાર અને ૨૦૦૦ હોર્સપાવર માટે વર્ષ-૨૦૨૮ સુધી રિન્યુ થયેલ છે. કારખાનાના મકાન બાંધકામ અને મશીનરી અંગેના નકશા નં.૬૪૧૨ થી તા.૧૯/૦૭/૨૦૧૯ ના રોજ મંજુર થયેલ હોવાનુ કચેરીના રેકોર્ડ જોતા જણાય છે. કારખાનાના બાંધકામની મજબુતાઇ અંગેનુ સ્ટેબીલીટી સર્ટીફીકેટ નમુના નં.૧(એ) માં નિયામકશ્રી, ઔદ્યોગિક સલામતી અને સ્વાસ્થ્ય ગુજરાત રાજ્ય અમદાવાદ માન્ય સક્ષમ વ્યક્તિ પાસેથી તા.૨૨/૦૬/૨૦૧૯ ના રોજ મેળવેલ છે.

(૩) કારખાનામાં ૨,૪ ડાયક્લોરો નાઇટ્રો બેંઝીન(DNFB), પોટેશીયમ ફ્લોરાઇડ, PEG 400 કેટાલીસ્ટ અને સલ્ફોલીન અને અન્ય જરૂરી રસાયણોનો રોમટીરીયલ તરીકે ઉપયોગ કરીને હેલેક્ષ, ડિસ્ટીલેશન અને ફિલ્ટરેશન પ્રોસેસ કરીને ૨,૪; ડાયક્લોરો નાઇટ્રો બેંઝીન નામનુ એગ્રો ઇન્ટરમીડીયેટ બનાવવાની ઉત્પાદન પ્રક્રિયા કરવામાં આવે છે.

(૪) કારખાનામાં ૨,૪, ડાયક્લોરો નાઇટ્રો બેંઝીન નામનુ એગ્રો ઇન્ટરમીડીયેટ બનાવવાની ઉત્પાદન પ્રક્રિયા કરવામાં આવે છે. આ પ્રોસેસ દરમ્યાન નિકળેલ ક્રુડ પ્રોડકટના મધર લિકરમાથી એજીટેટેડ થીન ફિલ્મ ઇવેપોરેટર્સમાં ૨,૪ ડાયક્લોરો નાઇટ્રો બેંઝીન પ્રમાણવાળા સોલ્વન્ટ તથા હાઇબોઇલરને વેક્યુમ ડિસ્ટીલેશન પ્રોસેસ દ્વારા સેપરેટ કરવાની પ્રોસેસ પુર્ણ કર્યા પછી રીસીવરમાં લીધેલ હાઇબોઇલર રસાયણને બનાવના દિવસે એટલે કે તા.૧૦/૯/૨૦૨૨ ના રોજ બીજી શિફ્ટમાં જી.આઇ. ડ્રમ (૨૦૦ લીટર) માં ખાલી કરવાની કામગીરી વખતે રીસીવરમાં તાપમાન વધેલ અને રીસીવરની વેન્ટમાં ધુમાડો જોવા મળતા કારખાનાની ફાયર ટીમ દ્વારા ફાયર હાઇડ્રંટ સિસ્ટમની મદદથી કુલીંગ કરવાની કામગીરી ચાલુ કરેલ તે સમયે તાપમાનમાં વધારો થતા ત્યા હાજર શ્રમયોગીઓને બહાર નિકળવા જણાવેલ જે સમયે રિસીવરમાં અચાનક ધડાકો થતા ૦૪ શ્રમયોગીઓનુ અવસાન થયેલ છે તથા ૨૦ શ્રમયોગીઓ ઇજા પામેલ છે. જેઓ ખાનગી હોસ્પીટલમાં હાલ સારવાર હેઠળ છે.

કારખાનામાં પ્રોડકશન વિભાગના બિલ્ડીંગ ના સ્ટ્રકચર અને તેના પર રહેલ રીએકટર, મશીનરી તથા ઇલેકટ્રીક વાયરીંગને આ આગ/ ધડાકાના કારણે નુકશાન થયેલ છે. તેમજ બિલ્ડીંગમાં આવેલ રિએકશન વેસલ, સ્ટોરેજ વેસલ અને પાઇપીંગમાં રહેલ જોખમી કેમિકલના કારણે તેમજ તેમાં ઉપયોગમાં લેવાતાં રસાયણોની MSDS નો અભ્યાસ કરતાં જોખમી પ્રકારના ઝેરી ગુણધર્મવાળા હોઈ ત્યા શ્રમયોગીઓ પાસે કામ કરાવવામાં આવે તો માનવ જીંન્દગીને તાત્કાલીક ભય ઉભો થાય તેમ છે. આથી હું શ્રી એ.વી.ગોસ્વામી, મદદનીશ નિયામક, ઔદ્યોગિક સલામતી અને સ્વાસ્થ્ય, સુરત કારખાના ધારા-૧૯૪૮ ની કલમ- ૮ હેઠળ નિમાયેલ કારખાના નિરીક્ષક ઉકત ધારાની કલમ-૯ હેઠળ મને મળેલ સત્તાની રૂએ કારખાનાધારા ૧૯૪૮ ની કલમ-૪૦(૨) હેઠળ કારખાનામાં નીચેના સલામતીના પગલા લીધા સિવાય કારખાનામાં ઉત્પાદન પ્રક્રિયા કરવાનો મનાઇ ફરમાવતો હુકમ કરૂ છુ.

સલામતીના પગલા :-

1) કારખાનાના નુકશાન પામેલ તમામ બાંધકામનુ સમારકામ/ નવિનીકરણ કરાવી તેનો કારખાના તરીકે ઉપયોગ કરતા પહેલા બાંધકામની મજબુતાઇ અંગેનુ સ્ટેબીલીટી સર્ટીફીકેટ ગુજરાત કારખાનાના નિયમો-૧૯૬૩ ના નિયમ-૩(સી) હેઠળ ફોર્મ નં.૧-એ પ્રમાણે નિયામકશ્રી, ઔદ્યોગિક સલામતી અને સ્વાસ્થ્ય ગુજરાત રાજ્ય અમદાવાદ માન્ય કોમ્પીટન્ટ પર્સન પાસેથી મેળવીને રજુ કરવુ.
2) આગ ધડાકાને કારણે કારખાનાનાં ઇલેક્ટ્રીક કેબલ્સ તથા ઇલેક્ટ્રિક ફિટીંગ્સને નુકશાન થયેલ છે જેને યોગ્ય સુપરવીઝનમાં વ્યક્તિની દેખરેખની નીચે સલામત રીતે દુર કરી તેની જગ્યાએ નવા ફ્લેમપ્રુફ ઇલેકટ્રીક કેબલ્સ તથા ફીટીંગ્સ લગાવી તે વાપરવા લાયક છે તે બાબતનું સરકાર માન્ય ઇલેકટ્રીક સુપરવાઇઝર પાસેથી સર્ટીફીકેટ મેળવી રજુ કરવું.
3) કારખાનાની પ્રોસેસનો રી-હેઝોપ સ્ટડી નિષ્ણાંત વ્યક્તિ/ એજન્સી પાસે કરાવી તેમાં જણાવેલ સુચનોનાં પાલન અંગેનો રિપોર્ટ અત્રેની કચેરીએ રજુ કરવો.
4) કારખાનામાં સદર અકસ્માતના કારણે ક્ષતિગ્રસ્ત થયેલ સ્ટ્રક્ચર/બિલ્ડીંગ, મશીનરી વિગેરેના કાટમાળને ખસેડવાની તથા તેને રીપેર/ રિસ્ટ્રેથનીંગ કરવાની કામગીરી વર્ક પરમીટ સિસ્ટમ દ્વારા કરવી અને પ્રોસેસ વેસલ તથા રીએકટરમાં રહેલ રસાયણોને સલામત રીતે ખાલી કરી નિકાલ કરવાની કામગીરી યોગ્ય સુપરવીઝનમાં ભારતીય ધારાધોરણો/ ઇન્ટરનેશનલ સ્ટાન્ડર્ડ મુજબના યોગ્ય અને પુરતા કામને અનુરૂપ સ્વ રક્ષણાત્મક સાધનો પહેરીને પુર્ણ કરવી.

(૫) કારખાનામાં અમારી મુલાકાત સમયે શ્રી મિલન નાયક- ફેકટરી મેનેજર હાજર છે. તેમના જણાવ્યા અનુસાર કબ્જેદારશ્રી આનંદ સુરેશભાઇ દેસાઇ છે. આમા કોઇ ફેરફાર હોય તો દિન-૭ માં લેખીતમાં પુરાવા સહિત ખુલાસો રજુ કરવો.

(૬) આ રીમાર્કસ વિઝિટ બુક ફોર્મ નં.૩૧ માં લગાવીને જાણ કરશો.

સ્થળ :- સુરત

તા:-૧૮/૦૮/૨૦૨૨

(એ.વી.ગોસ્વામી)
મદદનીશ નિયામક
ઔદ્યોગિક સલામતી અને સ્વાસ્થ્ય,
સુરત.

ANNEXURE-2

UNIT-6 Fire hydrant Contaminated Waste Water sent to GLOBE Enviro Care ltd. Tanker Details

S/N	DATE	TANKER NO	MANIFEST NO	QUNTITY (KG)	Remarks
1	11-09-2022	GJ15AV7906	3164	19560	
2	11-09-2022	GJ15AV7906	3160	19870	
3	11-09-2022	GJ15AV7906	3154	19170	
4	11-09-2022	GJ16X6769	3161	19170	
5	11-09-2022	GJ06W8483	3159	21810	
6	11-09-2022	GJ06W8483	3163	21880	
7	11-09-2022	GJ05BZ7906	15819	18630	
8	11-09-2022	GJ05BZ7906	15822	18260	
9	11-09-2022	GJ06W8483	15820	19460	
10	11-09-2022	GJ19Y7906	15824	26360	
11	11-09-2022	GJ19Y7906	15821	25220	
12	11-09-2022	GJ19Y7906	15823	22940	
Total				252330	

EFFLUENT TRANSFER MANIFEST

GLOBE ENVIRO CARE LTD.
PLOT NO. P-1
B/H KAYTEX MILL
G.I.D.C. SACHIN.

M. No: 3164
Date : 11/09/2022
Tanker ID: GJ15 AV/90

Name of Member: Anupam Rasayan India Ltd (VI) G.I.D.C, Sachin

GECL			MEMBER			Memer's Sign.
TANKER OUT	TIME	KM Reading	TANKER IN	TIME	KM Reading	
	17:38	127426		6:15		
TANKER IN	TIME	KM Reading	TANKER OUT	TIME	KM Reading	
				06:40		

Tanker release Approved by: NB Desai

Date: 11/09/2022 Time: 17:38

Tanker Received OK by: _____

Date: _____ Time: _____

★★ SECURITY ★★
Date _____ Intime _____
Sr.No. _____ Outtime _____
Anupam Rasayan India Ltd. U...

EFFLUENT TRANSFER MANIFEST

GLOBE ENVIRO CARE LTD.
PLOT NO. P-1
B/H KAYTEX MILL
G.I.D.C. SACHIN.

M. No: 3160

Date : 11/09/2022

Tanker ID: GJ15AV7900

Name of Member: Anupam Rasayan India Ltd (V I) G.I.D.C Saachin

GECL			MEMBER			Memer's Sign.
TANKER OUT	TIME	KM Reading	TANKER IN	TIME	KM Reading	
	16:13	127422		04:30		
TANKER IN	TIME	KM Reading	TANKER OUT	TIME	KM Reading	
				05:10		

Tanker release Approved by: [signature]

Date: 11/09/2022 Time: 16:13

Tanker Received OK by: _____

Date: _____ Time: _____

★★ SECURITY ★★

Date _____ Time _____

Sr.No. _____ Time _____

Anupam Ras... ...ndia Ltd. U-6

Sec. Sign

EFFLUENT TRANSFER MANIFEST

GLOBE ENVIRO CARE LTD.
PLOT NO. P-1
B/H KAYTEX MILL
G.I.D.C. SACHIN.

M. No: 3161

Date : 11/09/2022

Tanker ID: GJ16 AT 6169

Name of Member: Anupam Rasayan India Ltd (VT) G.I.D.C, Sachin

GECL			MEMBER			Memer's Sign.
TANKER OUT	TIME	KM Reading	TANKER IN	TIME	KM Reading	
	16:40	50[illegible]		05:10		
TANKER IN	TIME	KM Reading	TANKER OUT	TIME	KM Reading	
				05:35		

Tanker release Approved by: KReee

Date: 11/09/2022 Time: 16:40

Tanker Received OK by:

Date: Time:

★★ SECURITY ★★
Date
Sr.No.
Anupam Rasayan India Ltd. U-6

Sec. Sign

EFFLUENT TRANSFER MANIFEST

GLOBE ENVIRO CARE LTD.
PLOT NO. P-1
B/H KAYTEX MILL
G.I.D.C. SACHIN.

M. No: 3159

Date : 11/09/2022

Tanker ID: GJ6W8483

Name of Member: Anupam Rasayan-V5 GIDC Sachin

GECL			MEMBER			Memer's Sign.
TANKER OUT	TIME	KM Reading	TANKER IN	TIME	KM Reading	
	15:50	64065		03:45		
TANKER IN	TIME	KM Reading	TANKER OUT	TIME	KM Reading	
				04:20		

Tanker release Approved by: [signature]

Date: 11/09/22 Time: 15:50

Tanker Received OK by: _____

Date: _____ Time: _____

★★ SECURITY ★★

Date _____ Intime _____

Sr.No. _____ Outtime _____

Anupam Ra... ...India Ltd. U-6

Sec. Sign.

EFFLUENT TRANSFER MANIFEST

GLOBE ENVIRO CARE LTD.
PLOT NO. P-1
B/H KAYTEX MILL
G.I.D.C. SACHIN.

M. No: 3163

Date : 11/09/2022

Tanker ID: GJ06W8483

Name of Member: Anupam Rasayan India Ltd(VI) G.I.D.C, Sachin

GECL			MEMBER			Memer's Sign.
TANKER OUT	TIME	KM Reading	TANKER IN	TIME	KM Reading	
	17:28	64068		05:45		
TANKER IN	TIME	KM Reading	TANKER OUT	TIME	KM Reading	
				06:10		

Tanker release Approved by: [signature]

Date: 11/09/2022 Time: 17:28

Tanker Received OK by: _____

Date: _____ Time: _____

★★ SECURITY ★★

Date _____ Intime _____

Sr.No. _____ Outtime _____

Anupam Rasayan India Ltd. U-6

Sec. Sign.

EFFLUENT TRANSFER MANIFEST

GLOBE ENVIRO CARE LTD.
PLOT NO. P-1
B/H KAYTEX MILL
G.I.D.C. SACHIN.

STREAM 63

TRIAL OF MEE

M. No: 15819

Date : 11 / 9 / 2022

Tanker ID: GJ 05 BZ 7906

Name of Member: Anupam Rajendra Yadav IT GIBC

GECL			MEMBER			Memer's Sign.
TANKER OUT	TIME	KM Reading	TANKER IN	TIME	KM Reading	
	7.25	24102		08:00		
TANKER IN	TIME	KM Reading	TANKER OUT	TIME	KM Reading	
				09:10		

Tanker release Approved by:

Date: Time: 7.25

Tanker Received OK by:

Date: Time:

★★ SECURITY ★★

Date Intime

Sr.No. Outtime

Anupam Rajendra India Ltd. U-6

Sec. Sign

Steam-6

EFFLUENT TRANSFER MANIFEST

GLOBE ENVIRO CARE LTD.
PLOT NO. P-1
B/H KAYTEX MILL
G.I.D.C. SACHIN.

STREAM C3
TRIAL OF MEE

M. No: 15822

Date : 11/09/2022

Tanker ID: GJ 5BZ 7906

Name of Member: Anupam Rasayan India Ltd. GIDC Sachin

GECL			MEMBER			Memer's Sign.
TANKER OUT	TIME	KM Reading	TANKER IN	TIME	KM Reading	
	10:15	24106		11:10		
TANKER IN	TIME	KM Reading	TANKER OUT	TIME	KM Reading	
				11:46		

Tanker release Approved by:

★★ SECURITY ★★

Date: 11/09/22 Time: 10:15

Date Intime

Sr.No. Outtime

Anupam Rasayan India Ltd. U-6

Tanker Received OK by:

Date: Time:

Sec. Sign.

EFFLUENT TRANSFER MANIFEST

STREAM C3

TRIAL OF MEE

GLOBE ENVIRO CARE LTD.
PLOT NO. P-1
B/H KAYTEX MILL
G.I.D.C. SACHIN.

M. No: 15820

Date : 11/09/2022

Tanker ID: GJ 6N 8483

Name of Member: Anupam Rasayan V1 h.f.d.c Sachin.

GECL			MEMBER			Memer's Sign.
TANKER OUT	TIME 9.15	KM Reading 64061	TANKER IN	TIME 10:00	KM Reading	
TANKER IN	TIME	KM Reading	TANKER OUT	TIME 10:40	KM Reading	

Tanker release Approved by: _____

Date: 11/9/2022 Time: 9.15

Tanker Received OK by: _____

Date: _____ Time: _____

EFFLUENT TRANSFER MANIFEST

GLOBE ENVIRO CARE LTD.
PLOT NO. P-1
B/H KAYTEX MILL
G.I.D.C. SACHIN.

STREAM C3
TRIAL OF MEE

M. No: 15824

Date : 11/09/2022

Tanker ID: GJ05BX2966

Name of Member: Anupam Rasayan India Ltd GIDC Sachin 9427399

GECL			MEMBER			Memer's Sign.
TANKER OUT	TIME	KM Reading	TANKER IN	TIME	KM Reading	
	15:15	3393		12:40		
TANKER IN	TIME	KM Reading	TANKER OUT	TIME	KM Reading	
				09:20		

Tanker release Approved by: _____

Date: 11/09/22 Time: 15:15

Tanker Received OK by: _____

Date: _____ Time: _____

★★ SECURITY ★★

Date _____ Intime _____

Sr.No. _____ Outtime _____

Anupam Rasayan India Ltd. U-6

Sec. Sign

EFFLUENT TRANSFER MANIFEST

GLOBE ENVIRO CARE LTD.
PLOT NO. P-1
B/H KAYTEX MILL
G.I.D.C. SACHIN.

M. No: 3154

Date : 11/09/2022

Tanker ID: GJ15AV7906

Name of Member: Anupam Rasayan India Ltd Sachin

GECL			MEMBER			Memer's Sign.
TANKER OUT	TIME	KM Reading	TANKER IN	TIME	KM Reading	
	11:10	127419		11:50		
TANKER IN	TIME	KM Reading	TANKER OUT	TIME	KM Reading	
				12:25		

Tanker release Approved by: _____

Date: 11/09/22 Time: 11:10

Tanker Received OK by: _____

Date: _____ Time: _____

★★ SECURITY ★★

Date _____ Intime _____

Sr.No. _____ Outtime _____

Anupam Rasayan India Ltd. U-6

Sec. Sign.

EFFLUENT TRANSFER MANIFEST

GLOBE ENVIRO CARE LTD.
PLOT NO. P-1
B/H KAYTEX MILL
G.I.D.C. SACHIN.

TRIAL OF MEE

M. No: 15821
Date : 11/09/2022
Tanker ID: GJ19Z3906

Name of Member: Anupam Rasayan. Ltd. GIDC Sachin

GECL			MEMBER			Memer's Sign.
TANKER OUT	TIME	KM Reading	TANKER IN	TIME	KM Reading	
	10:00	3390		01:35		
TANKER IN	TIME	KM Reading	TANKER OUT	TIME	KM Reading	
				02:00		

Tanker release Approved by:

Date: 11/09/22 Time: 10:00

Tanker Received OK by:

Date: Time:

★★ SECURITY ★★
Date Intime
Sr.No. Outtime
Anupam Rasayan India Ltd. U-6

Sec. Sign

EFFLUENT TRANSFER MANIFEST

GLOBE ENVIRO CARE LTD.
PLOT NO. P-1
B/H KAYTEX MILL
G.I.D.C. SACHIN.

STREAM C3

TRIAL OF MEE

M. No: 15823

Date : 11/09/2022

Tanker ID: GJ05BT3906

Name of Member: Anupam Rasayan. I. Ltd C Sachin

GECL			MEMBER			Memer's Sign.
TANKER OUT	TIME	KM Reading	TANKER IN	TIME	KM Reading	
	12.30	24105		02:45		
TANKER IN	TIME	KM Reading	TANKER OUT	TIME	KM Reading	
				03:30		

Tanker release Approved by:

Date: 11/09/22 Time: 12:30

Tanker Received OK by:

Date: Time:

★★ SECURITY ★★

Date Intime

Sr.No. Outtime

Anupam Rasayan India Ltd. U-6

Sec. Sign

ANNEXURE - R-12

Anupam Rasayan India Limited
Plot No 2423 & 2425, Sachin GIDC, Surat

Particulars of Full and Final Settlement With respect to Deceased Employee

Sr No	Emp Code	Name of Employee	DOJ	DOD	Company	Bonus Amount	Leave Encashment	Salary for the Month of Septemeber	Salary Arrears	Gratuity	Gratuity (Death Claim)	Ex - Gratia	Insurance Amount	WC/ESIC	Total Payables	Nominee
1	242500018	Ankur Suresh Patel	10-03-2013	10-09-2022	ARIL	₹ 89,594.00	₹ 44,632.00	₹ 23,629.00	₹ 20,709.00	₹ 2,29,644.00	₹ 5,51,146.00	₹ 20,00,000.00	₹ 13,00,000.00	₹ 14,95,500.00	₹ 57,54,854.00	Patel Daxaben (Mother)
2	242500040	Sanjay Govindbhai Shyora	25-09-2017	10-09-2022	ARIL	₹ 56,602.00	₹ 25,709.00	₹ 14,928.00	₹ 16,875.00	₹ 69,141.00	₹ 4,01,020.00	₹ 20,00,000.00	₹ 13,00,000.00	₹ 15,74,400.00	₹ 54,58,675.00	Damuben Govindbhai Shyora (mother)
3	242500004	Rakesh Pramod Chaudhari	01-04-2001	10-09-2022	ARIL	₹ 33,283.00	₹ 9,310.00	₹ 10,241.00	₹ 9,345.00	₹ 2,93,265.00	₹ 2,79,300.00	₹ 20,00,000.00	₹ 13,00,000.00	₹ 14,21,700.00	₹ 53,56,444.00	Chaudhari GudiyaDevi (Spouse), Pramod Chaudhari (Father),Baidhi Devi (Mother)
4	242520034	Prabhat Dharmendra Jha	01-02-2020	10-09-2022	Contract	₹ 16,283.00	₹ 4,008.00	₹ 4,384.00	₹ 3,982.00	₹ 22,545.00	-	₹ 20,00,000.00	₹ 13,00,000.00	₹ 16,60,275.00	₹ 50,11,477.00	Ruma Za (mother), Dharmendra Za (Father)
5	242500049	Jayrajsinh Rajendrasinh Thakor	02-04-2019	15-09-2022	ARIL	₹ 50,942.00	₹ 25,377.00	₹ 19,407.00	₹ 15,189.00	₹ 36,782.00	₹ 3,92,345.00	₹ 20,00,000.00	₹ 13,00,000.00	₹ 16,26,825.00	₹ 54,66,867.00	RajendraSinh GovindSinh Thakor (Father), Kanakben Rajendrasinh Thakor (Mother)

Anupam Rasayan India Ltd. * SURAT * Authorised

ANNEXURE - R-13

ANKUR SURESH PATEL

Standard Chartered

Standard Chartered Bank
Surat branch, C.K Tower, Besides Sargam Shopping Centre,
Towards Surat Dumas Road,
Parle Point, Surat 395007
IFSC : SCBL0036063

Valid for 3 months from the date of issue

दिनांक Date 15 09 2022 (D D M M Y Y Y Y)

Pay Patel Daxaben या धारक को Or Bearer

रुपये Rupees One Lakh seventy eight thousand five Hundred Sixty four only — अदा करें। ₹ 1,78,564/-

A/c No. 65005051759

CBS

ANUPAM RASAYAN INDIA LIMITED

Please sign above this line

PAYABLE AT PAR AT ALL BRANCHES OF STANDARD CHARTERED BANK IN INDIA

⑈825099⑈ 395036002⑆ 505175⑈ 31

Manipal Technologies Limited - Navi Mumbai / CTS-2010

जारी करने की तारीख से 3 माह केलिए वैध VALID FOR 3 MONTHS FROM THE DATE OF ISSUE

15 09 2022 (D D M M Y Y Y Y)

बैंक ऑफ़ इंडिया Bank of India BOI

पांड्योंडि रोड शाखा , सूरत, गुजरात - 395001
GHODDOD ROAD Branch , SURAT, GUJARAT - 395001
IFSC : BKID0002743

A/c. Payee's Only

Pay Patel Daxaben या धारक को Or Bearer

रुपये Rupees Two Lakh twenty nine thousand six Hundred fourty four only — अदा करें। ₹ 2,29,644/-

खा.सं. A/c No. 270910110000026

चेक प्राप्तकर्ता की आधार संख्या (वैकल्पिक) Cheque receiver's AADHAAR number (optional)

For Anupam Rasayan India Ltd.
E.G.G. Scheme

Trustee

ANUPAM RASAYAN INDIA LTD. E.G.G. SCHEME

Please sign above

हमारी सभी शाखाओं पर समाशोधन में देय PAYABLE AT ALL OUR BRANCHES IN CLEARING

3313627 30/06/2020 00261331

SESHAASAI (I) - CTS-2010

⑈341331⑈ 395013006⑆ 013767⑈ 10

Standard Chartered

Standard Chartered Bank
Surat branch, C.K Tower, Besides Sargam Shopping Centre,
Towards Surat Dumas Road,
Parle Point, Surat 395007
IFSC : SCBL0036063

A/c. Payee's Only

Valid for 3 months from the date of issue

दिनांक Date | 1 | 5 | 0 | 9 | 2 | 0 | 2 | 2 |
D D M M Y Y Y Y

Pay Patel Daxaben

या धारक को Or ~~Bearer~~

रुपये Rupees Twenty Lakh only —

अदा करें।

₹ 20,00,000/-

A/c No. 65005051759

CBS

ANUPAM RASAYAN INDIA LIMITED

PAYABLE AT PAR AT ALL BRANCHES OF STANDARD CHARTERED BANK IN INDIA

Please sign above this line

⑈825095⑈ 395036002⑆ 505175⑈ 31

Manipal Technologies Limited - Navi Mumbai / CTS-2010

PRABHAT DHARMENDRA JHA

Standard Chartered

Standard Chartered Bank
Surat branch, C.K Tower, Besides Sargam Shopping Centre,
Towards Surat Dumas Road,
Parle Point, Surat 395007
IFSC : SCBL0036063

A/c. Payee's Only

Valid for 3 months from the date of issue

दिनांक Date 1 2 0 9 2 0 2 2
D D M M Y Y Y Y

Pay Ruma Za

या धारक को Or Bearer

रुपये Rupees Ten Lakh only —

अदा करें।

₹ 10,00,000/-

A/c No. 65005051759

CBS

ANUPAM RASAYAN INDIA LIMITED

PAYABLE AT PAR AT ALL BRANCHES OF STANDARD CHARTERED BANK IN INDIA

Please sign above this line

⑈825156⑈ 395036002⑆ 505175⑈ 31

Manipal Technologies Limited - Navi Mumbai / CTS-2010

Standard Chartered

Standard Chartered Bank
Surat branch, C.K Tower, Besides Sargam Shopping Centre,
Towards Surat Dumas Road,
Parle Point, Surat 395007
IFSC : SCBL0036063

A/c. Payee's Only

Valid for 3 months from the date of issue

दिनांक Date 1 2 0 9 2 0 2 2
D D M M Y Y Y Y

Pay Za Dharmendra

या धारक को Or Bearer

रुपये Rupees Ten Lakh only —

अदा करें।

₹ 10,00,000/-

A/c No. 65005051759

CBS

ANUPAM RASAYAN INDIA LIMITED

PAYABLE AT PAR AT ALL BRANCHES OF STANDARD CHARTERED BANK IN INDIA

Please sign above this line

⑈825157⑈ 395036002⑆ 505175⑈ 31

Manipal Technologies Limited - Navi Mumbai / CTS-2010

YES Prosperity BUSINESS

VALID FOR THREE MONTHS FROM THE DATE OF ISSUE

YES BANK Ltd., GR FLOOR,MANGALDEEP, RING ROAD, NEAR MAHAVIR HOSPITAL, NEAR RTO, SURAT 395001
IFS CODE : YESB0000011

A/c. Payee's Only

Payable At Par At All Branches of YES BANK Ltd.

1 5 0 9 2 0 2 2
D D M M Y Y Y Y

Pay Za Dharmendra or Bearer
या धारक को

Rupees रुपये Twenty eight thousand six Hundred fifty seven only — Paisa
अदा करें ₹ 28657/-

CURRENT
A/c No. खाता क्र. 001181300000542

For SAI ASSOCIATES

B.H. Desai

Authorised Signatories
Please sign above

YES BANK

VOID

UTILITY FORMS PVT. LTD. / CTS - 2010

⑈ 042767 ⑈ 395532002⑆ 028617 ⑈ 29

YES Prosperity BUSINESS

VALID FOR THREE MONTHS FROM THE DATE OF ISSUE

YES BANK Ltd., GR FLOOR,MANGALDEEP, RING ROAD, NEAR MAHAVIR HOSPITAL, NEAR RTO, SURAT 395001
IFS CODE : YESB0000011

A/c. Payee's Only

Payable At Par At All Branches of YES BANK Ltd.

2 0 0 9 2 0 2 2
D D M M Y Y Y Y

Pay Za Dharmendra or Bearer
या धारक को

Rupees रुपये Twenty two thousand five Hundred fourty five only — Paisa
अदा करें ₹ 22545/-

CURRENT
A/c No. खाता क्र. 001181300000542

For SAI ASSOCIATES

B. H. Desai

Authorised Signatories
Please sign above

YES BANK

VOID

UTILITY FORMS PVT. LTD. / CTS - 2010

⑈ 530901 ⑈ 395532002⑆ 028617 ⑈ 29

RAKESH PRAMOD CHAUDHRI

Standard Chartered

Standard Chartered Bank
Surat branch, C.K Tower, Besides Sargam Shopping Centre,
Towards Surat Dumas Road,
Parle Point, Surat 395007
IFSC : SCBL0036063

Valid for 3 months from the date of issue

दिनांक Date 1 5 0 9 2 0 2 2
D D M M Y Y Y Y

Pay Chodri Gudiyadevi

या धारक को Or Bearer

रुपये Rupees Six ty two thousand One Hundred &
Seventy nine only —

अदा करें। ₹ 62179/-

A/c No. 65005051759

CBS

ANUPAM RASAYAN INDIA LIMITED

PAYABLE AT PAR AT ALL BRANCHES OF STANDARD CHARTERED BANK IN INDIA

Please sign above this line

⑈825150⑈ 395036002⑆ 505175⑈ 31

Manipal Technologies Limited - Navi Mumbai / CTS-2010

Standard Chartered

Standard Chartered Bank
Surat branch, C.K Tower, Besides Sargam Shopping Centre,
Towards Surat Dumas Road,
Parle Point, Surat 395007
IFSC : SCBL0036063

A/c. Payee's Only

Valid for 3 months from the date of issue

दिनांक Date 1 2 0 9 2 0 2 2
D D M M Y Y Y Y

Pay Baidhi Devi

या धारक को Or Bearer

रुपये Rupees Two Lakhs only —

अदा करें। ₹ 2,00,000/-

A/c No. 65005051759

CBS

ANUPAM RASAYAN INDIA LIMITED

PAYABLE AT PAR AT ALL BRANCHES OF STANDARD CHARTERED BANK IN INDIA

Please sign above this line

⑈825154⑈ 395036002⑆ 505175⑈ 31

Manipal Technologies Limited - Navi Mumbai / CTS-2010

Standard Chartered

Standard Chartered Bank
Surat branch, C.K Tower, Besides Sargam Shopping Centre,
Towards Surat Dumas Road,
Parle Point, Surat 395007
IFSC : SCBL0036063

A/c. Payee's Only

Valid for 3 months from the date of issue

दिनांक Date 1 2 0 9 2 0 2 2
D D M M Y Y Y Y

Pay Pramod Choudhary

या धारक को Or Bearer

रुपये Rupees Two Lakh only —

₹ 2,00,000/-

अदा करें।

A/c No. 65005051759

CBS

ANUPAM RASAYAN INDIA LIMITED

Please sign above this line

PAYABLE AT PAR AT ALL BRANCHES OF STANDARD CHARTERED BANK IN INDIA

⑈825153⑈ 395036002⑆ 505175⑈ 31

Manipal Technologies Limited - Navi Mumbai / CTS-2010

Standard Chartered

Standard Chartered Bank
Surat branch, C.K Tower, Besides Sargam Shopping Centre,
Towards Surat Dumas Road,
Parle Point, Surat 395007
IFSC : SCBL0036063

A/c. Payee's Only

Valid for 3 months from the date of issue

दिनांक Date 1 2 0 9 2 0 2 2
D D M M Y Y Y Y

Pay Chodri Gudiyaderi

या धारक को Or Bearer

रुपये Rupees Sixteen Lakh Only —

₹ 16,00,000/-

अदा करें।

A/c No. 65005051759

CBS

ANUPAM RASAYAN INDIA LIMITED

Please sign above this line

PAYABLE AT PAR AT ALL BRANCHES OF STANDARD CHARTERED BANK IN INDIA

⑈825152⑈ 395036002⑆ 505175⑈ 31

Manipal Technologies Limited - Navi Mumbai / CTS-2010

बैंक ऑफ़ इंडिया Bank of India BOI

पोड्डोडि रोड शाखा , सूरत, गुजरात - 395001
GHODDOD ROAD Branch , SURAT, GUJARAT - 395001
IFSC : BKID0002743

A/c. Payee's Only

चेक जारी करने की तारीख से 3 माह के लिए वैध VALID FOR 3 MONTHS FROM THE DATE OF ISSUE

2 0 0 9 2 0 2 2
D D M M Y Y Y Y

Pay Chodri Gudiyaderi

या धारक को Or Bearer

रुपये Rupees Two Lakh ninty three thousand two Hundred Sixty five only —

अदा करें। ₹ 293265/-

खा.सं. A/c No. 270910110000026

चेक प्राप्तकर्ता की आधार संख्या (वैकल्पिक)Cheque receiver's AADHAAR number (optional)

For Anupam Rasayan India Ltd.
E.G.G. Scheme

Trustee

ANUPAM RASAYAN INDIA LTD. E.G.G. SCHEME

Please sign above

हमारी सभी शाखाओं पर समाशोधन में देय PAYABLE AT ALL OUR BRANCHES IN CLEARING

⑈341333⑈ 395013006⑆ 013767⑈ 10

3313627 30/06/2020 00261333

SESHAASAI (I.I.) / CTS-2010

JAYRAJ RAJENDRASINH THAKOR

बैंक ऑफ़ इंडिया Bank of India BOI

घोड्दोड रोड शाखा , सूरत, गुजरात - 395001
GHODDOD ROAD Branch , SURAT, GUJARAT - 395001
IFSC : BKID0002743

जारी करने की तारीख से 3 माह के लिए वैध VALID FOR 3 MONTHS FROM THE DATE OF ISSUE

2	0	0	9	2	0	2	2
D	D	M	M	Y	Y	Y	Y

A/c. Payee's Only

Pay Rajendrasinh Govindsinh thakor

या धारक को Or Bearer

रुपये Rupees Thirty six thousand Seven Hundred eighty two only -

अदा करें। ₹ 36,782/-

खा.सं. A/c No. 270910110000026

चेक प्राप्तकर्ता की आधार संख्या (वैकल्पिक)Cheque receiver's AADHAAR number (optional)

For Anupam Rasayan India Ltd.
E.G.G. Scheme

Trustee
ANUPAM RASAYAN INDIA LTD. E.G.G. SCHEME

हमारी सभी शाखाओं पर समाशोधन में देय PAYABLE AT ALL OUR BRANCHES IN CLEARING

Please sign above

3313627 30/06/2020 00261334 SESHAASAI (M) / CTS-2010

⑈341334⑈ 395013006⑆ 013767⑈ 10

Standard Chartered

Standard Chartered Bank
Surat branch, C.K Tower, Besides Sargam Shopping Centre,
Towards Surat Dumas Road,
Parle Point, Surat 395007
IFSC : SCBL0036063

Valid for 3 months from the date of issue

दिनांक Date

1	5	0	9	2	0	2	2
D	D	M	M	Y	Y	Y	Y

Pay Rajendrasinh Govindsinh thakor

या धारक को Or Bearer

रुपये Rupees One Lac ten thousand nine Hundred fifteen only -

अदा करें। ₹ 1,10,915/-

A/c No. 65005051759

CBS

ANUPAM RASAYAN INDIA LIMITED

PAYABLE AT PAR AT ALL BRANCHES OF STANDARD CHARTERED BANK IN INDIA

Please sign above this line

Manipal Technologies Limited - Navi Mumbai / CTS-2010

⑈825151⑈ 395036002⑆ 505175⑈ 31

Standard Chartered

A/c. Payee's Only

Standard Chartered Bank
Surat branch, C.K Tower, Besides Sargam Shopping Centre,
Towards Surat Dumas Road,
Parle Point, Surat 395007
IFSC : SCBL0036063

Valid for 3 months from the date of issue

दिनांक Date 1 5 0 9 2 0 2 2
D D M M Y Y Y Y

Pay Kanakben Rajendrasinh Thakor या धारक को Or Bearer

रुपये Rupees Ten Lakh Only —

अदा करें। ₹ 10,00,000/-

A/c No. 65005051759

CBS

ANUPAM RASAYAN INDIA LIMITED

PAYABLE AT PAR AT ALL BRANCHES OF STANDARD CHARTERED BANK IN INDIA

Please sign above this line

⑈825159⑈ 395036002⑆ 505175⑈ 31

Manipal Technologies Limited - Navi Mumbai / CTS-2010

Standard Chartered

A/c. Payee's Only

Standard Chartered Bank
Surat branch, C.K Tower, Besides Sargam Shopping Centre,
Towards Surat Dumas Road,
Parle Point, Surat 395007
IFSC : SCBL0036063

Valid for 3 months from the date of issue

दिनांक Date 1 5 0 9 2 0 2 2
D D M M Y Y Y Y

Pay Rajendrasinh Govindsinh Thakor या धारक को Or Bearer

रुपये Rupees Ten Lakh Only —

अदा करें। ₹ 10,00,000/-

A/c No. 65005051759

CBS

ANUPAM RASAYAN INDIA LIMITED

PAYABLE AT PAR AT ALL BRANCHES OF STANDARD CHARTERED BANK IN INDIA

Please sign above this line

⑈825158⑈ 395036002⑆ 505175⑈ 31

Manipal Technologies Limited - Navi Mumbai / CTS-2010

SANJAY GOVINDBHAI SHYORA

बैंक ऑफ़ इंडिया Bank of India BOI

घोड्दोड रोड शाखा , सूरत, गुजरात - 395001
GHODDOD ROAD Branch , SURAT, GUJARAT - 395001
IFSC : BKID0002743

A/c. Payee's Only

जारी करने की तारीख से 3 माह के लिए वैध VALID FOR 3 MONTHS FROM THE DATE OF ISSUE

2 0 0 9 2 0 2 2
D D M M Y Y Y Y

3313627 30/06/2020 00261332

Pay Damuben Govindbhai Shyora या धारक को Or Bearer

रुपये Rupees Six Nine thousand one Hundred & fourty one only —

अदा करें। ₹ 69,141/-

खा.सं. A/c No. 270910110000026

चेक प्राप्तकर्ता की आधार संख्या (वैकल्पिक)Cheque receiver's AADHAAR number (optional)

For Anupam Rasayan India Ltd.
E.G.G. Scheme

Trustee
ANUPAM RASAYAN INDIA LTD. E.G.G. SCHEME
Please sign above

SESHAASAI (M) : CTS-2010

हमारी सभी शाखाओं पर समाशोधन में देय PAYABLE AT ALL OUR BRANCHES IN CLEARING

⑈ 3 4 1 3 3 2 ⑈ 3 9 5 0 1 3 0 0 6 ⑆ 0 1 3 7 6 7 ⑈ 1 0

Standard Chartered

Standard Chartered Bank
Surat branch, C.K Tower, Besides Sargam Shopping Centre,
Towards Surat Dumas Road,
Parle Point, Surat 395007
IFSC : SCBL0036063

Valid for 3 months from the date of issue

दिनांक Date 1 5 0 9 2 0 2 2
D D M M Y Y Y Y

Pay Damuben Govindbhai Shyora या धारक को Or ~~Bearer~~

रुपये Rupees One lac fourteen thousand one Hundred fourteen only —

अदा करें। ₹ 1,14,114/-

A/c No. 65005051759

CBS

ANUPAM RASAYAN INDIA LIMITED

Please sign above this line

PAYABLE AT PAR AT ALL BRANCHES OF STANDARD CHARTERED BANK IN INDIA

Manipal Technologies Limited - Navi Mumbai

⑈ 8 2 5 1 0 0 ⑈ 3 9 5 0 3 6 0 0 2 ⑆ 5 0 5 1 7 5 ⑈ 3 1

Standard Chartered

Standard Chartered Bank
Surat branch, C.K Tower, Besides Sargam Shopping Centre,
Towards Surat Dumas Road,
Parle Point, Surat 395007
IFSC : SCBL0036063

A/c. Payee's Only

Valid for 3 months from the date of issue

दिनांक Date 15 09 2022
D D M M Y Y Y Y

Pay DAMUBEN GOVIND BHAI SHYORA या धारक को Or Bearer

रुपये Rupees TWENTY LAKH ONLY —

अदा करें। ₹ 20,00,000/-

A/c No. 65005051759

CBS

ANUPAM RASAYAN INDIA LIMITED

Please sign above this line

PAYABLE AT PAR AT ALL BRANCHES OF STANDARD CHARTERED BANK IN INDIA

⑈825097⑈ 395036002⑆ 505175⑈ 31

Manipal Technologies Limited - Navi Mumbai / CTS-2010

standard chartered

PAYEE ADVICE

To,
SONI RAKESH KUMAR

Bank Reference : IN1ON22091701GKV
Customer Reference : 1500005252170922
Advice Date : 17-Sep-2022

Dear Sir / Madam,
At the instruction of our client, we have initiated the following payment transaction to your account through ACH:

SETTLEMENT REFERENCE	:	IN1ON22091701GKV
REMITTER NAME	:	ANUPAM RASAYAN INDIA LIMITED
VALUE DATE	:	17-Sep-2022
CURRENCY	:	INR
REMITTANCE AMOUNT	:	50000.00
BANK NAME	:	YES BANK
BANK CODE	:	YESB0000929
ACCOUNT NAME	:	SONI RAKESH KUMAR
ACCOUNT NUMBER	:	092991800007321
PAYMENT DETAILS	:	NA

Our Client has provided additional details for your reference:

DATE	INV Ref	DOC NO	VENDOR	GROSS AMT	TAX	Amount (INR)
17/09/2022	MAIL REF	1500005252	EMPLOYEE	50000.00	0.00	50000

Note: We have initiated the above payment transaction at the instruction of our client, and the details of the transaction shown are based on information provided by our client. If the information provided was incorrect or our client revokes the payment instruction, or any other circumstance arises which is beyond our control, this may result in the payment being delayed or not received by you. The actual date of credit of funds into your account is subject to the clearing system(s) used, any intermediary bank(s) and the beneficiary bank.

(This is a system generated advice and requires no signature.)

standard chartered

PAYEE ADVICE

To,
SHUBHAM YUVRAJ IDHATE

Bank Reference : IN1ON22091701GKX
Customer Reference : 1500005260170922
Advice Date : 17-Sep-2022

Dear Sir / Madam,
At the instruction of our client, we have initiated the following payment transaction to your account through ACH:

SETTLEMENT REFERENCE	:	IN1ON22091701GKX
REMITTER NAME	:	ANUPAM RASAYAN INDIA LIMITED
VALUE DATE	:	17-Sep-2022
CURRENCY	:	INR
REMITTANCE AMOUNT	:	50000.00
BANK NAME	:	YES BANK
BANK CODE	:	YESB0000929
ACCOUNT NAME	:	SHUBHAM YUVRAJ IDHATE
ACCOUNT NUMBER	:	092991800008732
PAYMENT DETAILS	:	NA

Our Client has provided additional details for your reference:

DATE	INV Ref	DOC NO	VENDOR	GROSS AMT	TAX	Amount (INR)
17/09/2022	MAIL REF	1500005260	EMPLOYEE	50000.00	0.00	50000

Note: We have initiated the above payment transaction at the instruction of our client, and the details of the transaction shown are based on information provided by our client. If the information provided was incorrect or our client revokes the payment instruction, or any other circumstance arises which is beyond our control, this may result in the payment being delayed or not received by you. The actual date of credit of funds into your account is subject to the clearing system(s) used, any intermediary bank(s) and the beneficiary bank.

(This is a system generated advice and requires no signature.)

standard chartered

PAYEE ADVICE

To,
SAHIL VIMAL VESUWALA

Bank Reference : IN1ON22091701GKO
Customer Reference : 1500005266170922
Advice Date : 17-Sep-2022

Dear Sir / Madam,
At the instruction of our client, we have initiated the following payment transaction to your account through ACH:

SETTLEMENT REFERENCE	:	IN1ON22091701GKO
REMITTER NAME	:	ANUPAM RASAYAN INDIA LIMITED
VALUE DATE	:	17-Sep-2022
CURRENCY	:	INR
REMITTANCE AMOUNT	:	50000.00
BANK NAME	:	YES BANK
BANK CODE	:	YESB0000011
ACCOUNT NAME	:	SAHIL VIMAL VESUWALA
ACCOUNT NUMBER	:	001190200063981
PAYMENT DETAILS	:	NA

Our Client has provided additional details for your reference:

DATE	INV Ref	DOC NO	VENDOR	GROSS AMT	TAX	Amount (INR)
17/09/2022	MAIL REF	1500005266	EMPLOYEE	50000.00	0.00	50000

Note: We have initiated the above payment transaction at the instruction of our client, and the details of the transaction shown are based on information provided by our client. If the information provided was incorrect or our client revokes the payment instruction, or any other circumstance arises which is beyond our control, this may result in the payment being delayed or not received by you. The actual date of credit of funds into your account is subject to the clearing system(s) used, any intermediary bank(s) and the beneficiary bank.

(This is a system generated advice and requires no signature.)

standard chartered

PAYEE ADVICE

To,
SACHIN DILIP INGLE

Bank Reference : IN1ON22091701GL3
Customer Reference : 1500005253170922
Advice Date : 17-Sep-2022

Dear Sir / Madam,
At the instruction of our client, we have initiated the following payment transaction to your account through ACH:

SETTLEMENT REFERENCE	:	IN1ON22091701GL3
REMITTER NAME	:	ANUPAM RASAYAN INDIA LIMITED
VALUE DATE	:	17-Sep-2022
CURRENCY	:	INR
REMITTANCE AMOUNT	:	50000.00
BANK NAME	:	YES BANK
BANK CODE	:	YESB0000176
ACCOUNT NAME	:	SACHIN DILIP INGLE
ACCOUNT NUMBER	:	017690200006627
PAYMENT DETAILS	:	NA

Our Client has provided additional details for your reference:

DATE	INV Ref	DOC NO	VENDOR	GROSS AMT	TAX	Amount (INR)
17/09/2022	MAIL REF	1500005253	EMPLOYEE	50000.00	0.00	50000

Note: We have initiated the above payment transaction at the instruction of our client, and the details of the transaction shown are based on information provided by our client. If the information provided was incorrect or our client revokes the payment instruction, or any other circumstance arises which is beyond our control, this may result in the payment being delayed or not received by you. The actual date of credit of funds into your account is subject to the clearing system(s) used, any intermediary bank(s) and the beneficiary bank.

(This is a system generated advice and requires no signature.)

standard chartered

PAYEE ADVICE

To,
RAMEKAR GAJANAN

Bank Reference : IN1ON22091701GKS
Customer Reference : 1500005254170922
Advice Date : 17-Sep-2022

Dear Sir / Madam,
At the instruction of our client, we have initiated the following payment transaction to your account through ACH:

SETTLEMENT REFERENCE	:	IN1ON22091701GKS
REMITTER NAME	:	ANUPAM RASAYAN INDIA LIMITED
VALUE DATE	:	17-Sep-2022
CURRENCY	:	INR
REMITTANCE AMOUNT	:	50000.00
BANK NAME	:	YES BANK
BANK CODE	:	YESB0000011
ACCOUNT NAME	:	RAMEKAR GAJANAN
ACCOUNT NUMBER	:	001190200063592
PAYMENT DETAILS	:	NA

Our Client has provided additional details for your reference:

DATE	INV Ref	DOC NO	VENDOR	GROSS AMT	TAX	Amount (INR)
17/09/2022	MAIL REF	1500005254	EMPLOYEE	50000.00	0.00	50000

Note: We have initiated the above payment transaction at the instruction of our client, and the details of the transaction shown are based on information provided by our client. If the information provided was incorrect or our client revokes the payment instruction, or any other circumstance arises which is beyond our control, this may result in the payment being delayed or not received by you. The actual date of credit of funds into your account is subject to the clearing system(s) used, any intermediary bank(s) and the beneficiary bank.

(This is a system generated advice and requires no signature.)

standard chartered

PAYEE ADVICE

To,
RAJBHAR JITENDRA

Bank Reference : IN1ON22091701GKN
Customer Reference : 1500005265170922
Advice Date : 17-Sep-2022

Dear Sir / Madam,
At the instruction of our client, we have initiated the following payment transaction to your account through ACH:

SETTLEMENT REFERENCE	:	IN1ON22091701GKN
REMITTER NAME	:	ANUPAM RASAYAN INDIA LIMITED
VALUE DATE	:	17-Sep-2022
CURRENCY	:	INR
REMITTANCE AMOUNT	:	50000.00
BANK NAME	:	YES BANK
BANK CODE	:	YESB0000011
ACCOUNT NAME	:	RAJBHAR JITENDRA
ACCOUNT NUMBER	:	001191600005785
PAYMENT DETAILS	:	NA

Our Client has provided additional details for your reference:

DATE	INV Ref	DOC NO	VENDOR	GROSS AMT	TAX	Amount (INR)
17/09/2022	MAIL REF	1500005265	EMPLOYEE	50000.00	0.00	50000

Note: We have initiated the above payment transaction at the instruction of our client, and the details of the transaction shown are based on information provided by our client. If the information provided was incorrect or our client revokes the payment instruction, or any other circumstance arises which is beyond our control, this may result in the payment being delayed or not received by you. The actual date of credit of funds into your account is subject to the clearing system(s) used, any intermediary bank(s) and the beneficiary bank.

(This is a system generated advice and requires no signature.)

standard chartered

PAYEE ADVICE

To,
PATEL SHREYAS KIRANBHAI

Bank Reference : IN1ON22091701GKP
Customer Reference : 1500005257170922
Advice Date : 17-Sep-2022

Dear Sir / Madam,
At the instruction of our client, we have initiated the following payment transaction to your account through ACH:

SETTLEMENT REFERENCE	:	IN1ON22091701GKP
REMITTER NAME	:	ANUPAM RASAYAN INDIA LIMITED
VALUE DATE	:	17-Sep-2022
CURRENCY	:	INR
REMITTANCE AMOUNT	:	50000.00
BANK NAME	:	YES BANK
BANK CODE	:	YESB0000702
ACCOUNT NAME	:	PATEL SHREYAS KIRANBHAI
ACCOUNT NUMBER	:	070291900001430
PAYMENT DETAILS	:	NA

Our Client has provided additional details for your reference:

DATE	INV Ref	DOC NO	VENDOR	GROSS AMT	TAX	Amount (INR)
17/09/2022	MAIL REF	1500005257	EMPLOYEE	50000.00	0.00	50000

Note: We have initiated the above payment transaction at the instruction of our client, and the details of the transaction shown are based on information provided by our client. If the information provided was incorrect or our client revokes the payment instruction, or any other circumstance arises which is beyond our control, this may result in the payment being delayed or not received by you. The actual date of credit of funds into your account is subject to the clearing system(s) used, any intermediary bank(s) and the beneficiary bank.

(This is a system generated advice and requires no signature.)

standard chartered

PAYEE ADVICE

To,
PATEL JATIN THAKORBHAI

Bank Reference : IN1ON22091701GL2
Customer Reference : 1500005249170922
Advice Date : 17-Sep-2022

Dear Sir / Madam,
At the instruction of our client, we have initiated the following payment transaction to your account through ACH:

SETTLEMENT REFERENCE	:	IN1ON22091701GL2
REMITTER NAME	:	ANUPAM RASAYAN INDIA LIMITED
VALUE DATE	:	17-Sep-2022
CURRENCY	:	INR
REMITTANCE AMOUNT	:	50000.00
BANK NAME	:	YES BANK
BANK CODE	:	YESB0000176
ACCOUNT NAME	:	PATEL JATIN THAKORBHAI
ACCOUNT NUMBER	:	017691800002626
PAYMENT DETAILS	:	NA

Our Client has provided additional details for your reference:

DATE	INV Ref	DOC NO	VENDOR	GROSS AMT	TAX	Amount (INR)
17/09/2022	MAIL REF	1500005249	EMPLOYEE	50000.00	0.00	50000

Note: We have initiated the above payment transaction at the instruction of our client, and the details of the transaction shown are based on information provided by our client. If the information provided was incorrect or our client revokes the payment instruction, or any other circumstance arises which is beyond our control, this may result in the payment being delayed or not received by you. The actual date of credit of funds into your account is subject to the clearing system(s) used, any intermediary bank(s) and the beneficiary bank.

(This is a system generated advice and requires no signature.)

standard chartered

PAYEE ADVICE

To,
Ladumor Rakesh Danubhai

Bank Reference : IN1ON22091701GL0
Customer Reference : 1500005250170922
Advice Date : 17-Sep-2022

Dear Sir / Madam,
At the instruction of our client, we have initiated the following payment transaction to your account through ACH:

SETTLEMENT REFERENCE	:	IN1ON22091701GL0
REMITTER NAME	:	ANUPAM RASAYAN INDIA LIMITED
VALUE DATE	:	17-Sep-2022
CURRENCY	:	INR
REMITTANCE AMOUNT	:	50000.00
BANK NAME	:	YES BANK
BANK CODE	:	YESB0000176
ACCOUNT NAME	:	Ladumor Rakesh Danubhai
ACCOUNT NUMBER	:	017691800003299
PAYMENT DETAILS	:	NA

Our Client has provided additional details for your reference:

DATE	INV Ref	DOC NO	VENDOR	GROSS AMT	TAX	Amount (INR)
17/09/2022	MAIL REF	1500005250	RAKESH	50000.00	0.00	50000

Note: We have initiated the above payment transaction at the instruction of our client, and the details of the transaction shown are based on information provided by our client. If the information provided was incorrect or our client revokes the payment instruction, or any other circumstance arises which is beyond our control, this may result in the payment being delayed or not received by you. The actual date of credit of funds into your account is subject to the clearing system(s) used, any intermediary bank(s) and the beneficiary bank.

(This is a system generated advice and requires no signature.)

standard chartered

PAYEE ADVICE

To,
KUSHWAHAA VINAYKUMAR KAMALKISHOR

Bank Reference : IN1ON22091701GKT
Customer Reference : 1500005261170922
Advice Date : 17-Sep-2022

Dear Sir / Madam,
At the instruction of our client, we have initiated the following payment transaction to your account through ACH:

SETTLEMENT REFERENCE	:	IN1ON22091701GKT
REMITTER NAME	:	ANUPAM RASAYAN INDIA LIMITED
VALUE DATE	:	17-Sep-2022
CURRENCY	:	INR
REMITTANCE AMOUNT	:	50000.00
BANK NAME	:	YES BANK
BANK CODE	:	YESB0000929
ACCOUNT NAME	:	KUSHWAHAA VINAYKUMAR KAMALKISHOR
ACCOUNT NUMBER	:	092991800012450
PAYMENT DETAILS	:	NA

Our Client has provided additional details for your reference:

DATE	INV Ref	DOC NO	VENDOR	GROSS AMT	TAX	Amount (INR)
17/09/2022	MAIL REF	1500005261	EMPLOYEE	50000.00	0.00	50000

Note: We have initiated the above payment transaction at the instruction of our client, and the details of the transaction shown are based on information provided by our client. If the information provided was incorrect or our client revokes the payment instruction, or any other circumstance arises which is beyond our control, this may result in the payment being delayed or not received by you. The actual date of credit of funds into your account is subject to the clearing system(s) used, any intermediary bank(s) and the beneficiary bank.

(This is a system generated advice and requires no signature.)

standard chartered

PAYEE ADVICE

To,
GURUDAYAL SINGH

Bank Reference : IN1ON22091701GKU
Customer Reference : 1500005259170922
Advice Date : 17-Sep-2022

Dear Sir / Madam,
At the instruction of our client, we have initiated the following payment transaction to your account through ACH:

SETTLEMENT REFERENCE	:	IN1ON22091701GKU
REMITTER NAME	:	ANUPAM RASAYAN INDIA LIMITED
VALUE DATE	:	17-Sep-2022
CURRENCY	:	INR
REMITTANCE AMOUNT	:	50000.00
BANK NAME	:	YES BANK
BANK CODE	:	YESB0000929
ACCOUNT NAME	:	GURUDAYAL SINGH
ACCOUNT NUMBER	:	092991900009960
PAYMENT DETAILS	:	NA

Our Client has provided additional details for your reference:

DATE	INV Ref	DOC NO	VENDOR	GROSS AMT	TAX	Amount (INR)
17/09/2022	MAIL REF	1500005259	EMPLOYEE	50000.00	0.00	50000

Note: We have initiated the above payment transaction at the instruction of our client, and the details of the transaction shown are based on information provided by our client. If the information provided was incorrect or our client revokes the payment instruction, or any other circumstance arises which is beyond our control, this may result in the payment being delayed or not received by you. The actual date of credit of funds into your account is subject to the clearing system(s) used, any intermediary bank(s) and the beneficiary bank.

(This is a system generated advice and requires no signature.)

standard chartered

PAYEE ADVICE

To,
GOVINDA KUMAR

Bank Reference : IN1ON22091701GL4
Customer Reference : 1500005263170922
Advice Date : 17-Sep-2022

Dear Sir / Madam,
At the instruction of our client, we have initiated the following payment transaction to your account through ACH:

SETTLEMENT REFERENCE	:	IN1ON22091701GL4
REMITTER NAME	:	ANUPAM RASAYAN INDIA LIMITED
VALUE DATE	:	17-Sep-2022
CURRENCY	:	INR
REMITTANCE AMOUNT	:	50000.00
BANK NAME	:	YES BANK
BANK CODE	:	YESB0001142
ACCOUNT NAME	:	GOVINDA KUMAR
ACCOUNT NUMBER	:	114291900000747
PAYMENT DETAILS	:	NA

Our Client has provided additional details for your reference:

DATE	INV Ref	DOC NO	VENDOR	GROSS AMT	TAX	Amount (INR)
17/09/2022	MAIL REF	1500005263	EMPLOYEE	50000.00	0.00	50000

Note: We have initiated the above payment transaction at the instruction of our client, and the details of the transaction shown are based on information provided by our client. If the information provided was incorrect or our client revokes the payment instruction, or any other circumstance arises which is beyond our control, this may result in the payment being delayed or not received by you. The actual date of credit of funds into your account is subject to the clearing system(s) used, any intermediary bank(s) and the beneficiary bank.

(This is a system generated advice and requires no signature.)

standard chartered

PAYEE ADVICE

To,
Govind Mahendra Rai

Bank Reference : IN1ON22091701GKL
Customer Reference : 1500005258170922
Advice Date : 17-Sep-2022

Dear Sir / Madam,
At the instruction of our client, we have initiated the following payment transaction to your account through ACH:

SETTLEMENT REFERENCE	:	IN1ON22091701GKL
REMITTER NAME	:	ANUPAM RASAYAN INDIA LIMITED
VALUE DATE	:	17-Sep-2022
CURRENCY	:	INR
REMITTANCE AMOUNT	:	50000.00
BANK NAME	:	YES BANK
BANK CODE	:	YESB0000929
ACCOUNT NAME	:	Govind Mahendra Rai
ACCOUNT NUMBER	:	092991800010712
PAYMENT DETAILS	:	NA

Our Client has provided additional details for your reference:

DATE	INV Ref	DOC NO	VENDOR	GROSS AMT	TAX	Amount (INR)
17/09/2022	MAIL REF	1500005258	EMPLOYEE	50000.00	0.00	50000

Note: We have initiated the above payment transaction at the instruction of our client, and the details of the transaction shown are based on information provided by our client. If the information provided was incorrect or our client revokes the payment instruction, or any other circumstance arises which is beyond our control, this may result in the payment being delayed or not received by you. The actual date of credit of funds into your account is subject to the clearing system(s) used, any intermediary bank(s) and the beneficiary bank.

(This is a system generated advice and requires no signature.)

standard chartered

PAYEE ADVICE

To,
GOHIL KAUSHAL VIRENDRABHAI

Bank Reference : IN1ON22091701GL5
Customer Reference : 1500005248170922
Advice Date : 17-Sep-2022

Dear Sir / Madam,
At the instruction of our client, we have initiated the following payment transaction to your account through ACH:

SETTLEMENT REFERENCE	:	IN1ON22091701GL5
REMITTER NAME	:	ANUPAM RASAYAN INDIA LIMITED
VALUE DATE	:	17-Sep-2022
CURRENCY	:	INR
REMITTANCE AMOUNT	:	50000.00
BANK NAME	:	YES BANK
BANK CODE	:	YESB0000011
ACCOUNT NAME	:	GOHIL KAUSHAL VIRENDRABHAI
ACCOUNT NUMBER	:	001191800017931
PAYMENT DETAILS	:	NA

Our Client has provided additional details for your reference:

DATE	INV Ref	DOC NO	VENDOR	GROSS AMT	TAX	Amount (INR)
17/09/2022	MAIL REF	1500005248	EMPLOYEE	50000.00	0.00	50000

Note: We have initiated the above payment transaction at the instruction of our client, and the details of the transaction shown are based on information provided by our client. If the information provided was incorrect or our client revokes the payment instruction, or any other circumstance arises which is beyond our control, this may result in the payment being delayed or not received by you. The actual date of credit of funds into your account is subject to the clearing system(s) used, any intermediary bank(s) and the beneficiary bank.

(This is a system generated advice and requires no signature.)

standard chartered

PAYEE ADVICE

To,
GIRENDRA SHARDA JAA

Bank Reference : IN1ON22091701GL6
Customer Reference : 1500005256170922
Advice Date : 17-Sep-2022

Dear Sir / Madam,
At the instruction of our client, we have initiated the following payment transaction to your account through ACH:

SETTLEMENT REFERENCE	:	IN1ON22091701GL6
REMITTER NAME	:	ANUPAM RASAYAN INDIA LIMITED
VALUE DATE	:	17-Sep-2022
CURRENCY	:	INR
REMITTANCE AMOUNT	:	50000.00
BANK NAME	:	YES BANK
BANK CODE	:	YESB0000929
ACCOUNT NAME	:	GIRENDRA SHARDA JAA
ACCOUNT NUMBER	:	092991800008579
PAYMENT DETAILS	:	NA

Our Client has provided additional details for your reference:

DATE	INV Ref	DOC NO	VENDOR	GROSS AMT	TAX	Amount (INR)
17/09/2022	MAIL REF	1500005256	EMPLOYEE	50000.00	0.00	50000

Note: We have initiated the above payment transaction at the instruction of our client, and the details of the transaction shown are based on information provided by our client. If the information provided was incorrect or our client revokes the payment instruction, or any other circumstance arises which is beyond our control, this may result in the payment being delayed or not received by you. The actual date of credit of funds into your account is subject to the clearing system(s) used, any intermediary bank(s) and the beneficiary bank.

(This is a system generated advice and requires no signature.)

standard chartered

PAYEE ADVICE

To,
DIYORA VISHAL JASUBHAI

Bank Reference : IN1ON22091701GKR
Customer Reference : 1500005247170922
Advice Date : 17-Sep-2022

Dear Sir / Madam,
At the instruction of our client, we have initiated the following payment transaction to your account through ACH:

SETTLEMENT REFERENCE	:	IN1ON22091701GKR
REMITTER NAME	:	ANUPAM RASAYAN INDIA LIMITED
VALUE DATE	:	17-Sep-2022
CURRENCY	:	INR
REMITTANCE AMOUNT	:	50000.00
BANK NAME	:	YES BANK
BANK CODE	:	YESB0000176
ACCOUNT NAME	:	DIYORA VISHAL JASUBHAI
ACCOUNT NUMBER	:	017690200006238
PAYMENT DETAILS	:	NA

Our Client has provided additional details for your reference:

DATE	INV Ref	DOC NO	VENDOR	GROSS AMT	TAX	Amount (INR)
17/09/2022	MAIL REF	1500005247	EMPLOYEE	50000.00	0.00	50000

Note: We have initiated the above payment transaction at the instruction of our client, and the details of the transaction shown are based on information provided by our client. If the information provided was incorrect or our client revokes the payment instruction, or any other circumstance arises which is beyond our control, this may result in the payment being delayed or not received by you. The actual date of credit of funds into your account is subject to the clearing system(s) used, any intermediary bank(s) and the beneficiary bank.

(This is a system generated advice and requires no signature.)

standard chartered

PAYEE ADVICE

To,
DESAI JAYKUMAR KISHORBHAI

Bank Reference : IN1ON22091701GKQ
Customer Reference : 1500005251170922
Advice Date : 17-Sep-2022

Dear Sir / Madam,
At the instruction of our client, we have initiated the following payment transaction to your account through ACH:

SETTLEMENT REFERENCE	:	IN1ON22091701GKQ
REMITTER NAME	:	ANUPAM RASAYAN INDIA LIMITED
VALUE DATE	:	17-Sep-2022
CURRENCY	:	INR
REMITTANCE AMOUNT	:	50000.00
BANK NAME	:	YES BANK
BANK CODE	:	YESB0000784
ACCOUNT NAME	:	DESAI JAYKUMAR KISHORBHAI
ACCOUNT NUMBER	:	078491900004651
PAYMENT DETAILS	:	NA

Our Client has provided additional details for your reference:

DATE	INV Ref	DOC NO	VENDOR	GROSS AMT	TAX	Amount (INR)
17/09/2022	MAIL REF	1500005251	EMPLOYEE	50000.00	0.00	50000

Note: We have initiated the above payment transaction at the instruction of our client, and the details of the transaction shown are based on information provided by our client. If the information provided was incorrect or our client revokes the payment instruction, or any other circumstance arises which is beyond our control, this may result in the payment being delayed or not received by you. The actual date of credit of funds into your account is subject to the clearing system(s) used, any intermediary bank(s) and the beneficiary bank.

(This is a system generated advice and requires no signature.)

standard chartered

PAYEE ADVICE

To,
Arun Santosh Patil

Bank Reference : IN1ON22091701GKZ
Customer Reference : 1500005262170922
Advice Date : 17-Sep-2022

Dear Sir / Madam,
At the instruction of our client, we have initiated the following payment transaction to your account through ACH:

SETTLEMENT REFERENCE	:	IN1ON22091701GKZ
REMITTER NAME	:	ANUPAM RASAYAN INDIA LIMITED
VALUE DATE	:	17-Sep-2022
CURRENCY	:	INR
REMITTANCE AMOUNT	:	50000.00
BANK NAME	:	YES BANK
BANK CODE	:	YESB0000702
ACCOUNT NAME	:	Arun Santosh Patil
ACCOUNT NUMBER	:	070291800001836
PAYMENT DETAILS	:	NA

Our Client has provided additional details for your reference:

DATE	INV Ref	DOC NO	VENDOR	GROSS AMT	TAX	Amount (INR)
17/09/2022	MAIL REF	1500005262	EMPLOYEE	50000.00	0.00	50000

Note: We have initiated the above payment transaction at the instruction of our client, and the details of the transaction shown are based on information provided by our client. If the information provided was incorrect or our client revokes the payment instruction, or any other circumstance arises which is beyond our control, this may result in the payment being delayed or not received by you. The actual date of credit of funds into your account is subject to the clearing system(s) used, any intermediary bank(s) and the beneficiary bank.

(This is a system generated advice and requires no signature.)

standard chartered

PAYEE ADVICE

To,
AKSHAYKUMAR AJITBHAI PATEL

Bank Reference : IN1ON22091701GKM
Customer Reference : 1500005264170922
Advice Date : 17-Sep-2022

Dear Sir / Madam,
At the instruction of our client, we have initiated the following payment transaction to your account through ACH:

SETTLEMENT REFERENCE	:	IN1ON22091701GKM
REMITTER NAME	:	ANUPAM RASAYAN INDIA LIMITED
VALUE DATE	:	17-Sep-2022
CURRENCY	:	INR
REMITTANCE AMOUNT	:	50000.00
BANK NAME	:	YES BANK
BANK CODE	:	YESB0000176
ACCOUNT NAME	:	AKSHAYKUMAR AJITBHAI PATEL
ACCOUNT NUMBER	:	017691600002866
PAYMENT DETAILS	:	NA

Our Client has provided additional details for your reference:

DATE	INV Ref	DOC NO	VENDOR	GROSS AMT	TAX	Amount (INR)
17/09/2022	MAIL REF	1500005264	EMPLOYEE	50000.00	0.00	50000

Note: We have initiated the above payment transaction at the instruction of our client, and the details of the transaction shown are based on information provided by our client. If the information provided was incorrect or our client revokes the payment instruction, or any other circumstance arises which is beyond our control, this may result in the payment being delayed or not received by you. The actual date of credit of funds into your account is subject to the clearing system(s) used, any intermediary bank(s) and the beneficiary bank.

(This is a system generated advice and requires no signature.)

standard chartered

PAYEE ADVICE

To,
AJEET KUMAR

Bank Reference : IN1ON22091701GL1
Customer Reference : 1500005255170922
Advice Date : 17-Sep-2022

Dear Sir / Madam,
At the instruction of our client, we have initiated the following payment transaction to your account through ACH:

SETTLEMENT REFERENCE	:	IN1ON22091701GL1
REMITTER NAME	:	ANUPAM RASAYAN INDIA LIMITED
VALUE DATE	:	17-Sep-2022
CURRENCY	:	INR
REMITTANCE AMOUNT	:	50000.00
BANK NAME	:	YES BANK
BANK CODE	:	YESB0000176
ACCOUNT NAME	:	AJEET KUMAR
ACCOUNT NUMBER	:	017690200005542
PAYMENT DETAILS	:	NA

Our Client has provided additional details for your reference:

DATE	INV Ref	DOC NO	VENDOR	GROSS AMT	TAX	Amount (INR)
17/09/2022	MAIL REF	1500005255	EMPLOYEE	50000.00	0.00	50000

Note: We have initiated the above payment transaction at the instruction of our client, and the details of the transaction shown are based on information provided by our client. If the information provided was incorrect or our client revokes the payment instruction, or any other circumstance arises which is beyond our control, this may result in the payment being delayed or not received by you. The actual date of credit of funds into your account is subject to the clearing system(s) used, any intermediary bank(s) and the beneficiary bank.

(This is a system generated advice and requires no signature.)

Standard Chartered

Standard Chartered Bank
Surat branch, C.K Tower, Besides Sargam Shopping Centre,
Towards Surat Dumas Road,
Parle Point, Surat 395007
IFSC : SCBL0036063

A/c. Payee's Only

Valid for 3 months from the date of issue

दिनांक Date 15/02/2022

258

Pay RUMA ZA

या धारक को Or Bearer

रुपये Rupees TWENTY LAKH ONLY

अदा करें।

₹ 20,00,000/-

A/c No. 65005051759

CBS

ANUPAM RASAYAN INDIA LIMITED

PAYABLE AT PAR AT ALL BRANCHES OF STANDARD CHARTERED BANK IN INDIA

Please sign above this line

⑈825096⑈ 395036002⑆ 505175⑈ 31

Manipal Technologies Limited - Navi Mumbai / CTS-2010

Standard Chartered

Standard Chartered Bank
Surat branch, C.K Tower, Besides Sargam Shopping Centre,
Towards Surat Dumas Road,
Parle Point, Surat 395007
IFSC : SCBL0036063

A/c. Payee's Only

Valid for 3 months from the date of issue

दिनांक Date 1 5 0 2 5 9 0 2 2

Pay Patel Daxaben

या धारक को Or Bearer

रुपये Rupees Twenty Lakh only —

अदा करें।

₹ 20,00,000/-

A/c No. 65005051759

ANUPAM RASAYAN INDIA LIMITED

CBS

Please sign above this line

PAYABLE AT PAR AT ALL BRANCHES OF STANDARD CHARTERED BANK IN INDIA

⑈825095⑈ 395036002⑆ 505175⑈ 31

Manipal Technologies Limited - Navi Mumbai / CTS-2010

Standard Chartered

Standard Chartered Bank
Surat branch, C.K Tower, Besides Sargam Shopping Centre,
Towards Surat Dumas Road,
Parle Point, Surat 395007
IFSC : SCBL0036063

A/c. Payee's Only

Valid for 3 months from the date of issue

दिनांक Date | 1 | 5 | C | 2 | 2 |

260

Pay CHODRI GUDIYADEVI या धारक को Or Bearer

रुपये Rupees TWENTY LAKH ONLY

अदा करें। ₹ 20,00,000/-

A/c No. 65005051759

CBS

ANUPAM RASAYAN INDIA LIMITED

PAYABLE AT PAR AT ALL BRANCHES OF STANDARD CHARTERED BANK IN INDIA

Please sign above this line

⑈825098⑈ 395036002⑆ 505175⑈ 31

Manipal Technologies Limited - Navi Mumbai / CTS-2010

Standard Chartered

Standard Chartered Bank
Surat branch, C.K Tower, Besides Sargam Shopping Centre,
Towards Surat Dumas Road,
Parle Point, Surat 395007
IFSC : SCBL0036063

A/c. Payee's Only

Valid for 3 months from the date of issue

दिनांक Date 15 01 2022

261

Pay DAMUBEN GOVINDBHAI SHYORA या धारक को Or Bearer

रुपये Rupees TWENTY LAKH ONLY —

अदा करें। ₹ 20,00,000/-

A/c No. 65005051759

ANUPAM RASAYAN INDIA LIMITED

CBS

Please sign above this line

PAYABLE AT PAR AT ALL BRANCHES OF STANDARD CHARTERED BANK IN INDIA

⑈825097⑈ 395036002⑆ 505175⑈ 31

Manipal Technologies Limited - Navi Mumbai / CTS-2010

standard chartered

PAYEE ADVICE

To,
SONI RAKESH KUMAR

Bank Reference : IN1ON22091701GKV
Customer Reference : 1500005252170922
Advice Date : 17-Sep-2022

Dear Sir / Madam,
At the instruction of our client, we have initiated the following payment transaction to your account through ACH:

SETTLEMENT REFERENCE	:	IN1ON22091701GKV
REMITTER NAME	:	ANUPAM RASAYAN INDIA LIMITED
VALUE DATE	:	17-Sep-2022
CURRENCY	:	INR
REMITTANCE AMOUNT	:	50000.00
BANK NAME	:	YES BANK
BANK CODE	:	YESB0000929
ACCOUNT NAME	:	SONI RAKESH KUMAR
ACCOUNT NUMBER	:	092991800007321
PAYMENT DETAILS	:	NA

Our Client has provided additional details for your reference:

DATE	INV Ref	DOC NO	VENDOR	GROSS AMT	TAX	Amount (INR)
17/09/2022	MAIL REF	1500005252	EMPLOYEE	50000.00	0.00	50000

Note: We have initiated the above payment transaction at the instruction of our client, and the details of the transaction shown are based on information provided by our client. If the information provided was incorrect or our client revokes the payment instruction, or any other circumstance arises which is beyond our control, this may result in the payment being delayed or not received by you. The actual date of credit of funds into your account is subject to the clearing system(s) used, any intermediary bank(s) and the beneficiary bank.

(This is a system generated advice and requires no signature.)

standard chartered

PAYEE ADVICE

To,
SHUBHAM YUVRAJ IDHATE

Bank Reference : IN1ON22091701GKX
Customer Reference : 1500005260170922
Advice Date : 17-Sep-2022

Dear Sir / Madam,
At the instruction of our client, we have initiated the following payment transaction to your account through ACH:

SETTLEMENT REFERENCE	:	IN1ON22091701GKX
REMITTER NAME	:	ANUPAM RASAYAN INDIA LIMITED
VALUE DATE	:	17-Sep-2022
CURRENCY	:	INR
REMITTANCE AMOUNT	:	50000.00
BANK NAME	:	YES BANK
BANK CODE	:	YESB0000929
ACCOUNT NAME	:	SHUBHAM YUVRAJ IDHATE
ACCOUNT NUMBER	:	092991800008732
PAYMENT DETAILS	:	NA

Our Client has provided additional details for your reference:

DATE	INV Ref	DOC NO	VENDOR	GROSS AMT	TAX	Amount (INR)
17/09/2022	MAIL REF	1500005260	EMPLOYEE	50000.00	0.00	50000

Note: We have initiated the above payment transaction at the instruction of our client, and the details of the transaction shown are based on information provided by our client. If the information provided was incorrect or our client revokes the payment instruction, or any other circumstance arises which is beyond our control, this may result in the payment being delayed or not received by you. The actual date of credit of funds into your account is subject to the clearing system(s) used, any intermediary bank(s) and the beneficiary bank.

(This is a system generated advice and requires no signature.)

standard chartered

PAYEE ADVICE

To,
SAHIL VIMAL VESUWALA

Bank Reference : IN1ON22091701GKO
Customer Reference : 1500005266170922
Advice Date : 17-Sep-2022

Dear Sir / Madam,
At the instruction of our client, we have initiated the following payment transaction to your account through ACH:

SETTLEMENT REFERENCE	:	IN1ON22091701GKO
REMITTER NAME	:	ANUPAM RASAYAN INDIA LIMITED
VALUE DATE	:	17-Sep-2022
CURRENCY	:	INR
REMITTANCE AMOUNT	:	50000.00
BANK NAME	:	YES BANK
BANK CODE	:	YESB0000011
ACCOUNT NAME	:	SAHIL VIMAL VESUWALA
ACCOUNT NUMBER	:	001190200063981
PAYMENT DETAILS	:	NA

Our Client has provided additional details for your reference:

DATE	INV Ref	DOC NO	VENDOR	GROSS AMT	TAX	Amount (INR)
17/09/2022	MAIL REF	1500005266	EMPLOYEE	50000.00	0.00	50000

Note: We have initiated the above payment transaction at the instruction of our client, and the details of the transaction shown are based on information provided by our client. If the information provided was incorrect or our client revokes the payment instruction, or any other circumstance arises which is beyond our control, this may result in the payment being delayed or not received by you. The actual date of credit of funds into your account is subject to the clearing system(s) used, any intermediary bank(s) and the beneficiary bank.

(This is a system generated advice and requires no signature.)

standard chartered

PAYEE ADVICE

To,
SACHIN DILIP INGLE

Bank Reference : IN1ON22091701GL3
Customer Reference : 1500005253170922
Advice Date : 17-Sep-2022

Dear Sir / Madam,
At the instruction of our client, we have initiated the following payment transaction to your account through ACH:

SETTLEMENT REFERENCE	:	IN1ON22091701GL3
REMITTER NAME	:	ANUPAM RASAYAN INDIA LIMITED
VALUE DATE	:	17-Sep-2022
CURRENCY	:	INR
REMITTANCE AMOUNT	:	50000.00
BANK NAME	:	YES BANK
BANK CODE	:	YESB0000176
ACCOUNT NAME	:	SACHIN DILIP INGLE
ACCOUNT NUMBER	:	017690200006627
PAYMENT DETAILS	:	NA

Our Client has provided additional details for your reference:

DATE	INV Ref	DOC NO	VENDOR	GROSS AMT	TAX	Amount (INR)
17/09/2022	MAIL REF	1500005253	EMPLOYEE	50000.00	0.00	50000

Note: We have initiated the above payment transaction at the instruction of our client, and the details of the transaction shown are based on information provided by our client. If the information provided was incorrect or our client revokes the payment instruction, or any other circumstance arises which is beyond our control, this may result in the payment being delayed or not received by you. The actual date of credit of funds into your account is subject to the clearing system(s) used, any intermediary bank(s) and the beneficiary bank.

(This is a system generated advice and requires no signature.)

standard chartered

PAYEE ADVICE

To,
RAMEKAR GAJANAN

Bank Reference : IN1ON22091701GKS
Customer Reference : 1500005254170922
Advice Date : 17-Sep-2022

Dear Sir / Madam,
At the instruction of our client, we have initiated the following payment transaction to your account through ACH:

SETTLEMENT REFERENCE	:	IN1ON22091701GKS
REMITTER NAME	:	ANUPAM RASAYAN INDIA LIMITED
VALUE DATE	:	17-Sep-2022
CURRENCY	:	INR
REMITTANCE AMOUNT	:	50000.00
BANK NAME	:	YES BANK
BANK CODE	:	YESB0000011
ACCOUNT NAME	:	RAMEKAR GAJANAN
ACCOUNT NUMBER	:	001190200063592
PAYMENT DETAILS	:	NA

Our Client has provided additional details for your reference:

DATE	INV Ref	DOC NO	VENDOR	GROSS AMT	TAX	Amount (INR)
17/09/2022	MAIL REF	1500005254	EMPLOYEE	50000.00	0.00	50000

Note: We have initiated the above payment transaction at the instruction of our client, and the details of the transaction shown are based on information provided by our client. If the information provided was incorrect or our client revokes the payment instruction, or any other circumstance arises which is beyond our control, this may result in the payment being delayed or not received by you. The actual date of credit of funds into your account is subject to the clearing system(s) used, any intermediary bank(s) and the beneficiary bank.

(This is a system generated advice and requires no signature.)

standard chartered

PAYEE ADVICE

To,
RAJBHAR JITENDRA

Bank Reference : IN1ON22091701GKN
Customer Reference : 1500005265170922
Advice Date : 17-Sep-2022

Dear Sir / Madam,
At the instruction of our client, we have initiated the following payment transaction to your account through ACH:

SETTLEMENT REFERENCE	:	IN1ON22091701GKN
REMITTER NAME	:	ANUPAM RASAYAN INDIA LIMITED
VALUE DATE	:	17-Sep-2022
CURRENCY	:	INR
REMITTANCE AMOUNT	:	50000.00
BANK NAME	:	YES BANK
BANK CODE	:	YESB0000011
ACCOUNT NAME	:	RAJBHAR JITENDRA
ACCOUNT NUMBER	:	001191600005785
PAYMENT DETAILS	:	NA

Our Client has provided additional details for your reference:

DATE	INV Ref	DOC NO	VENDOR	GROSS AMT	TAX	Amount (INR)
17/09/2022	MAIL REF	1500005265	EMPLOYEE	50000.00	0.00	50000

Note: We have initiated the above payment transaction at the instruction of our client, and the details of the transaction shown are based on information provided by our client. If the information provided was incorrect or our client revokes the payment instruction, or any other circumstance arises which is beyond our control, this may result in the payment being delayed or not received by you. The actual date of credit of funds into your account is subject to the clearing system(s) used, any intermediary bank(s) and the beneficiary bank.

(This is a system generated advice and requires no signature.)

standard chartered

PAYEE ADVICE

To,
PATEL SHREYAS KIRANBHAI

Bank Reference : IN1ON22091701GKP
Customer Reference : 1500005257170922
Advice Date : 17-Sep-2022

Dear Sir / Madam,
At the instruction of our client, we have initiated the following payment transaction to your account through ACH:

SETTLEMENT REFERENCE	:	IN1ON22091701GKP
REMITTER NAME	:	ANUPAM RASAYAN INDIA LIMITED
VALUE DATE	:	17-Sep-2022
CURRENCY	:	INR
REMITTANCE AMOUNT	:	50000.00
BANK NAME	:	YES BANK
BANK CODE	:	YESB0000702
ACCOUNT NAME	:	PATEL SHREYAS KIRANBHAI
ACCOUNT NUMBER	:	070291900001430
PAYMENT DETAILS	:	NA

Our Client has provided additional details for your reference:

DATE	INV Ref	DOC NO	VENDOR	GROSS AMT	TAX	Amount (INR)
17/09/2022	MAIL REF	1500005257	EMPLOYEE	50000.00	0.00	50000

Note: We have initiated the above payment transaction at the instruction of our client, and the details of the transaction shown are based on information provided by our client. If the information provided was incorrect or our client revokes the payment instruction, or any other circumstance arises which is beyond our control, this may result in the payment being delayed or not received by you. The actual date of credit of funds into your account is subject to the clearing system(s) used, any intermediary bank(s) and the beneficiary bank.

(This is a system generated advice and requires no signature.)

standard chartered

PAYEE ADVICE

To,
PATEL JATIN THAKORBHAI

Bank Reference : IN1ON22091701GL2
Customer Reference : 1500005249170922
Advice Date : 17-Sep-2022

Dear Sir / Madam,
At the instruction of our client, we have initiated the following payment transaction to your account through ACH:

SETTLEMENT REFERENCE	:	IN1ON22091701GL2
REMITTER NAME	:	ANUPAM RASAYAN INDIA LIMITED
VALUE DATE	:	17-Sep-2022
CURRENCY	:	INR
REMITTANCE AMOUNT	:	50000.00
BANK NAME	:	YES BANK
BANK CODE	:	YESB0000176
ACCOUNT NAME	:	PATEL JATIN THAKORBHAI
ACCOUNT NUMBER	:	017691800002626
PAYMENT DETAILS	:	NA

Our Client has provided additional details for your reference:

DATE	INV Ref	DOC NO	VENDOR	GROSS AMT	TAX	Amount (INR)
17/09/2022	MAIL REF	1500005249	EMPLOYEE	50000.00	0.00	50000

Note: We have initiated the above payment transaction at the instruction of our client, and the details of the transaction shown are based on information provided by our client. If the information provided was incorrect or our client revokes the payment instruction, or any other circumstance arises which is beyond our control, this may result in the payment being delayed or not received by you. The actual date of credit of funds into your account is subject to the clearing system(s) used, any intermediary bank(s) and the beneficiary bank.

(This is a system generated advice and requires no signature.)

standard chartered

PAYEE ADVICE

To,
Ladumor Rakesh Danubhai

Bank Reference : IN1ON22091701GL0
Customer Reference : 1500005250170922
Advice Date : 17-Sep-2022

Dear Sir / Madam,
At the instruction of our client, we have initiated the following payment transaction to your account through ACH:

SETTLEMENT REFERENCE	:	IN1ON22091701GL0
REMITTER NAME	:	ANUPAM RASAYAN INDIA LIMITED
VALUE DATE	:	17-Sep-2022
CURRENCY	:	INR
REMITTANCE AMOUNT	:	50000.00
BANK NAME	:	YES BANK
BANK CODE	:	YESB0000176
ACCOUNT NAME	:	Ladumor Rakesh Danubhai
ACCOUNT NUMBER	:	017691800003299
PAYMENT DETAILS	:	NA

Our Client has provided additional details for your reference:

DATE	INV Ref	DOC NO	VENDOR	GROSS AMT	TAX	Amount (INR)
17/09/2022	MAIL REF	1500005250	RAKESH	50000.00	0.00	50000

Note: We have initiated the above payment transaction at the instruction of our client, and the details of the transaction shown are based on information provided by our client. If the information provided was incorrect or our client revokes the payment instruction, or any other circumstance arises which is beyond our control, this may result in the payment being delayed or not received by you. The actual date of credit of funds into your account is subject to the clearing system(s) used, any intermediary bank(s) and the beneficiary bank.

(This is a system generated advice and requires no signature.)

standard chartered

PAYEE ADVICE

To,
KUSHWAHAA VINAYKUMAR KAMALKISHOR

Bank Reference : IN1ON22091701GKT
Customer Reference : 1500005261170922
Advice Date : 17-Sep-2022

Dear Sir / Madam,
At the instruction of our client, we have initiated the following payment transaction to your account through ACH:

SETTLEMENT REFERENCE	:	IN1ON22091701GKT
REMITTER NAME	:	ANUPAM RASAYAN INDIA LIMITED
VALUE DATE	:	17-Sep-2022
CURRENCY	:	INR
REMITTANCE AMOUNT	:	50000.00
BANK NAME	:	YES BANK
BANK CODE	:	YESB0000929
ACCOUNT NAME	:	KUSHWAHAA VINAYKUMAR KAMALKISHOR
ACCOUNT NUMBER	:	092991800012450
PAYMENT DETAILS	:	NA

Our Client has provided additional details for your reference:

DATE	INV Ref	DOC NO	VENDOR	GROSS AMT	TAX	Amount (INR)
17/09/2022	MAIL REF	1500005261	EMPLOYEE	50000.00	0.00	50000

Note: We have initiated the above payment transaction at the instruction of our client, and the details of the transaction shown are based on information provided by our client. If the information provided was incorrect or our client revokes the payment instruction, or any other circumstance arises which is beyond our control, this may result in the payment being delayed or not received by you. The actual date of credit of funds into your account is subject to the clearing system(s) used, any intermediary bank(s) and the beneficiary bank.

(This is a system generated advice and requires no signature.)

standard chartered

PAYEE ADVICE

To,
GURUDAYAL SINGH

Bank Reference : IN1ON22091701GKU
Customer Reference : 1500005259170922
Advice Date : 17-Sep-2022

Dear Sir / Madam,
At the instruction of our client, we have initiated the following payment transaction to your account through ACH:

SETTLEMENT REFERENCE	:	IN1ON22091701GKU
REMITTER NAME	:	ANUPAM RASAYAN INDIA LIMITED
VALUE DATE	:	17-Sep-2022
CURRENCY	:	INR
REMITTANCE AMOUNT	:	50000.00
BANK NAME	:	YES BANK
BANK CODE	:	YESB0000929
ACCOUNT NAME	:	GURUDAYAL SINGH
ACCOUNT NUMBER	:	092991900009960
PAYMENT DETAILS	:	NA

Our Client has provided additional details for your reference:

DATE	INV Ref	DOC NO	VENDOR	GROSS AMT	TAX	Amount (INR)
17/09/2022	MAIL REF	1500005259	EMPLOYEE	50000.00	0.00	50000

Note: We have initiated the above payment transaction at the instruction of our client, and the details of the transaction shown are based on information provided by our client. If the information provided was incorrect or our client revokes the payment instruction, or any other circumstance arises which is beyond our control, this may result in the payment being delayed or not received by you. The actual date of credit of funds into your account is subject to the clearing system(s) used, any intermediary bank(s) and the beneficiary bank.

(This is a system generated advice and requires no signature.)

standard chartered

PAYEE ADVICE

To,
GOVINDA KUMAR

Bank Reference : IN1ON22091701GL4
Customer Reference : 1500005263170922
Advice Date : 17-Sep-2022

Dear Sir / Madam,
At the instruction of our client, we have initiated the following payment transaction to your account through ACH:

SETTLEMENT REFERENCE	:	IN1ON22091701GL4
REMITTER NAME	:	ANUPAM RASAYAN INDIA LIMITED
VALUE DATE	:	17-Sep-2022
CURRENCY	:	INR
REMITTANCE AMOUNT	:	50000.00
BANK NAME	:	YES BANK
BANK CODE	:	YESB0001142
ACCOUNT NAME	:	GOVINDA KUMAR
ACCOUNT NUMBER	:	114291900000747
PAYMENT DETAILS	:	NA

Our Client has provided additional details for your reference:

DATE	INV Ref	DOC NO	VENDOR	GROSS AMT	TAX	Amount (INR)
17/09/2022	MAIL REF	1500005263	EMPLOYEE	50000.00	0.00	50000

Note: We have initiated the above payment transaction at the instruction of our client, and the details of the transaction shown are based on information provided by our client. If the information provided was incorrect or our client revokes the payment instruction, or any other circumstance arises which is beyond our control, this may result in the payment being delayed or not received by you. The actual date of credit of funds into your account is subject to the clearing system(s) used, any intermediary bank(s) and the beneficiary bank.

(This is a system generated advice and requires no signature.)

standard chartered

PAYEE ADVICE

To,
Govind Mahendra Rai

Bank Reference : IN1ON22091701GKL
Customer Reference : 1500005258170922
Advice Date : 17-Sep-2022

Dear Sir / Madam,
At the instruction of our client, we have initiated the following payment transaction to your account through ACH:

SETTLEMENT REFERENCE	:	IN1ON22091701GKL
REMITTER NAME	:	ANUPAM RASAYAN INDIA LIMITED
VALUE DATE	:	17-Sep-2022
CURRENCY	:	INR
REMITTANCE AMOUNT	:	50000.00
BANK NAME	:	YES BANK
BANK CODE	:	YESB0000929
ACCOUNT NAME	:	Govind Mahendra Rai
ACCOUNT NUMBER	:	092991800010712
PAYMENT DETAILS	:	NA

Our Client has provided additional details for your reference:

DATE	INV Ref	DOC NO	VENDOR	GROSS AMT	TAX	Amount (INR)
17/09/2022	MAIL REF	1500005258	EMPLOYEE	50000.00	0.00	50000

Note: We have initiated the above payment transaction at the instruction of our client, and the details of the transaction shown are based on information provided by our client. If the information provided was incorrect or our client revokes the payment instruction, or any other circumstance arises which is beyond our control, this may result in the payment being delayed or not received by you. The actual date of credit of funds into your account is subject to the clearing system(s) used, any intermediary bank(s) and the beneficiary bank.

(This is a system generated advice and requires no signature.)

standard chartered

PAYEE ADVICE

To,
GOHIL KAUSHAL VIRENDRABHAI

Bank Reference : IN1ON22091701GL5
Customer Reference : 1500005248170922
Advice Date : 17-Sep-2022

Dear Sir / Madam,
At the instruction of our client, we have initiated the following payment transaction to your account through ACH:

SETTLEMENT REFERENCE	:	IN1ON22091701GL5
REMITTER NAME	:	ANUPAM RASAYAN INDIA LIMITED
VALUE DATE	:	17-Sep-2022
CURRENCY	:	INR
REMITTANCE AMOUNT	:	50000.00
BANK NAME	:	YES BANK
BANK CODE	:	YESB0000011
ACCOUNT NAME	:	GOHIL KAUSHAL VIRENDRABHAI
ACCOUNT NUMBER	:	001191800017931
PAYMENT DETAILS	:	NA

Our Client has provided additional details for your reference:

DATE	INV Ref	DOC NO	VENDOR	GROSS AMT	TAX	Amount (INR)
17/09/2022	MAIL REF	1500005248	EMPLOYEE	50000.00	0.00	50000

Note: We have initiated the above payment transaction at the instruction of our client, and the details of the transaction shown are based on information provided by our client. If the information provided was incorrect or our client revokes the payment instruction, or any other circumstance arises which is beyond our control, this may result in the payment being delayed or not received by you. The actual date of credit of funds into your account is subject to the clearing system(s) used, any intermediary bank(s) and the beneficiary bank.

(This is a system generated advice and requires no signature.)

standard chartered

PAYEE ADVICE

To,
GIRENDRA SHARDA JAA

Bank Reference : IN1ON22091701GL6
Customer Reference : 1500005256170922
Advice Date : 17-Sep-2022

Dear Sir / Madam,
At the instruction of our client, we have initiated the following payment transaction to your account through ACH:

SETTLEMENT REFERENCE	:	IN1ON22091701GL6
REMITTER NAME	:	ANUPAM RASAYAN INDIA LIMITED
VALUE DATE	:	17-Sep-2022
CURRENCY	:	INR
REMITTANCE AMOUNT	:	50000.00
BANK NAME	:	YES BANK
BANK CODE	:	YESB0000929
ACCOUNT NAME	:	GIRENDRA SHARDA JAA
ACCOUNT NUMBER	:	092991800008579
PAYMENT DETAILS	:	NA

Our Client has provided additional details for your reference:

DATE	INV Ref	DOC NO	VENDOR	GROSS AMT	TAX	Amount (INR)
17/09/2022	MAIL REF	1500005256	EMPLOYEE	50000.00	0.00	50000

Note: We have initiated the above payment transaction at the instruction of our client, and the details of the transaction shown are based on information provided by our client. If the information provided was incorrect or our client revokes the payment instruction, or any other circumstance arises which is beyond our control, this may result in the payment being delayed or not received by you. The actual date of credit of funds into your account is subject to the clearing system(s) used, any intermediary bank(s) and the beneficiary bank.

(This is a system generated advice and requires no signature.)

standard chartered

PAYEE ADVICE

To,
DIYORA VISHAL JASUBHAI

Bank Reference : IN1ON22091701GKR
Customer Reference : 1500005247170922
Advice Date : 17-Sep-2022

Dear Sir / Madam,
At the instruction of our client, we have initiated the following payment transaction to your account through ACH:

SETTLEMENT REFERENCE	:	IN1ON22091701GKR
REMITTER NAME	:	ANUPAM RASAYAN INDIA LIMITED
VALUE DATE	:	17-Sep-2022
CURRENCY	:	INR
REMITTANCE AMOUNT	:	50000.00
BANK NAME	:	YES BANK
BANK CODE	:	YESB0000176
ACCOUNT NAME	:	DIYORA VISHAL JASUBHAI
ACCOUNT NUMBER	:	017690200006238
PAYMENT DETAILS	:	NA

Our Client has provided additional details for your reference:

DATE	INV Ref	DOC NO	VENDOR	GROSS AMT	TAX	Amount (INR)
17/09/2022	MAIL REF	1500005247	EMPLOYEE	50000.00	0.00	50000

Note: We have initiated the above payment transaction at the instruction of our client, and the details of the transaction shown are based on information provided by our client. If the information provided was incorrect or our client revokes the payment instruction, or any other circumstance arises which is beyond our control, this may result in the payment being delayed or not received by you. The actual date of credit of funds into your account is subject to the clearing system(s) used, any intermediary bank(s) and the beneficiary bank.

(This is a system generated advice and requires no signature.)

standard chartered

PAYEE ADVICE

To,
DESAI JAYKUMAR KISHORBHAI

Bank Reference : IN1ON22091701GKQ
Customer Reference : 1500005251170922
Advice Date : 17-Sep-2022

Dear Sir / Madam,
At the instruction of our client, we have initiated the following payment transaction to your account through ACH:

SETTLEMENT REFERENCE	:	IN1ON22091701GKQ
REMITTER NAME	:	ANUPAM RASAYAN INDIA LIMITED
VALUE DATE	:	17-Sep-2022
CURRENCY	:	INR
REMITTANCE AMOUNT	:	50000.00
BANK NAME	:	YES BANK
BANK CODE	:	YESB0000784
ACCOUNT NAME	:	DESAI JAYKUMAR KISHORBHAI
ACCOUNT NUMBER	:	078491900004651
PAYMENT DETAILS	:	NA

Our Client has provided additional details for your reference:

DATE	INV Ref	DOC NO	VENDOR	GROSS AMT	TAX	Amount (INR)
17/09/2022	MAIL REF	1500005251	EMPLOYEE	50000.00	0.00	50000

Note: We have initiated the above payment transaction at the instruction of our client, and the details of the transaction shown are based on information provided by our client. If the information provided was incorrect or our client revokes the payment instruction, or any other circumstance arises which is beyond our control, this may result in the payment being delayed or not received by you. The actual date of credit of funds into your account is subject to the clearing system(s) used, any intermediary bank(s) and the beneficiary bank.

(This is a system generated advice and requires no signature.)

standard chartered

PAYEE ADVICE

To,
Arun Santosh Patil

Bank Reference : IN1ON22091701GKZ
Customer Reference : 1500005262170922
Advice Date : 17-Sep-2022

Dear Sir / Madam,
At the instruction of our client, we have initiated the following payment transaction to your account through ACH:

SETTLEMENT REFERENCE	:	IN1ON22091701GKZ
REMITTER NAME	:	ANUPAM RASAYAN INDIA LIMITED
VALUE DATE	:	17-Sep-2022
CURRENCY	:	INR
REMITTANCE AMOUNT	:	50000.00
BANK NAME	:	YES BANK
BANK CODE	:	YESB0000702
ACCOUNT NAME	:	Arun Santosh Patil
ACCOUNT NUMBER	:	070291800001836
PAYMENT DETAILS	:	NA

Our Client has provided additional details for your reference:

DATE	INV Ref	DOC NO	VENDOR	GROSS AMT	TAX	Amount (INR)
17/09/2022	MAIL REF	1500005262	EMPLOYEE	50000.00	0.00	50000

Note: We have initiated the above payment transaction at the instruction of our client, and the details of the transaction shown are based on information provided by our client. If the information provided was incorrect or our client revokes the payment instruction, or any other circumstance arises which is beyond our control, this may result in the payment being delayed or not received by you. The actual date of credit of funds into your account is subject to the clearing system(s) used, any intermediary bank(s) and the beneficiary bank.

(This is a system generated advice and requires no signature.)

standard chartered

PAYEE ADVICE

To,
AKSHAYKUMAR AJITBHAI PATEL

Bank Reference : IN1ON22091701GKM
Customer Reference : 1500005264170922
Advice Date : 17-Sep-2022

Dear Sir / Madam,
At the instruction of our client, we have initiated the following payment transaction to your account through ACH:

SETTLEMENT REFERENCE	:	IN1ON22091701GKM
REMITTER NAME	:	ANUPAM RASAYAN INDIA LIMITED
VALUE DATE	:	17-Sep-2022
CURRENCY	:	INR
REMITTANCE AMOUNT	:	50000.00
BANK NAME	:	YES BANK
BANK CODE	:	YESB0000176
ACCOUNT NAME	:	AKSHAYKUMAR AJITBHAI PATEL
ACCOUNT NUMBER	:	017691600002866
PAYMENT DETAILS	:	NA

Our Client has provided additional details for your reference:

DATE	INV Ref	DOC NO	VENDOR	GROSS AMT	TAX	Amount (INR)
17/09/2022	MAIL REF	1500005264	EMPLOYEE	50000.00	0.00	50000

Note: We have initiated the above payment transaction at the instruction of our client, and the details of the transaction shown are based on information provided by our client. If the information provided was incorrect or our client revokes the payment instruction, or any other circumstance arises which is beyond our control, this may result in the payment being delayed or not received by you. The actual date of credit of funds into your account is subject to the clearing system(s) used, any intermediary bank(s) and the beneficiary bank.

(This is a system generated advice and requires no signature.)

standard chartered

PAYEE ADVICE

To,
AJEET KUMAR

Bank Reference : IN1ON22091701GL1
Customer Reference : 1500005255170922
Advice Date : 17-Sep-2022

Dear Sir / Madam,
At the instruction of our client, we have initiated the following payment transaction to your account through ACH:

SETTLEMENT REFERENCE	:	IN1ON22091701GL1
REMITTER NAME	:	ANUPAM RASAYAN INDIA LIMITED
VALUE DATE	:	17-Sep-2022
CURRENCY	:	INR
REMITTANCE AMOUNT	:	50000.00
BANK NAME	:	YES BANK
BANK CODE	:	YESB0000176
ACCOUNT NAME	:	AJEET KUMAR
ACCOUNT NUMBER	:	017690200005542
PAYMENT DETAILS	:	NA

Our Client has provided additional details for your reference:

DATE	INV Ref	DOC NO	VENDOR	GROSS AMT	TAX	Amount (INR)
17/09/2022	MAIL REF	1500005255	EMPLOYEE	50000.00	0.00	50000

Note: We have initiated the above payment transaction at the instruction of our client, and the details of the transaction shown are based on information provided by our client. If the information provided was incorrect or our client revokes the payment instruction, or any other circumstance arises which is beyond our control, this may result in the payment being delayed or not received by you. The actual date of credit of funds into your account is subject to the clearing system(s) used, any intermediary bank(s) and the beneficiary bank.

(This is a system generated advice and requires no signature.)

ANNEXURE - R-14

LIABILITY INSURANCE (UNDER PUBLIC LIABILITY INSURANCE ACT, 1991) POLICY SCHEDULE

Policy No.	**: 171601/48/2022/4748**	**Prev. Policy No.**	**: 171601/48/2021/6623**
Cover Note No.	:	Cover Note Date	:
Insured's Code	: AB0000015080	Issue Office code	: 171601
Insured's Name	: M/S. ANUPAM RASAYAN INDIA LTD. (GSTIN: 24AAECA4575D1ZY)	Issue Office Name	: BO UDHNA (GSTIN: 24AAACT0627R2Z4)
Address	: [1] PLOT NO. 8109, 8110, 8111, GIDC SACHIN, SACHIN, SURAT. [2] PLOT NO. 701, GIDC SACHIN, SACHIN, SURAT. 3, PLOT NO 8104,8106 ROAD NO 2 SACHIN(4) PLOT 268/1 ROAD NO 2 GIDC SACHIN (5)UNIT III PLOT NO 905/1 GIDC JHAGADIA BHARUCH(6)UNIT IV PLOT NO 907/3 & 907/4 GIDC JHAGADIA BHARUCH(7)UNIT V PLOT NO 827 GIDC JHAGADIA BHARUCH(8)UNIT VI PLOT NO 2423,2425 GIDC SACHIN(9)PLOT NO.3716 ROAD NO.37 SACHIN(10)UNIT 1 SHED C1B-451 GIDC SACHIN(11)PLOT NO 830/21 JHAGADIA IND ESTATE BHARUCH SURAT GUJARAT 394230	Address	: 2ND FLOOR, FIROZ CHAMBERS KHAND BAZAR, LALGATE, SURAT PHONE 0261 2451826 & FAX 2459050 SURAT GUJARAT 395003
Tel./Fax/Email	: / / 0 / NA	Tel./Fax/Email	: 0261-2459050/2451826 / 0261-2459050 / 171601@orientalinsurance.co.in

Agent/Broker Details

Dev.Off.Code :

Agent/Broker : LC0000000179 (1149)UNISON INSURANCE BROKING SERVICES P LTD

Address : 601-602 ,6TH FLOOR AURAM NR VASNA,HP PETROL PUMP MARKAND DESAI RAOD VADODARA 390015 GUJARAT INDIA,MOB NO 9898295111 PHONE NO 0265-2252274,BARODA,GUJARAT,396007

Tel/Fax/Email

Co-insurance Details : NIL

Nature of Business : MANUFACTURING

Category of Industry RED Policy Purchaser Category : Manufacture

Indemnity Limit : Rs. 0.00 Any One Accident

Rs. 0.00 Aggregate during the Policy Period (Not exceeding three times of any one accident of Indemnity Limit.)

Retroactive Date : 07/01/2022

: 14,262.00 (included in the Total Premium)

Place : SURAT

Date : 06/01/2022

IRDA-REGNO-556

For and on behalf of
The Oriental Insurance Company Limited

This is an electronically generated document (Policy Schedule).The Policy document duly stamped will be sent by post.

In case of any query regarding the Policy please call Toll Free No. 1800 11 8485 and 011 33208485.

Authorised Signatory

Attached to and forming part of policy number 171601/48/2022/4748

: 0265-2252274/0265-2357445/0265-2356033/

Period of Insurance : FROM 00:00 ON 07/01/2022 TO MIDNIGHT OF 06/01/2023

Collection No. & Dt. : CD A/C AB0000015080 GST INVOICE NO :2420482816 UIN :0

Gross Premium : 14,262 GST 2568 Stamp Duty : .5 Total : 31,092

Contribution to the
Environmental Relief Fund

TERRITORY/JURISDICTION : INDIA / INDIA

The Insurance under this policy is subject to terms and conditions given in the policy attached here to.

Specific Conditions if any :

AOA LIMIT 50000000/- AOY LIMIT 150000000/-

In the event of a claim under the policy exceeding Rs. 1 lac or a claim for refund of premium exceeding Rs. 1 lac,the insured will comply with the provisions of the AML policy of the Company.The AML policy is available in all our operaing offices as well as Company's website.

Excess : NIL

Financier Names are as per the list attached: Not applicable

Warranted that in case of dishonour of premium cheque(s) the Company shall not be liable under the policy and the policy shall be void abinitio (from inception).

In witness whereof the undersigned being authorised by and on behalf of the Company has/have herein to set his/their hands at BO UDHNA (GSTIN: 24AAACT0627R2Z4) on 06TH DAY OF JANUARY 2022

Entered By : D K Mahida

Examined By : Umesh Kumar

For and on behalf of
The Oriental Insurance Company Limited

Policy Printed By : 972371 IP :

Policy Printed On : 06-JAN-22 16:56:26 MAC :

Authorised Signatory

Place : SURAT

Date : 06/01/2022

IRDA-REGNO-556

For and on behalf of
The Oriental Insurance Company Limited

This is an electronically generated document (Policy Schedule).The Policy document duly stamped will be sent by post.

In case of any query regarding the Policy please call Toll Free No. 1800 11 8485 and 011 33208485.

Authorised Signatory

ANNEXURE - R-15

ANUPAM RASAYAN INDIA LIMITED, UNIT-6

HAZOP STUDY REPORT

PRODUCT: 2,4-DFNB

Hazard:	Hazard is defined as a “source, situation or act with a potential for harm in terms of human injury or ill health, or a combination of these.” Deviation from design or operation intent may constitute hazard or produce hazard. A single Hazard could potentially lead to multiple form of Hazards
Process Hazard :	A type of Hazard associated with deviation from one of the process parameters e.g. Temperature, pressure
Non Process Hazard:	A type of Hazard associated with deviation from one of the non process parameters e.g. fall from height
Process Parameter:	The characteristics of process being evaluated e.g flow, temperature, pressure etc
Design Intent:	The intended action of the unit operation with in the process being evaluated e.g charging of the material X from storage tank to Reactor under pressure.
Node:	A specific part/location of the process where we have to analyze and evaluate the hazards based on deviation of design/operation intent.
Deviation:	A way in which a process condition may deviate from its actual design/process intent.
Guidewords:	A short word to create the deviation of process parameter
Cause:	The reason for the deviation to occur.
Consequences:	The result of the cause due to deviation in case it occurs.
Safeguards:	Facility provided to process to minimize the frequency of deviation and its consequences
Risk Ranking:	It is the process of determining the risk as a combination of Severity and probability by considering the consequences of the deviation.

Deviation	Parameter	Guideword
More Flow	More	Flow
No/Less Flow	No/Less	Flow
Misdirected Flow	Other Than	Flow
Reverse	Other Than	Flow
High Pressure	High	Pressure
Low Pressure	Low	Pressure
Back Pressure	Other Than	Pressure
High Temperature	High	Temperature
Low Temperature	Low	Temperature
High Level	High	Level
Low Level	Low	Level
More Quantity	More	Quantity
No/Less Quantity	No/Less	Quantity
More Stirring	More	Stirring
No/Less Stirring	No/Less	Stirring

Deviation	Parameter	Guideword
More Chilling	More	Chilling
No/Less Chilling	No/Less	Chilling
Composition Change	Other Than	Composition
Sampling Issues	Other Than	Sampling
Failure of DCS	Other Than	Control System
Start up/Shutdown	Other Than	Start up/Shutdown
Loss of Containment	Other Than	Leakage
Corrosion / Erosion	Other Than	Corrosion
Improper Maintenance	Other Than	Maintenance
Engineering Issue/ Drawing errors	Other Than	other issues
Power Failure	Other Than	Power
More Heating	More	Heating
No/Less Heating	No/Less	Heating
More Cooling	More	Cooling
No/Less Cooling	No/Less	Cooling
Utility Failure	Other Than	Utility

Description	Probability	Severity				
		Insignificant	Minor	Serious	Major	Catastrophic
		1	2	4	6	10
One or more times per year	10	10	20	40	60	100
Between 1 times per year and 1 time per 10 years	6	6	12	24	36	60
Between 1 times per 10 years and 1 time per 100 years	4	4	8	16	24	40
Between 1 times per 100 years and 1 time per 1000 years	2	2	4	8	12	20
Less than 1 time per 1000 years	1	1	2	4	6	10

Local Community and Reputation	No Annoyance	Limited Annoyance, no injuries	Serious Annoyance, no injuries	Reversible Health Effects	Adverse health effects, one or more fatalities
Health & Safety Staff	First Aid cases, limited inuries	Severe Injuries. Temporary impairment	Severe Injuries. Permanent impairment, explosion or fire with limited consequences	1 fatality on site ,explosion or fire with moderate consequences	Several fatalities on site, explosion or fire with serious consequences
Environment	Minor release or spill	Limited environment annoyance	Pollution on the site	Limited pollution outside the site	Severe Pollution outside the side
Business Impact	Financial Loss < Rs. XX	Rs.XX Financial Loss < Rs. YY	Rs.YY Financial Loss< Rs. ZZ	Rs.ZZ Financial Loss< Rs. AA	Rs.AA Financial Loss< Rs. BB

Risk Classification			
60,100	Extremely High	Unacceptable	Immediate stop activities and Implement Recommendations
36,40	High	Unacceptable	Immediate implement risk reduction measures
20,24	Moderate	Unacceptable	Implement risk reduction measures.Short term actions allowed before implementing Permanent.
10,12,16	Low	Acceptable	Little Attention Required
1,2,4,6,8	Exremely Low	Acceptable	No Risk reduction required

HAZOP TEAM DETAILS																
NAME	DEPARTMENT	01-03-22	02-03-22	03-03-22	04-03-22	05-03-22	06-03-22	07-03-22	08-03-22	09-03-22	10-03-22	11-03-22	12-03-22	13-03-22	14-03-22	15-03-22
BHAUMIK BHAI	CHAIRMAN	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
IMRAN	MR	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
YUVRAJ	ELECTRICAL	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
ANKUR/PIYUSH	PRODUCTION	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
YAGNESH/ VINAY	SAFETY	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
NAME	DEPARTMENT	16-03-22	17-03-22	18-03-22	19-03-22	20-03-22	21-03-22	22-03-22	23-03-22	24-03-22	25-03-22	26-03-22	27-03-22	28-03-22	29-03-22	
BHAUMIK BHAI	CHAIRMAN	P	P	P	P	P	P	P	P	P	P	P	P	P	P	
IMRAN	MR	P	P	P	P	P	P	P	P	P	P	P	P	P	P	
YUVRAJ	ELECTRICAL	P	P	P	P	P	P	P	P	P	P	P	P	P	P	
ANKUR/PIYUSH	PRODUCTION	P	P	P	P	P	P	P	P	P	P	P	P	P	P	
YAGNESH/ VINAY	SAFETY	P	P	-	-	P	P	P	P	P	-	-	P	P	P	

NAME	DEPARTMENT	30-03-22	31-03-22	01-04-22	02-04-22	03-04-22	04-04-22	05-04-22	06-04-22	07-04-22	08-04-22	09-04-22	10-04-22	11-04-22	12-04-22	13-04-22
BHAUMIK BHAI	CHAIRMAN	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
IMRAN	MR	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
YUVRAJ	ELECTRICAL	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
ANKUR/PIYUSH	PRODUCTION	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
YAGNESH/ VINAY	SAFETY	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P

HAZOP WORK SHEET				Hazop Work Sheet Revision No	PHA-001.00
Product Name	2,4-DFNB			Hazop Work Sheet Effective Date	06-05-18
NODE NO :	1				
DESIGN INTENTION	Transfer 2,4-DCNB from drums to storage tank TF-108 by pump TFP-108A at 30-35^{0}C.				
EQUIPMENTS COVERED IN THIS NODE	Storage tank TF-108, Pump TFP-108A				
DOCUMENT REFERRED	P& ID and PTC	DOCUMENT No.		DOCUMENT Revision No.	
HAZOP Revision No	01				
HAZOP Effective Date	01-03-22				

	Temperature (^{0}C)		Pressure (kg/cm^{2}g)		MOC	Capacity	
Equipment Details	Design	Working	Design	Working		Design	Working
Storage tank TF-108	250	150	4.5	ATM	SS316L	25 KL	30 KL
Pump TFP-108A	150	ATM	3	3	SS316L	10M/3	10 m3/hr

Guide Word	Parameter	Sr. No.	CAUSES	CONSEQUENCES	Probability	Severity	RPN No	Risk Classification	SAFEGUARDS	Probability	Severity	RPN No	Risk Classification	RECOMMENDATIONS	Probability	Severity	RPN No	Remarks
NO/Less	Flow	1.1	NA															
More	Flow	2.1	NA															
Other than/ Misdirected	Flow	3.1	Transfer of 2,4DCNB from drum to RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B instead of storage tank TF-108 by pump TFP-108A due to valve in by-pass line towards plant kept open / pass	1. It may lead to overflow from the receivers which further results into spillage. 2. Spillage will cause health & Environment issue. 3. It may lead to Fire in presence of external source of ignition.	6	6	36	HIGH	1. LT provided with field display and HMI display on Receivers RC-13104B, RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B High level alert indication on HMI. 2. LI on storage tank TF-108 3. Three valves provided on transfer line from Storage by-pass line towards plant to receivers. 4. Flameproof electrical fittings provided 5. Sight glass on transfer line to receivers 6. Process under supervision. 7. Work permit system followed. 8. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 9. RCC Flooring within the plant. 10. Spill kit available on floor. 11. Self primming pump is used for transferring the material to storage tank from drums 12. TI provided on receivers RC-13104B, RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B 13. Suitable MOC of valve SS316 is selected. 14. OCP displayed for Transferring operation from drum to storage tank in local language 15. Earthing / bonding provided in transfer line & connected equipment 16. Fire protection system available	4	6	24	MODERATE	1. Change LI to LT on receivers RC-13104B, RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B in P&ID.	6	2	12	
		3.2	Transfer of 2,4DCNB from drum to RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B instead of storage tank TF-108 by pump TFP-108A due to human error	1. It may lead to overflow from the receivers which further results into spillage. 2. Spillage will cause health & Environment issue. 3. It may lead to Fire in presence of external source of ignition.	6	6	36	HIGH	1. LT provided with field display and HMI display on Receivers RC-13104B, RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B High level alert indication on HMI. 2. LI on storage tank TF-108 3. Three valves provided on transfer line from Storage by-pass line towards plant to receivers. 4. Flameproof electrical fittings provided 5. Sight glass on transfer line to receivers 6. Suitable MOC of valve SS316 is selected. 7. Work permit system followed. 8. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 9. RCC Flooring within the plant. 10. Spill kit available on floor. 11. Self primming pump is used for transferring the material to storage tank from drums 12. TI provided on receivers RC-13104B, RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B 13. Process under supervision 14. OCP displayed for Transferring operation from drum to storage tank in local language. 15. Earthing / bonding provided in transfer line & connected equipment 16. Fire protection system available	4	6	24	MODERATE					
Reverse	Flow	4.1	NA															
		5.1	No / Less Quantity of 2,4 DCNB transferred from drum to storage tank TF-108 by pump TFP-108A due to human error	1. It will lead to process delay	6	2	12	LOW	1. Drum Weighing before and after transferring operation. 2. LI on storage tank TF-108 3. Empty drum check after transferring operation. 4. Sight glass on inlet transfer line 5. Process under supervision 6. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 7. OCP displayed for Transferring operation from drum to storage tank in local language. 8. PG provided on pump discharge line 9. Jacketed transfer line provided for transferring the material	4	2	8	EXTREMELY LOW					

NO/Less	Quantity	5.2	No / Less Quantity of 2,4 DCNB transferred from drums to storage tank TF-108 by pump TFP-108A due to discharge Line choke up / valve choke up	1. It will lead to material loss. 2. It will lead to pressurization of line which results into gasket leakage / pump damage causing Health & Environment issue. 3. Leakage will cause burn injuries. 4. It may lead to Fire in presence of external ignition source.	6	6	36	HIGH	1. Drum Weighing before and after transferring operation. 2. LI on storage tank TF-108 3. Empty drum check after transferring operation. 4. Sight glass on inlet transfer line 5. Process under supervision 6. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 7. Overload protection for Pump is provided. 8. Self primming pump is used for transferring the material to storage tank from drums 9. Suitable MOC of pipelines and valve (SS316). 10. Jacketed pipeline and valve with insulation for steam heating. 11. PG on Pump discharge line. 12. Suitable MOC of packing (teflon). 13. Spill kit available. 14. Sight Glass on pump TFP-108A discharge line. 15. Earthing / bonding provided in transfer line & connected equipment 16. Fire protection system available 17. Flameproof fittings installed	4	6	24	MODERATE	1. Secondary containment to be provided around pump.	4	4	16	
		5.3	No / Less Quantity of 2,4 DCNB transferred from drums to storage tank TF-108 by pump TFP-108A due to suction Line choke up / valve choke up / steiner choke up	1. It will lead to material loss. 2. It will lead to leakage causing Health & Environment issue. 3. Leakage will cause burn injuries. 4. It may lead to dry running of pump. 5. It may lead to Fire in presence of external ignition source.	6	6	36	HIGH	1. Drum Weighing before and after transferring operation. 2. LI on storage tank TF-108 3. Empty drum check after transferring operation. 4. Sight glass on inlet transfer line 5. Process under supervision 6. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 7. Dry run protection for Pump is provided. 8. Self primming pump is used for transferring the material to storage tank from drums 9. Suitable MOC of pipelines and valve (SS316). 10. Jacketed pipeline and valve with insulation for steam heating. 11. PG on Pump discharge line. 12. Suitable MOC of packing (teflon). 13. Spill kit available. 14. Sight Glass on pump TFP-108A discharge line. 15. Earthing / bonding provided in transfer line & connected equipment 16. Fire protection system available 17. Flameproof fittings installed	4	6	24	MODERATE					
		5.4	No / Less Quantity of 2,4 DCNB transferred from drums to storage tank TF-108 by pump TFP-108A due to pump failure	1. It will lead to material loss. 2. It will lead to leakage causing Health & Environment issue. 3. Leakage will cause burn injuries. 4. It may lead to dry running of pump. 5. It may lead to Fire in presence of external ignition source. 6. It will lead to overflowing of drum due to back flow of material.	6	6	36	HIGH	1. Drum Weighing before and after transferring operation. 2. LI on storage tank TF-108 3. Empty drum check after transferring operation. 4. Sight glass on inlet transfer line 5. Process under supervision 6. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 7. Overload / dry run protection for Pump is provided. 8. Self primming pump is used for transferring the material to storage tank from drums 9. Suitable MOC of Pump (SS316) is selected 10. PMS of pump is done periodically. 11. PG on Pump discharge line. 12. Sight Glass on pump TFP-108A discharge line. 13. Spill kit available. 14. Sight Glass on pump TFP-108A discharge line. 15. Earthing / bonding provided in transfer line & connected equipment 16. Fire protection system available 17. Flameproof fittings installed 18. RCC flooring available. 19. Three Manual value provided in discharge line and one in suction line	4	6	24	MODERATE	NRV to be provided in pump discharge line	4	4	16	
		5.5	No / Less Quantity of 2,4 DCNB transferred from drums to storage tank TF-108 by pump TFP-108A due to weigh balance malfuntion	1. It will lead to process delay	6	2	12	LOW	1. Calibration of weigh balance is done (monthly - Internally ; Yearly - External). 2. LI on storage tank TF-108 3. Empty drum check after transferring operation. 4. Sight glass on inlet transfer line 5. Process under supervision 6. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron)	4	2	8	EXTREMELY LOW					
		5.6	No / Less Quantity of 2,4 DCNB transferred from drums to storage tank TF-108 by pump TFP-108A due to leakage in system	1. It will lead to material loss. 2. It will lead to leakage causing Health & Environment issue. 3. Leakage will cause burn injuries. 4. It may lead to dry running of pump. 5. It may lead to Fire in presence of external ignition source.	6	6	36	HIGH	1. Drum Weighing before and after transferring operation. 2. LI on storage tank TF-108 3. Empty drum check after transferring operation. 4. Sight glass on inlet transfer line 5. Process under supervision 6. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 7. Dry run / overload protection for Pump is provided. 8. Self primming pump is used for transferring the material to storage tank from drums 9. Suitable MOC of pipelines and valve (SS316). 10. Jacketed pipeline and valve with insulation for steam heating. 11. PG on Pump discharge line. 12. Suitable MOC of packing (teflon). 13. Spill kit available. 14. Sight Glass on pump TFP-108A discharge line. 15. Earthing / bonding provided in transfer line & connected equipment 16. Fire protection system available 17. Flameproof fittings installed	4	6	24	MODERATE	1. Provide flange guards on the lines.	4	4	16	

		5.7	No / Less Quantity of 2,4 DCNB transferred from drums to storage tank TF-108 by pump TFP-108A due to LI malfunction of storage tank TF-108	It will lead to process delay.	6	2	12	LOW	1. Glass LI on storage tank TF-108 provided. 2. Sight glass on inlet transfer line 3. Drum Weighing before and after transferring operation. 4. Empty drum check after transferring operation. 5. Process under supervision 6. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 7. Logbook for stock in storage tank is maintained.	4	2	8	EXTREMELY LOW					
More	Quantity	6.1	More Quantity of 2,4 DCNB transferred from drum to storage tank TF-108 by pump TFP-108A due to human error	1. It may lead to overflow from the storage tanks which further results into spillage. 2. Spillage will cause health & Environment issue. 3. It may lead to Fire in presence of external source of ignition.	6	6	36	HIGH	1. Drum Weighing before and after transferring operation. 2. LI on storage tank TF-108 3. Empty drum check after transferring operation. 4. Sight glass on inlet transfer line 5. Process under supervision 6. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 7. OCP displayed for Transferring operation from drum to storage tank in local language. 8. PG provided on pump discharge line 9. Jacketed transfer line provided for transferring the material 10. Logbook for stock in storage tank is maintained. 11. Spill kit available. 12. Sight Glass on pump TFP-108A discharge line. 13. Earthing / bonding provided in transfer line & connected equipment 14. Fire protection system available 15. Flameproof fittings installed 16. Secondary containment provided around storage tank TF-108	4	6	24	MODERATE					
		6.2	More Quantity of 2,4 DCNB transferred from drum to storage tank TF-108 by pump TFP-108A due to LI malfunction.	1. It may lead to overflow from the storage tanks which further results into spillage. 2. Spillage will cause health & Environment issue. 3. It may lead to Fire in presence of external source of ignition.	6	6	36	HIGH	1. Drum Weighing before and after transferring operation. 2. Two stage Glass LI on storage tank TF-108 3. Empty drum check after transferring operation. 4. Sight glass on inlet transfer line 5. Process under supervision 6. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 7. OCP displayed for Transferring operation from drum to storage tank in local language. 8. PG provided on pump discharge line 9. Jacketed transfer line provided for transferring the material 10. Logbook for stock in storage tank is maintained. 11. Spill kit available. 12. Sight Glass on pump TFP-108A discharge line. 13. Earthing / bonding provided in transfer line & connected equipment 14. Fire protection system available 15. Flameproof fittings installed 16. Secondary containment provided around storage tank TF-108	4	6	24	MODERATE	1. Provide flange guards on the lines.	4	4	16	
NO/Less	Pressure	7.1	NA															
More	Pressure	8.1	NA															
Back	Pressure	9.1	NA															
Less	Temperature	10.1	Less temperature than 29^{0}C of material while transferring of material from drums to storage tank TF-108 by pump TFP-108A due to human error	1. This will lead to process delay and may also lead to dry running of pump due to solidification of material. 2. This will lead to choke up in transfer lines due to solidification of material.	6	2	12	LOW	1. Drum Weighing before and after transferring operation. 2. LI on storage tank TF-108 3. Empty drum check after transferring operation. 4. Sight glass on inlet transfer line 5. Process under supervision 6. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 7. Dry run protection for Pump is provided. 8. Self primming pump is used for transferring the material to storage tank from drums 9.Jacketed pipeline and valve with insulation for steam heating. 10. PG on Pump discharge line. 11. Sight Glass on pump TFP-108A discharge line.	4	2	8	EXTREMELY LOW					
		10.2	Less temperature than 29^{0}C of material while transferring of material from drums to storage tank TF-108 by pump TFP-108A due to steam failure in transfer line	1. This will lead to process delay and may also lead to dry running of pump due to solidification of material. 2. This will lead to choke up in transfer lines due to solidification of material.	6	2	12	LOW	1. Drum Weighing before and after transferring operation. 2. LI on storage tank TF-108 3. Empty drum check after transferring operation. 4. Sight glass on inlet transfer line 5. Process under supervision 6. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 7. Dry run protection for Pump is provided. 8. Self primming pump is used for transferring the material to storage tank from drums 9.Jacketed pipeline and valve with insulation for steam heating. 10. PG on Pump discharge line. 11. Sight Glass on pump TFP-108A discharge line. 12. PG provided on steam header 13. PT provided in steam supply line with low / no pressure alarm	4	2	8	EXTREMELY LOW					
More	Temperature	11.1	NA															
NO/Less	Level	12.1	No Consequences															
More	Level	13.1	More level in Storage tank while transferring 2,4-DCNB from drums to storage tank TF-108 by pump TFP-108A due to human error	Refer Section more quantity 6.1														
		13.2	More level in Storage tank while transferring 2,4-DCNB from drums to storage tank TF-108 by pump TFP-108A due to LI malfunction	Refer Section more quantity 6.2														

Improper	Agitation	14	NA															
Changed	Composition	15	NA															
Failure	Utility	16.1	Failure of Steam	Refer Section less temperature 10.2														
High	Viscosity	17	NA															
Low	Viscosity	18	NA															
Incorrect Sequence	Raw material Issues	19	NA															
	Sampling Issues	20	NA															
Incompatibility	Raw Material	21	Transferring of incompatible raw material in storage tank TF-108 instead of 2,4-DCNB due to human error / wrong material issued from store	It may lead to unknown reaction in the tank and may lead to unknown consequences.	6	6	36	HIGH	1. Drum with labelling is received from store. 2. Process under supervision 3. Challan of material checked at the time of receiving material	4	6	24	MODERATE					
Failure	DCS	22	NA															
	Power	23.1	Failure of power while transferring 2,4-DCNB from drums to storage tank TF-108 by pump TFP-108A due to no electricity	Refer Section No/less quantity 5.4					1. DG set available									
	Start up/Shut down	24.1	NA															
	Loss of Containment (Leakage / Rupture)	25.1	Loss of 2,4-DCNB	1. It will lead to environment issue and health issue (Toxic in contact with skin, Toxic in contact with skin, Toxic in contact with skin, Causes serious eye irritation, May cause an allergic skin reaction, May cause respiratory irritation). 2. it will lead to fire in presence of external ignition source.	6	6	36	HIGH	1. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 2. OCP displayed for Transferring operation from drum to storage tank in local language. 3. Jacketed transfer line provided for transferring the material 4. Spill kit available. 5. Earthing / bonding provided in transfer line & connected equipment 6. Fire protection system available 7. Flameproof fittings installed 8. Secondary containment provided around storage tank TF-108. 9. RCC Flooring available.	4	6	24	MODERATE					
MOC	Corrosion / Erosion	26.1	NA															
Improper	Maintenance	27.1	Refer Section No/less quantity 5.4															
	Engineering issues/ Drawing Errors	28.1	Due to human error	It will lead to in-effective PHA	6	2	12	LOW										

HAZOP WORK SHEET				Hazop Work Sheet Revision No	PHA-001.00
Product Name	2,4-DFNB			Hazop Work Sheet Effective Date	06-05-18
NODE NO :	2				
DESIGN INTENTION	Transfer Solvent-S from drums to storage tank TF-107 by pump TFP-107A at 30-35^{O}C.				
EQUIPMENTS COVERED IN THIS NODE	Storage tank TF-107, Pump TFP-107A				
DOCUMENT REFERRED	P& ID and PTC	DOCUMENT No.		DOCUMENT Revision No.	
HAZOP Revision No	01				
HAZOP Effective Date	04-03-22				

	Temperature (^{0}C)		Pressure (kg/cm^{2}g)		MOC	Capacity	
Equipment Details	Design	Working	Design	Working		Design	Working
Storage tank TF-107	250	150	4.5	ATM	SS316L	25 KL	30 KL
Pump TFP-107A	150	80	3	3	SS316L	10M/3	10 m3/hr

Guide Word	Parameter	Sr. No.	CAUSES	CONSEQUENCES	Probability	Severity	RPN No	Risk Classification	SAFEGUARDS	Probability	Severity	RPN No	Risk Classification	RECOMMENDATIONS	Probability	Severity	RPN No	Remarks
NO/Less	Flow	1.1	NA															
More	Flow	2.1	NA															
Other than/ Misdirected	Flow	3.1	Transfer of Solvent-S from drum to RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A instead of storage tank TF-107 by pump TFP-107A due to valve in by-pass line towards plant kept open / pass	1. It may lead to overflow from the receivers which further results into spillage. 2. Spillage will cause health & Environment issue. 3. It may lead to Fire in presence of external source of ignition.	6	6	36	HIGH	1. LT provided with field display and HMI display on Receivers RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A High level alert indication on HMI. 2. LI on storage tank TF-107 3. Three valves provided on transfer line from Storage by-pass line towards plant to receivers. 4. Flameproof electrical fittings provided 5. Sight glass on transfer line to receivers 6. Process under supervision. 7. Work permit system followed. 8. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 9. RCC Flooring within the plant. 10. Spill kit available on floor. 11. Self primming pump is used for transferring the material to storage tank from drums 12. TI provided on receivers RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A 13. Suitable MOC of valve SS316 is selected. 14. OCP displayed for Transferring operation from drum to storage tank in local language 15. Earthing / bonding provided in transfer line & connected equipment 16. Fire protection system available	4	6	24	MODERATE	1. Change LI to LT on receivers RC-13104B, RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B in P&ID.	2	6	12	
		3.2	Transfer of Solvent-S from drum to RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A instead of storage tank TF-107 by pump TFP-107A due to human error	1. It may lead to overflow from the receivers which further results into spillage. 2. Spillage will cause health & Environment issue. 3. It may lead to Fire in presence of external source of ignition.	6	6	36	HIGH	1. LT provided with field display and HMI display on Receivers RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A High level alert indication on HMI. 2. LI on storage tank TF-107 3. Three valves provided on transfer line from Storage by-pass line towards plant to receivers. 4. Flameproof electrical fittings provided 5. Sight glass on transfer line to receivers 6. Suitable MOC of valve SS316 is selected. 7. Work permit system followed. 8. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 9. RCC Flooring within the plant. 10. Spill kit available on floor. 11. Self primming pump is used for transferring the material to storage tank from drums 12. TI provided on receivers RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A 13. Process under supervision 14. OCP displayed for Transferring operation from drum to storage tank in local language. 15. Earthing / bonding provided in transfer line & connected equipment 16. Fire protection system available	4	6	24	MODERATE					
Reverse	Flow	4.1	NA															
		5.1	No / Less Quantity of Solvent-S transferred from drum to storage tank TF-107 by pump TFP-107A due to human error	1. It will lead to process delay	6	2	12	LOW	1. Drum Weighing before and after transferring operation. 2. LI on storage tank TF-107 3. Empty drum check after transferring operation. 4. Sight glass on inlet transfer line 5. Process under supervision 6. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 7. OCP displayed for Transferring operation from drum to storage tank in local language. 8. PG provided on pump discharge line 9. Jacketed transfer line provided for transferring the material	4	2	8	EXTREMELY LOW					

NO/Less	Quantity	5.2	No / Less Quantity of Solvent-S transferred from drums to storage tank TF-107 by pump TFP-107A due to discharge Line choke up / valve choke up	1. It will lead to material loss. 2. It will lead to pressurization of line which results into gasket leakage / pump damage causing Health & Environment issue. 3. Leakage will cause burn injuries. 4. It may lead to Fire in presence of external ignition source.	6	6	36	HIGH	1. Drum Weighing before and after transferring operation. 2. LI on storage tank TF-107 3. Empty drum check after transferring operation. 4. Sight glass on inlet transfer line 5. Process under supervision 6. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 7. Overload protection for Pump is provided. 8. Self primming pump is used for transferring the material to storage tank from drums 9. Suitable MOC of pipelines and valve (SS316). 10. Jacketed pipeline and valve with insulation for steam heating. 11. PG on Pump discharge line. 12. Suitable MOC of packing (teflon). 13. Spill kit available. 14. Sight Glass on pump TFP-107A discharge line. 15. Earthing / bonding provided in transfer line & connected equipment 16. Fire protection system available 17. Flameproof fittings installed	4	6	24	MODERATE	1. Secondary containment to be provided around pump.	4	4	16	
		5.3	No / Less Quantity of Solvent-S transferred from drums to storage tank TF-107 by pump TFP-107A due to suction Line choke up / valve choke up / strainer choke up	1. It will lead to material loss. 2. It will lead to leakage causing Health & Environment issue. 3. Leakage will cause burn injuries. 4. It may lead to dry running of pump. 5. It may lead to Fire in presence of external ignition source.	6	6	36	HIGH	1. Drum Weighing before and after transferring operation. 2. LI on storage tank TF-107 3. Empty drum check after transferring operation. 4. Sight glass on inlet transfer line 5. Process under supervision 6. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 7. Dry run protection for Pump is provided. 8. Self primming pump is used for transferring the material to storage tank from drums 9. Suitable MOC of pipelines and valve (SS316). 10. Jacketed pipeline and valve with insulation for steam heating. 11. PG on Pump discharge line. 12. Suitable MOC of packing (teflon). 13. Spill kit available. 14. Sight Glass on pump TFP-107A discharge line. 15. Earthing / bonding provided in transfer line & connected equipment 16. Fire protection system available 17. Flameproof fittings installed	4	6	24	MODERATE					
		5.4	No / Less Quantity of Solvent-S transferred from drums to storage tank TF-107 by pump TFP-107A due to pump failure	1. It will lead to process delay	6	2	12	LOW	1. Drum Weighing before and after transferring operation. 2. LI on storage tank TF-107 3. Empty drum check after transferring operation. 4. Sight glass on inlet transfer line 5. Process under supervision 6. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 7. Overload / dry run protection for Pump is provided. 8. Self primming pump is used for transferring the material to storage tank from drums 9. Suitable MOC of Pump (SS316) is selected 10. PMS of pump is done periodically. 11. PG on Pump discharge line. 12. Sight Glass on pump TFP-107A discharge line.	4	2	8	EXTREMELY LOW	NRV to be provided in pump discharge line	4	2	8	
		5.5	No / Less Quantity of Solvent-S transferred from drums to storage tank TF-107 by pump TFP-107A due to weigh balance malfuntion	1. It will lead to process delay	6	2	12	LOW	1. Calibration of weigh balance is done (monthly - Internally ; Yearly - External). 2. LI on storage tank TF-107 3. Empty drum check after transferring operation. 4. Sight glass on inlet transfer line 5. Process under supervision 6. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron)	4	2	8	EXTREMELY LOW					
		5.6	No / Less Quantity of Solvent-S transferred from drums to storage tank TF-107 by pump TFP-107A due to leakage in system	1. It will lead to material loss. 2. It will lead to leakage causing Health & Environment issue. 3. Leakage will cause burn injuries. 4. It may lead to dry running of pump. 5. It may lead to Fire in presence of external ignition source.	6	6	36	HIGH	1. Drum Weighing before and after transferring operation. 2. LI on storage tank TF-107 3. Empty drum check after transferring operation. 4. Sight glass on inlet transfer line 5. Process under supervision 6. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 7. Dry run / overload protection for Pump is provided. 8. Self primming pump is used for transferring the material to storage tank from drums 9. Suitable MOC of pipelines and valve (SS316). 10. Jacketed pipeline and valve with insulation for steam heating. 11. PG on Pump discharge line. 12. Suitable MOC of packing (teflon). 13. Spill kit available. 14. Sight Glass on pump TFP-107A discharge line. 15. Earthing / bonding provided in transfer line & connected equipment 16. Fire protection system available 17. Flameproof fittings installed	4	6	24	MODERATE	1. Provide flange guards on the lines.	4	4	16	
		5.7	No / Less Quantity of Solvent-S transferred from drums to storage tank TF-107 by pump TFP-107A due to LI malfunction of storage tank TF-107	It will lead to process delay.	6	2	12	LOW	1. Glass LI on storage tank TF-107 provided. 2. Sight glass on inlet transfer line 3. Drum Weighing before and after transferring operation. 4. Empty drum check after transferring operation. 5. Process under supervision 6. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 7. Logbook for stock in storage tank is maintained.	4	2	8	EXTREMELY LOW					

More	Quantity	6.1	More Quantity of Solvent-S transferred from drum to storage tank TF-107 by pump TFP-107A due to human error	1. It may lead to process delay	6	2	12	LOW	1. Drum Weighing before and after transferring operation. 2. LI on storage tank TF-107 3. Empty drum check after transferring operation. 4. Sight glass on inlet transfer line 5. Process under supervision 6. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 7. OCP displayed for Transferring operation from drum to storage tank in local language. 8. PG provided on pump discharge line 9. Jacketed transfer line provided for transferring the material 10. Logbook for stock in storage tank is maintained.	4	2	8	EXTREMELY LOW					
		6.2	More Quantity of Solvent-S transferred from drum to storage tank TF-107 by pump TFP-107A due to LI malfunction.	1. It may lead to overflow from the storage tanks which further results into spillage. 2. Spillage will cause health & Environment issue. 3. It may lead to Fire in presence of external source of ignition.	6	6	36	HIGH	1. Drum Weighing before and after transferring operation. 2. Two stage Glass LI on storage tank TF-107 3. Empty drum check after transferring operation. 4. Sight glass on inlet transfer line 5. Process under supervision 6. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 7. OCP displayed for Transferring operation from drum to storage tank in local language. 8. PG provided on pump discharge line 9. Jacketed transfer line provided for transferring the material 10. Logbook for stock in storage tank is maintained. 11. Spill kit available. 12. Sight Glass on pump TFP-107A discharge line. 13. Earthing / bonding provided in transfer line & connected equipment 14. Fire protection system available 15. Flameproof fittings installed 16. Secondary containment provided around storage tank TF-107	4	6	24	MODERATE	1. Provide flange guards on the lines.	4	4	16	
NO/Less	Pressure	7.1	NA															
More	Pressure	8.1	NA															
Back	Pressure	9.1	NA															
Less	Temperature	10.1	Less temperature than 28^{O}C of material while transferring of material from drums to storage tank TF-107 by pump TFP-107A due to human error	1. This will lead to process delay and may also lead to dry running of pump due to solidification of material. 2. This will lead to choke up in transfer lines due to solidification of material.	6	2	12	LOW	1. Drum Weighing before and after transferring operation. 2. LI on storage tank TF-107 3. Empty drum check after transferring operation. 4. Sight glass on inlet transfer line 5. Process under supervision 6. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 7. Dry run protection for Pump is provided. 8. Self primming pump is used for transferring the material to storage tank from drums 9.Jacketed pipeline and valve with insulation for steam heating. 10. PG on Pump discharge line. 11. Sight Glass on pump TFP-107A discharge line.	4	2	8	EXTREMELY LOW					
		10.2	Less temperature than 28^{O}C of material while transferring of material from drums to storage tank TF-107 by pump TFP-107A due to steam failure in transfer line	1. This will lead to process delay and may also lead to dry running of pump due to solidification of material. 2. This will lead to choke up in transfer lines due to solidification of material.	6	2	12	LOW	1. Drum Weighing before and after transferring operation. 2. LI on storage tank TF-107 3. Empty drum check after transferring operation. 4. Sight glass on inlet transfer line 5. Process under supervision 6. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 7. Dry run protection for Pump is provided. 8. Self primming pump is used for transferring the material to storage tank from drums 9.Jacketed pipeline and valve with insulation for steam heating. 10. PG on Pump discharge line. 11. Sight Glass on pump TFP-107A discharge line. 12. PG provided on steam header 13. PT provided in steam supply line with low / no pressure alarm	4	2	8	EXTREMELY LOW					
More	Temperature	11.1	NA															
NO/Less	Level	12.1	No Consequences															
More	Level	13.1	More level in Storage tank while transferring Solvent-S from drums to storage tank TF-107 by pump TFP-107A due to human error	Refer Section more quantity 6.1														
		13.2	More level in Storage tank while transferring Solvent-S from drums to storage tank TF-107 by pump TFP-107A due to LI malfunction	Refer Section more quantity 6.2														
Improper	Agitation	14	NA															
Changed	Composition	15	NA															
Failure	Utility	16.1	Failure of Steam	Refer Section less temperature 10.2														
High	Viscosity	17	NA															
Low	Viscosity	18	NA															
Incorrect Sequence	Raw material Issues	19	NA															
	Sampling Issues	20	NA															
Incompatibility	Raw Material	21	Transferring of incompatible raw material in storage tank TF-107 instead of Solvent-S due to human error / wrong material issued from store	It may lead to unknown reaction in the tank and may lead to unknown consequences.	6	6	36	HIGH	1. Drum with labelling is received from store. 2. Process under supervision 3. Challan of material checked at the time of receiving material	4	6	24	MODERATE					
	DCS	22	NA															

Failure	Power	23.1	Failure of power while transferring Solvent-S from drums to storage tank TF-107 by pump TFP-107A due to no electricity	Refer Section No/less quantity 5.4					1. DG set available										
	Start up/Shut down	24.1	NA																
	Loss of Containment (Leakage / Rupture)	25.1	Loss of Solvent-S	1. It will lead to environment issue and health issue (Harmful if swallowed, May be harmful in contact with skin). 2. it will lead to fire in presence of external ignition source.	6	6	36	HIGH	1. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 2. OCP displayed for Transferring operation from drum to storage tank in local language. 3. Jacketed transfer line provided for transferring the material 4. Spill kit available. 5. Earthing / bonding provided in transfer line & connected equipment 6. Fire protection system available 7. Flameproof fittings installed 8. Secondary containment provided around storage tank TF-107. 9. RCC Flooring available.	4	6	24	MODERATE					
MOC	Corrosion / Erosion	26.1	NA																
Improper	Maintenance	27.1	Refer Section No/less quantity 5.4																
	Engineering issues/ Drawing Errors	28.1	Due to human error	It will lead to in-effective PHA	6	2	12	LOW											

HAZOP WORK SHEET				Hazop Work Sheet Revision No	PHA-001.00
Product Name	2,4-DFNB			Hazop Work Sheet Effective Date	06-05-18
NODE NO :	3				
DESIGN INTENTION	Charge 2500kg 2,4DCNB at 35-45^{O}C temperature from storage tank TF-108 to receiver RC-13104B / RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B by pump TFP-108B. Charge fresh 5200kg (transferred twice, 2600kg each time) Solvent -S at 35-45^{O}C temperature from storage tank TF-107 to receiver RC-13104A / RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A at temperatur 35-45^{O}C by pump TFP-107B. Charge recovered 5200kg Solvent-S at 35-45^{O}C temperature from storage tank ST-11118 to reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 by pump P-11118. (this process would be done if the below mentioned process is not implemented) Start stirring in the reactors and transfer fresh Solvent -S from respective receivers to respective reactors reactor R-13104 / R-14105 / R -14106 / R - 14111 / R-13110 / R-13126. (the above process would be implemented if the above step is not done) Charge 25 kg K2CO3 by scoop to bring neutral pH. Start heating and keep the set point in HMI at 65-70^{O}C. Start charging of 1575kg KF manually from bags to reactor at temperature 65-70^{O}C. Once KF charging is completed, Apply normal vacuum till 700mmHg then apply high vacuum by steam ejectors of respective equipments SE-15104 /SE-15105 / SE-15106 / SE-15111 / SE-15110 / SE-15126 to bring the temperature between 130 - 135^{O}C. Collect the Solvent-S + Moisture in receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. Break the vacuum by using Nitrogen purging then transfer solvent S + moisture from receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C to drum, Charge 50kg of Catalyst No 37 in reactor. Set Temperature in HMI at 140^{O}C. Start addition of 2,4 DCNB (2.5 Ton) from respective receivers to respective reactors by maintaining temperature upto 140^{O}C. Once additon completes, Set 170^{O}C from HMI and then start heating in reactors. Once temperature 170^{O}C achieved, apply normal vacuum EDC-VP-15104 /EDC-VP-15105 / EDC-VP-15106 / EDC-VP-15111 / EDC-VP-15110 / EDC-VP-15126 for reflux for 36 hrs and maintain the temperature between 180^{O}C - 185^{O}C. Take sample after maintaning 36 Hrs for QC testing.				
EQUIPMENTS COVERED IN THIS NODE	Storage tank TF-108 , Storage tank TF-107,Storage tank ST-11118, Receiver RC-13104B / RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B, Receiver RC-13104A / RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A, Receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C., Pump TFP-108B, Pump TFP-107B, Pump P-11118, Reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126, Steam ejector SE-15104 /SE-15105 / SE-15106 / SE-15111 / SE-15110 / SE-15126, Vacuum pump EDC-VP-15104 /EDC-VP-15105 / EDC-VP-15106 / EDC-VP-15111 / EDC-VP-15110 / EDC-VP-15126, Primary condenser HE-13104A, HE-13110A, HE-13126A, HE-14105A, HE-14106A, HE-14111A., Secondary condenser HE-13104A, HE-13110A, HE-13126A, HE-14105A, HE-14106A, HE-14111A.				
DOCUMENT REFERRED	P& ID and PTC	DOCUMENT No.		DOCUMENT Revision No.	
HAZOP Revision No	01				
HAZOP Effective Date	07-03-22				

	Temperature (^{0}C)		Pressure (kg/cm^{2}g)		MOC	Capacity	
Equipment Details	Design	Working	Design	Working		Design	Working
Storage tank TF-108	250	150	4.5	ATM	SS-316	25 KL	30 KL
Storage tank TF-107	150	150	4.5	ATM	SS-316	25 KL	30 KL
Storage tank ST-11118	250	150	4.5	ATM	SS-316	10KL	13 KL
Receiver RC-13104B / RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B	170	ATM	4.5	ATM	SS-316	3KL	4.5 KL
Receiver RC-13104A / RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A	170	ATM	4.5	ATM	SS-316	3KL	4 KL
Receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C.	170	ATM	4.5	ATM	SS-316	3 KL	4 KL
Pump TFP-108B	150	ATM	3	3	SS-316	10M/3	10M/3
Pump TFP-107B	150	ATM	3	3	SS-316	10m/3	10m/3
Pump P-11118	150	ATM	3	3	SS-316	10m/3	10m/3
Reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126	250	185	6	700mmhg	SS-316	8 KL	11 KL
Steam ejector SE-15104 /SE-15105 / SE-15106 / SE-15111 / SE-15110 / SE-15126	150	130	3.5	700 mmhg	SS-316	1 TORR	1 TORR
Vacuum pump EDC-VP-15104 /EDC-VP-15105 / EDC-VP-15106 / EDC-VP-15111 / EDC-VP-15110 / EDC-VP-15126	90	60	720mmhg	720mmhg	Ductile Iron	36 TORR	36 TORR
Primary condenser HE-13104A, HE-13110A, HE-13126A, HE-14105A, HE-14106A, HE-14111A.	175	105	3.5	ATM	SS-316	15m2	15m2
Secondary condenser HE-13104A, HE-13110A, HE-13126A, HE-14105A, HE-14106A, HE-14111A.	175	140	3.5	ATM	SS-316	10m2	10m2

Guide Word	Parameter	Sr. No.	CAUSES	CONSEQUENCES	Probability	Severity	RPN No	Risk Classification	SAFEGUARDS	Probability	Severity	RPN No	Risk Classification	RECOMMENDATIONS	Probability	Severity	RPN No	Remarks
NO/Less	Flow	1.1	NA															
More	Flow	2.1	NA															
Other than/ Misdirected	Flow	3.1	Transfer of 2,4DCNB from storage tank TF-108 to receiver RC-13104B instead of RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B or vice versa by pump TFP-108BB due to valve on plant header pass	1. It may lead to overflow from the receivers which further results into spillage. 2. Spillage will cause health & Environment issue. 3. It may lead to Fire in presence of external source of ignition.	6	6	36	HIGH	1. LT provided with field display and HMI display on Receivers RC-13104B, RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B with pump TFP-108B interlock at High level with alert indication on HMI. 2. LI on storage tank TF-108 3. Double valve provided on transfer line from plant header to receiver. 4. Flameproof electrical fittings provided 5. Side glass on inlet transfer line 6. Process under supervision 7. Work permit system followed. 8. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 9. RCC Flooring within the plant. 10. Spill kit available on floor. 11. Pump tripping indication on HMI. 12. TI provided on receivers RC-13104B, RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B 13. Suitable MOC of valve SS316	4	6	24	MODERATE	1. Provide Pressure switch on pump TFP-108B discharge line interlock with pump at high pressure. 2. Change LI to LT on receivers RC-13104B, RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B in P&ID.	2	6	12	
		3.2	Transfer of 2,4DCNB from storage tank TF-108 to receiver RC-13104B instead of RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B or vice versa by pump TFP-108BB due to human error	1. It may lead to overflow from the receivers which further results into spillage. 2. Spillage will cause health & Environment issue. 3. It may lead to Fire in presence of external source of ignition.	4	6	24	MODERATE	1. LT provided with field display and HMI display on Receivers RC-13104B, RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B with pump TFP-108B interlock at High level with alert indication on HMI. 2. LI on storage tank TF-108 3. Double valve provided on transfer line from plant header to receiver. 4. Flameproof electrical fittings provided 5. Side glass on inlet transfer line 6. Work permit system followed. 7. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 8. RCC Flooring within the plant. 9. Spill kit available on floor. 10. Pump tripping indication on HMI. 11. TI provided on receivers RC-12104B, RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B 12. Suitable MOC of valve SS316	2	6	12	LOW					
		3.3	Transfer of Solvent-S from storage tank TF-107 to receiver RC-13104A instead of RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A or vice versa by pump TFP-107B due to human error	1. It may lead to overflow from the receivers which further results into spillage. 2. Spillage will cause health & Environment issue. 3. It may lead to Fire in presence of external source of ignition.	6	6	36	HIGH	1. LT provided with field display and HMI display on Receivers RC-13104A, RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A with pump TFP-107 interlock at High level with alert indication on HMI. 2. LI on storage tank TF-107 3. Double valve provided on transfer line from plant header to receiver. 4. Flameproof electrical fittings provided 5. Side glass on inlet transfer line 6. Work permit system followed. 7. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 8. RCC Flooring within the plant. 9. Spill kit available on floor. 10. Pump tripping indication on HMI. 11. TI provided on receivers RC-13104A, RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A 12. Suitable MOC of valve SS316	4	6	24	MODERATE	1. Set fix Quantity of Solvent - S on HMI 2. Provide Pressure switch on pump TFP-107 discharge line interlock with pump at high pressure. 3. Change LI to LT on receivers RC-13104A, RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A	2	6	12	
		3.4	Transfer of Solvent-S from storage tank TF-107 to receiver RC-13104A instead of RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A or vice versa by pump TFP-107B due to valve on plant header pass	1. It may lead to overflow from the receivers which further results into spillage. 2. Spillage will cause health & Environment issue. 3. It may lead to Fire in presence of external source of ignition.	6	6	36	HIGH	1. LT provided with field display and HMI display on Receivers RC-13104A, RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A with pump TFP-107 interlock at High level with alert indication on HMI. 2. LI on storage tank TF-107 3. Double valve provided on transfer line from plant header to receiver. 4. Flameproof electrical fittings provided 5. Side glass on inlet transfer line 6. Work permit system followed. 7. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 8. RCC Flooring within the plant. 9. Spill kit available on floor. 10. Pump tripping indication on HMI. 11. TI provided on receivers RC-13104A, RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A 12. Process under supervision 13. Suitable MOC of valve SS316	4	6	24	MODERATE	1. Provide Pressure switch on pump TFP-108B discharge line interlock with pump at high pressure. 2. Change LI to LT on receivers RC-13104B, RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B in P&ID.	2	6	12	
Reverse	Flow	4.1	NA															
NO/Less	Quantity	5.1	No / Less Quantity of 2,4 DCNB transferred from storage tank TF-108 to receivers RC-13104B / RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B by pump TFP-108B due to human error	1. It will lead to process delay and quality issue	6	2	12	LOW	1. LT provided with field display and HMI display on Receivers RC-13104B, RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B with pump TFP-108B interlock at High level with alert indication on HMI. 2. LI on storage tank TF-108 3. QC analysis of running samples 5-6 times. 4. Side glass on inlet transfer line 5. Process under supervision 6. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 7. Pump tripping indication on HMI. 8. TI provided on receivers RC-13104B, RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B 9. Suitable MOC of valve SS316 10. Operation Control Procedure displayed.	4	2	8	EXTREMELY LOW					

5.2	No / Less Quantity of 2,4 DCNB transferred from storage tank TF-108 to receivers RC-13104B / RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B by pump TFP-108B due to discharge Line choke up / valve choke up	1. It will lead to process delay and quality issue 2. It will lead to pressurization of line which results into gasket leakage causing Health & Environment issue. 3. Leakage will cause burn injuries.	6	4	24	MODERATE	1. LT provided with field display and HMI display on Receivers RC-13104B, RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B with pump TFP-108B interlock at High level with alert indication on HMI. 2. LI on storage tank TF-108 3. QC analysis of running samples 5-6 times. 4. Side glass on inlet transfer line 5. Process under supervision 6. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 7. Overload protection for Pump tripping with indication on HMI. 8. TI provided on receivers RC-13104B, RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B 9. Suitable MOC of pipelines and valve (SS316). 10. Jacketed pipeline and valve with insulation for steam heating. 11. PG on Pump discharge line. 12. Suitable MOC of packing (teflon). 13. Spill kit available. 14. Side Glass on pump TFP-108B discharge line.	4	4	16	LOW	1. Provide flange guards on the lines.	4	2	8	
5.3	No / Less Quantity of 2,4 DCNB transferred from storage tank TF-108 to receivers RC-13104B / RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B by pump TFP-108B due to suction Line choke up / valve choke up / strainer choke up	1. It will lead to process delay and quality issue . 2. It will lead to leakage causing Health & Environment issue. 3. Leakage will cause burn injuries. 4. It may lead to dry running of pump.	6	4	24	MODERATE	1. LT provided with field display and HMI display on Receivers RC-13104B, RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B with pump TFP-108B interlock at High level with alert indication on HMI. 2. LI on storage tank TF-108 3. QC analysis of running samples 5-6 times. 4. Side glass on inlet transfer line 5. Process under supervision 6. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 7. Underload protection for Pump tripping with indication on HMI. 8. TI provided on receivers RC-13104B, RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B 9. Suitable MOC of pipelines and valve (SS316). 10. Jacketed pipeline and valve with insulation for steam heating. 11. PG on Pump discharge line. 12. Suitable MOC of packing (teflon). 13. Spill kit available. 14. Dyke wall around pump TFP-108B provided 15. Dyke wall around storage tank TF-108 16. Side Glass on pump TFP-108B discharge line. 16. Drain valve provided on suction valve 17. Side Glass on pump TFP-108B discharge line.	4	4	16	LOW					
5.4	No / Less Quantity of 2,4 DCNB transferred from storage tank TF-108 to receivers RC-13104B / RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B by pump TFP-108B due to pump failure	1. It will lead to process delay	6	2	12	LOW	1. Preventive Maintenance in place. 2. Suitable selection of MOC of pump TFP-108B (SS316) 3. Underload and overload tripping protection provided. 4. PG provided on discharge line. 5. Side Glass on pump TFP-108B discharge line. 6. LT provided with field display and HMI display on Receivers RC-13104B, RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B with pump TFP-108B interlock at High level with alert indication on HMI. 7. LI on storage tank TF-108	4	2	8	EXTREMELY LOW					
5.5	No / Less Quantity of 2,4 DCNB transferred from storage tank TF-108 to receivers RC-13104B / RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B by pump TFP-108B due to no / less quantity in storage tank	1. It may lead to dry running of pump which will lead to process delay	6	4	24	MODERATE	1. Process under supervision 2. Daily Stock log register maintained. 3. Underload tripping protection provided. 4. PG provided on discharge line. 5. Side Glass on pump TFP-108B discharge line. 6. LT provided with field display and HMI display on Receivers RC-13104B, RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B with pump TFP-108B interlock at High level with alert indication on HMI. 7. LI on storage tank TF-108	4	4	16	LOW					
5.6	No / Less Quantity of 2,4 DCNB transferred from storage tank TF-108 to receivers RC-13104B / RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B by pump TFP-108B due to leakage in system	1. It will lead to material loss. 2. It will lead to leakage causing Health & Environment issue. 3. Leakage will cause burn injuries.	6	4	24	MODERATE	1. LT provided with field display and HMI display on Receivers RC-13104B, RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B with pump TFP-108B interlock at High level with alert indication on HMI. 2. LI on storage tank TF-108 3. Side glass on inlet transfer line 4. Process under supervision 5. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 6. TI provided on receivers RC-13104B, RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B 7. Suitable MOC of pumps, pipelines and valves (SS316). 8. Jacketed pipeline and valve with insulation for steam heating. 9. PG on Pump discharge line. 10. Suitable MOC of packing (teflon). 11. Spill kit available. 12. Side Glass on pump TFP-108B discharge line. 13. Emergency Stop button for pump provided on shop floor.	4	4	16	LOW	1. Provide flange guards on the lines.	4	2	8	
5.7	No / Less Quantity of 2,4 DCNB transferred from storage tank TF-108 to receiversRC-13104B / RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B by pump TFP-108B due to valve in by-pass line open / pass	1. It will lead to process delay.	6	2	12	LOW	1. Process under supervision s 2. LT provided with field display and HMI display on Receivers RC-13104B, RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B with pump TFP-108B interlock at High level with alert indication on HMI. 3. LI on storage tank TF-108 4. PG provided on discharge line 5. SG provided on discharge line.	4	2	8	EXTREMELY LOW	1. P&ID of Tank Farm is not available 2. By pass line on pump TFP-108B to be shown. 3. Provide Pressure switch on pump TFP-108B discharge line interlock with pump at high pressure or Rupture disc to be provided.	4	2	8	

5.8	No / Less Quantity of 2,4 DCNB transferred from storage tank TF-108 to receivers RC-13104B / RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B by pump TFP-108B due to LT malfunction	It will lead to process delay and quality issue	6	2	12	LOW	1. Calibration and PM of LT done on Receivers RC-13104B, RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B. 2. LI on storage tank TF-108 3. QC analysis of running samples 5-6 times. 4. Side glass on inlet transfer line 5. Process under supervision 6. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 7. Suitable selection of LT (non contact, PTFE coated with SS316).	4	2	8	EXTREMELY LOW					
5.9	No / Less Quantity of 2,4 DCNB transferred from storage tank TF-108 to receivers RC-13104B / RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B by pump TFP-108B due to steam failure in system	1. It will lead to line choke up resulting pressure in line and may cause leakage. 2. Leakage will lead to material loss and thus causing Health & Environment issue. 3. Leakage will cause burn injuries. 4. It may lead to dry running of pump leads to overloading of pump.	6	4	24	MODERATE	1. LT provided with field display and HMI display on Receivers RC-13104B, RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B with pump TFP-108B interlock at High level with alert indication on HMI. 2. LI on storage tank TF-108 3. QC analysis of running samples 5-6 times. 4. Side glass on inlet transfer line 5. Process under supervision 6. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 7. Overload / Underload protection for Pump tripping with indication on HMI. 8. TI provided on receivers RC-13104B, RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B 9. Suitable MOC of pipelines and valve (SS316). 10. Jacketed pipeline and valve with insulation for steam heating. 11. PG on Pump discharge line. 12. Suitable MOC of packing (teflon). 13. Spill kit available. 14. Dyke wall around pump TFP-108B provided. 15. Dyke wall around storage tank TF-108 16. Side Glass on pump TFP-108B discharge line. 17. Drain valve provided on suction valve 18. Side Glass on pump TFP-108B discharge line. 19. Stand by steam supply available. 20. PG on inlet line and PT in outlet line with Hooter in plant area of PRS system provided. 21. PG on Steam supply header. 22. Steam trap provided on steam condensate line.	4	4	16	LOW					
5.10	No / Less Quantity of 2,4 DCNB transferred from storage tank TF-108 to receivers RC-13104B / RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B by pump TFP-108B due to pump drain valve in suction line open	1. It will lead to material loss. 2. It will lead to leakage causing Health & Environment issue. 3. Leakage will cause burn injuries. 4. It may lead to dry running of pump.	6	4	24	MODERATE	1. LT provided with field display and HMI display on Receivers RC-13104B, RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B with pump TFP-108B interlock at High level with alert indication on HMI. 2. LI on storage tank TF-108 3. Side glass on inlet transfer line 4. Process under supervision 5. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 6. TI provided on receivers RC-13104B, RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B 7. Blind flange provided on drain valve. 8. Underload protection provided on pump TFP-108B. 9. PG on Pump discharge line. 10. Spill kit available. 11. Side Glass on pump TFP-108B discharge line. 12. Emergency Stop button for pump provided on shop floor. 13. Dyke wall provided around the storage tank and pump TFP-108B.	4	4	16	LOW	1. Provide flange guards on the lines.	4	4	16	
5.11	No / Less Quantity of 2,4 DCNB transferred from storage tank TF-108 to receivers RC-13104B / RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B by pump TFP-108B due to LI malfunction / LI glass damage of storage tank TF-108	1. It will lead to material loss. 2. It will lead to leakage causing Health & Environment issue. 3. Leakage will cause burn injuries. 4. It may lead to dry running of pump. 5.It will lead to process delay and quality issue	6	4	24	MODERATE	1. LT provided with field display and HMI display on Receivers RC-13104B, RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B with pump TFP-108B interlock at High level with alert indication on HMI. 2. Visual Inspection of LI on storage tank TF-108 3. Side glass on inlet transfer line 4. Process under supervision 5. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 6. TI provided on storage tank TF-108. 7. Jacketed with insulated Storage tank TF-108. 8. Underload protection provided on pump TFP-108B with indication on HMI. 9. PG on Pump discharge line. 10. Spill kit available. 11. Side Glass on pump TFP-108B discharge line. 12. Drain valve provided on LI. 13. Dyke wall provided around the storage tank. 14. Two stage LI with protection guard provided. 15. Isolation valve provided on both sides of LI.	4	4	16	LOW	1. Provide flange guards on the lines. 2. Float type LI to be provided on storage tank TF-108	4	4	16	
5.12	No / Less Quantity of 2,4 DCNB transferred from storage tank TF-108 to receivers RC-13104B / RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B by pump TFP-108B due to NRV Failure of pump TFP-108B	1. It will lead to generation of back pressure in pump resulting into seal leakage / impeller jam which further resulting into pump failure. 2. Seal leakage will lead to spillage from the pump leads to health / environment issue. 3.It may lead to burn injury	6	4	24	MODERATE	1. Suitable MOC of NRV (SS316). 2. PMS of Pump and NRV. 3. Suitable MOC with pressure rating of Seal. 4. Process under supervision 5. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 6. TI provided on storage tank TF-108. 7. Jacketed pipeline with insulation on transfer system. 8. PG on Pump discharge line. 9. Spill kit available. 10. Side Glass on pump TFP-108B discharge line. 11. Dyke wall provided around the pump TFP-108B. 12. Bypass line provided from pump header to storage tank.	4	4	16	LOW		6	2	12	

5.13	No / Less Quantity of SOL-S transferred from storage tank TF-107 to receivers RC-13104A, RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A twice by pump TFP-107 due to human error	1. It will lead to process delay and quality issue 2. It will lead to overflow from the receivers in case previous step material left in the receiver. 3. Overflow will cause leakage resulting in health and enviornment issue	6	4	24	MODERATE	1. LT provided with field display and HMI display on Receivers RC-13104A, RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A with pump TFP-107 interlock at High level with alert indication on HMI. 2. LI on storage tank TF-107 3. Emergency Stop button for pump provided in storage tank farm area. 4. Side glass on inlet transfer line. 5. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 6. Pump tripping indication on HMI. 7. TI provided on receivers RC-13104A, RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A 7. Process under supervision	4	4	16	LOW	1. Ensure Receiver is empty before second transfer of Sol-S from storage tank to receivers RC-13104A, RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A	4	4	16	
5.14	No / Less Quantity of SOL-S transferred from storage tank TF-107 to receivers RC-13104A, RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A by pump TFP-107 due to discharge Line choke up / valve choke up	1. It will lead to material loss. 2. It will lead to pressurization of line which results into gasket leakage causing Health & Environment issue. 3. Leakage will cause burn injuries.	6	4	24	MODERATE	1. LT provided with field display and HMI display on Receivers RC-13104A, RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A with pump TFP-107 interlock at High level with alert indication on HMI. 2. LI on storage tank TF-107 3.Side glass on inlet transfer line of receivers 4. Process under supervision 5. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 6. Overload protection for Pump tripping with indication on HMI. 7. TI provided on receivers RC-13104A, RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A 8. Suitable MOC of pipelines and valve (SS316). 9. Jacketed pipeline and valve with insulation for steam heating. 10. PG on Pump discharge line. 11. Suitable MOC of packing (teflon). 12. Spill kit available. 13. Side Glass on pump TFP-107 discharge line.	4	4	16	LOW	1. Provide flange guards on the lines. 2. Provide Pressure switch on pump TFP-107 discharge line interlock with pump at high pressure or Rupture disc to be provided.	4	4	16	
5.15	No / Less Quantity of SOL-S transferred from storage tank TF-107 to receivers RC-13104A, RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A by pump TFP-107 due to suction Line choke up / valve choke up / strainer choke up	1. It will lead to material loss. 2. It will lead to leakage causing Health & Environment issue. 3. Leakage will cause burn injuries. 4. It may lead to dry running of pump.	6	4	24	MODERATE	1. LT provided with field display and HMI display on Receivers RC-13104A, RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A with pump TFP-107 interlock at High level with alert indication on HMI. 2. LI on storage tank TF-107 3. Side glass on pump outlet transfer line 4. Process under supervision 5. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 6. Underload / dry run protection for Pump tripping with indication on HMI. 7. TI provided on receivers RC-13104A, RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A 8. Suitable MOC of pipelines and valve (SS316). 9. Jacketed pipeline and valve with insulation for steam heating. 10. PG on Pump discharge line. 11. Suitable MOC of packing (teflon). 12. Spill kit available. 13. Dyke wall around pump TFP-107 provided 14. Dyke wall around storage tank TF-107 15. Side Glass on receivers inlet line. 16. Drain valve provided on suction valve. 17. TI on storage tank TF-107 18. PMS of pump on regular interval.	4	4	16	LOW					
5.16	No / Less Quantity of SOL-S transferred from storage tank TF-107 to receivers RC-13104A, RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A by pump TFP-107 due to pump failure	1. It will lead to production delay.	10	2	20	MODERATE	1. Preventive Maintenance in place. 2. Suitable selection of MOC of pump TFP-107 (SS316) 3. Underload and overload tripping protection provided. 4. PG provided on discharge line. 5. Side Glass on pump TFP-107 discharge line. 6. LT provided with field display and HMI display on Receivers RC-13104A, RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A with pump TFP-107 interlock at High level with alert indication on HMI. 7. LI on storage tank TF-107	6	2	12	LOW					
5.17	No / Less Quantity of SOL-S transferred from storage tank TF-107 to receivers RC-13104A, RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A by pump TFP-107 due to no / less quantity in storage tank	1. It may lead to dry running of pump which leads to production delay.	6	2	12	LOW	1. Process under supervision 2. Daily Stock log register maintained. 3. Underload tripping protection provided. 4. PG provided on discharge line. 5. Sight Glass on pump TFP-107 discharge line. 6. LT provided with field display and HMI display on Receivers RC-13104A, RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A with pump TFP-107 interlock at High level with alert indication on HMI. 7. LI on storage tank TF-107 8. Visual level inspection before starting new batch.	4	2	8	EXTREMELY LOW					

5.18	No / Less Quantity of SOL-S transferred from storage tank TF-107 to receivers RC-13104A, RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A by pump TFP-107 due to leakage in system	1. It will lead to material loss. 2. It will lead to leakage causing Health & Environment issue. 3. Leakage will cause burn injuries. 4. It may lead to fire in case of external source of ignition	6	6	36	HIGH	1. LT provided with field display and HMI display on Receivers RC-13104A, RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A with pump TFP-107 interlock at High level with alert indication on HMI. 2. LI on storage tank TF-107 3. Side glass on inlet line of receiver. 4. Process under supervision 5. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 6. TI provided on receivers RC-13104A, RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A 7. Suitable MOC of pumps, pipelines and valves (SS316). 8. Jacketed pipeline and valve with insulation for steam heating. 9. PG on Pump discharge line. 10. Suitable MOC of packing (teflon). 11. Spill kit available. 12. Sight Glass on pump TFP-107 discharge line. 13. Emergency Stop button for pump provided on shop floor. 14. Dyke wall surrounding pump TFP-107 15. Fire hydrant system available 16. Earthing and bonding provided 17. OCP displayed at location 18. Spare valve is available 19. Suitable MOC of valve SS-316 is selected 20. RCC flooring available.	4	6	24	MODERATE	1. Provide flange guards on the lines.	4	4	16	
5.19	No / Less Quantity of SOL-S transferred from storage tank TF-107 to receivers RC-13104A, RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A by pump TFP-107 due to valve in by-pass line open / pass	1. It will lead to production delay.	6	2	12	LOW	1. Process under supervision 2. LT provided with field display and HMI display on Receivers RC-13104A, RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A with pump TFP-107 interlock at High level with alert indication on HMI. 3. LI on storage tank TF-107 4. PG provided on discharge line 5. SG provided on discharge line. 6. Sight glass on inlet line of receiver.	4	2	8	EXTREMELY LOW	1. P&ID of Tank Farm is not available 2. By pass line on pump TFP-107 to be shown. 3. Provide Pressure switch on pump TFP-107 discharge line interlock with pump at high pressure or Rupture disc to be provided.	4	2	8	
5.20	No / Less Quantity of SOL-S transferred from storage tank TF-107 to receivers RC-13104A, RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A by pump TFP-107 due to LT malfunction	1. It will lead to material loss. 2. It may lead to over flow resulting in health and enviornment issue .	6	4	24	MODERATE	1. Calibration and PM of LT done on Receivers RC-13104A, RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A. 2. LI on storage tank TF-107 3. Stock register available. 4. Side glass on inlet transfer line 5. Process under supervision 6. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 7. Suitable selection of LT (non contact, PTFE coated with SS316).	4	4	16	LOW					
5.21	No / Less Quantity of SOL-S transferred from storage tank TF-107 to receivers RC-13104A, RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A by pump TFP-107 due to steam failure in system	1. It will lead to line choke up resulting pressure in line and may cause leakage. 2. Leakage will lead to material loss and thus causing Health & Environment issue. 3. Leakage will cause burn injuries. 4. It may lead to dry running of pump leads to overloading of pump.	6	4	24	MODERATE	1. LT provided with field display and HMI display on RC-13104A, RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A with pump TFP-107 interlock at High level with alert indication on HMI. 2. LI on storage tank TF-107 3. Side glass on inlet line of receiver 4. Process under supervision 5. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 6. Overload / Underload protection for Pump tripping with indication on HMI. 7. TI provided on receivers RC-13104A, RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A 8. Suitable MOC of pipelines and valve (SS316). 9. Jacketed pipeline and valve with insulation for steam heating. 10. PG on Pump discharge line. 11. Suitable MOC of packing (teflon). 12. Spill kit available. 13. Dyke wall around pump TFP-107 provided. 14. Dyke wall around storage tank TF-107 15. Side Glass on pump TFP-107 discharge line. 16. PG on steam header. 17. Drain valve provided on suction valve 18. Side Glass on pump TFP-108B discharge line. 19. Stand by steam supply available. 20. PG on inlet line and PT in outlet line with Hooter in plant area of PRS system provided. 21. PG on Steam supply header. 22. Steam trap provided on steam condensate line.	4	4	16	LOW	1. Provide Pressure switch on pump TFP-107 discharge line interlock with pump at high pressure or Rupture disc to be provided. 2. PG to be provided on steam headet at storage tank.	4	4	16	

5.22	No / Less Quantity of SOL-S transferred from storage tank TF-107 to receivers RC-13104A, RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A by pump TFP-107 due to steam trap malfunctioning	1. It will lead to line choke up resulting pressure in line and may cause leakage. 2. Leakage will lead to material loss and thus causing Health & Environment issue. 3. Leakage will cause burn injuries. 4. It may lead to dry running of pump leads to overloading / underloading of pump.	6	4	24	MODERATE	1. LT provided with field display and HMI display on Receivers RC-13104A, RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A with pump TFP-107 interlock at High level with alert indication on HMI. 2. LI on storage tank TF-107 3. Side glass on inlet line of receiver 4. Process under supervision 5. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 6. Overload / Underload protection for Pump tripping with indication on HMI. 7. TI provided on receiversRC-13104A, RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A 8. Suitable MOC of pipelines and valve (SS316). 9. Jacketed pipeline and valve with insulation for steam heating. 10. PG on Pump discharge line. 11. Suitable MOC of packing (teflon). 12. Spill kit available. 13. Dyke wall around pump TFP-107 provided. 14. Dyke wall around storage tank TF-107 15. Side Glass on pump TFP-107 discharge line. 16. PG on steam header. 17. Drain valve provided on suction valve 18. Side Glass on pump TFP-108B discharge line. 19. Stand by steam supply available. 20. PG on inlet line and PT in outlet line with Hooter in plant area of PRS system provided. 21. PG on Steam supply header. 22. Steam trap provided on steam condensate line.	4	4	16	LOW	1. Provide flange guards on the lines.	4	4	16	
5.23	No / Less Quantity of SOL-S transferred from storage tank TF-107 to receivers RC-13104A, RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A by pump TFP-107 due to pump drain valve in suction line pass / open	1. It will lead to material loss. 2. It will lead to leakage causing Health & Environment issue. 3. Leakage will cause burn injuries. 4. It may lead to dry running of pump. 5. It may lead to fire in case external source of ignition	6	4	24	MODERATE	1. LT provided with field display and HMI display on Receivers RC-13104A, RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A with pump TFP-107 interlock at High level with alert indication on HMI. 2. LI on storage tank TF-107 3. Side glass on inlet line of receivers 4. Process under supervision 5. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 6. TI provided on receivers RC-13104A, RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A 7. Blind flange provided on drain valve. 8. Underload protection provided on pump TFP-107. 9. PG on Pump discharge line. 10. Spill kit available. 11. Side Glass on pump TFP-107 discharge line. 12. Emergency Stop button for pump provided on shop floor. 13. Dyke wall provided around the storage tank and pump TFP-107. 14. RCC flooring available. 15. Fire hydrant system available 16. Earthing and bonding provided 17. OCP displayed at location 18. Spare valve is available 19. Suitable MOC of valve SS-316 is selected	4	4	16	LOW					
5.24	No / Less Quantity of SOL-S transferred from storage tank TF-107 to receivers RC-13104A, RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A by pump TFP-107 due to LI malfunction / LI glass damage of storage tank TF-107	1. It will lead to material loss. 2. It will lead to leakage causing Health & Environment issue. 3. Leakage will cause burn injuries. 4. It may lead to dry running of pump.	6	4	24	MODERATE	1. LT provided with field display and HMI display on Receivers RC-13104A, RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A with pump TFP-107 interlock at High level with alert indication on HMI. 2. Visual Inspection of LI on storage tank TF-107 3. Side glass on inlet transfer line 4. Process under supervision 5. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 6. TI provided on storage tank TF-107. 7. Jacketed with insulated Storage tank TF-107 8. Underload protection provided on pump TFP-107 with indication on HMI. 9. PG on Pump discharge line. 10. Spill kit available. 11. Side Glass on pump TFP-107 discharge line. 12. Drain valve provided on LI. 13. Dyke wall provided around the storage tank. 14. Two stage LI with protection guard provided. 15. Isolation valve provided on both sides of LI. 16. Spare LI is available	4	4	16	LOW	1. Provide flange guards on the lines. 2. Float type LI to be provided on storage tank TF-107	4	4	16	
5.25	No / Less Quantity of recovered solvent S transferred from storage tank ST-11118 to reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 by pump P-11118 due to human error	1. It will lead to process delay, yield loss and quality issue	6	4	24	MODERATE	1. WG provided on reactors 2. LI on storage tank ST-11118 3. QC analysis of running samples 5-6 times. 4. Side glass on inlet transfer line 5. Process under supervision 6. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 7. Emergency push button available on floor 8. TI provided onreactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126	4	4	16	LOW					

5.26	No / Less Quantity of recovered solvent S transferred from storage tank ST-11118 to reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 by pump P-11118 due to discharge Line choke up / valve choke up	1. It will lead to process delay and quality issue 2. It will lead to pressurization of line which results into gasket leakage causing Health & Environment issue. 3. Leakage will cause burn injuries. 4. It may lead to fire due to external source of ignition	6	6	36	HIGH	1. WG provided on reactors 2. LI on storage tank ST-11118 3. QC analysis of running samples 5-6 times. 4. Side glass on inlet transfer line 5. Process under supervison 6. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 7. Overload protection for Pump tripping with indication on HMI. 8. TI provided on reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 9. Suitable MOC of pipelines and valve (SS-316). 10. Jacketed pipeline and valve with insulation for steam heating. 11. PG on Pump discharge line. 12. Suitable MOC of packing (teflon). 13. Spill kit available. 14. Side Glass on pump P-11118 discharge line. 15. Fire fighting system is available 16. FLP fittings provided 17. Earthing and bonding provided on equipment and line 18. PTW system is available 19. RCC flooring available	4	6	24	MODERATE	1. Provide flange guards on the lines.	4	4	16	
5.27	No / Less Quantity of recovered solvent S transferred from storage tank ST-11118 to reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 by pump P-11118 due to suction Line choke up / valve choke up / strainer choke up	1. It will lead to process delay, yield loss and quality issue . 2. It may lead to dry running of pump may casue damage to seal	6	4	24	MODERATE	1. WG provided on reactors 2. LI on storage tank ST-11118 3. QC analysis of running samples 5-6 times. 4. Side glass on inlet transfer line 5. Process under supervison 6. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 7. Underload protection for Pump tripping with indication on HMI. 8. TI provided on reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 9. Jacketed pipeline and valve with insulation for steam heating. 10. PG on Pump discharge line.	4	4	16	LOW					
5.28	No / Less Quantity of recovered solvent S transferred from storage tank ST-11118 to reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 by pump P-11118 due to pump failure	1. It will lead to process delay	6	2	12	LOW	1. Preventive Maintenance in place. 2. Suitable selection of MOC of pump P-11118 (SS316) 3. Underload and overload tripping protection provided. 4. PG provided on discharge line. 5. Side Glass on pump P-11118 discharge line. 6. LI on storage tank TF-11118	4	2	8	EXTREMELY LOW					
5.29	No / Less Quantity of recovered solvent S transferred from storage tank ST-11118 to reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 by pump P-11118 due to no / less quantity in storage tank	1. It may lead to dry running of pump which will lead to process delay	6	4	24	MODERATE	1. Process under supervision 2. Daily Stock log register maintained. 3. Underload tripping protection provided. 4. PG provided on discharge line. 5. Side Glass on pump P-11118 discharge line. 6. LI on storage tank ST-11118 7. WG provided on reactors	4	4	16	LOW					
5.30	No / Less Quantity of recovered solvent S transferred from storage tank ST-11118 to reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 by pump P-11118 due to leakage in system	1. It will lead to material loss. 2. It will lead to leakage causing Health & Environment issue. 3. Leakage will cause burn injuries. 4. It may lead to fire in case of external source of ignition	6	6	36	HIGH	1. WG provided on reactors 2. LI on storage tank ST-11118 3. QC analysis of running samples 5-6 times. 4. Side glass on inlet transfer line 5. Process under supervison 6. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 7. Emergency push button available on floor 8. TI provided on reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 9. Suitable MOC of pipelines and valve (SS-316). 10. Jacketed pipeline and valve with insulation for steam heating. 11. PG on Pump discharge line. 12. Suitable MOC of packing (teflon). 13. Spill kit available. 14. Side Glass on pump P-11118 discharge line. 15. Fire fighting system is available 16. FLP fittings provided 17. Earthing and bonding provided on equipment and line 18. PTW system is available 19. RCC flooring available	4	6	24	MODERATE	1. Provide flange guards on the lines.	4	4	16	

5.31	No / Less Quantity of recovered solvent S transferred from storage tank ST-11118 to reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 by pump P-11118 due to steam failure in system	1. It will lead to line choke up resulting pressure in line and may cause leakage. 2. Leakage will lead to material loss and thus causing Health & Environment issue. 3. Leakage will cause burn injuries. 4. It may lead to pump damage 5. It may lead to fire in case of external source of ignition	6	6	36	HIGH	1. WG provided on reactor 2. LI on storage tank ST-11118 3. QC analysis of running samples 5-6 times. 4. Side glass on inlet transfer line 5. Process under supervision 6. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 7. Overload / Underload protection for Pump tripping 8. TI provided onreactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 9. Suitable MOC of pipelines and valve (SS-316). 10. Jacketed pipeline and valve with insulation for steam heating. 11. PG on Pump discharge line. 12. Suitable MOC of packing (teflon). 13. Spill kit available. 14. Stand by steam provision is available 15. Side Glass on pump P-11118 discharge line. 16. Drain valve provided on suction valve 17. PG on inlet line and PT in outlet line with Hooter in plant area of PRS system provided. 18. PG on Steam supply header. 19. Steam trap provided on steam condensate line. 20. Jacketed pump is available 21. Fire fighting system is available 22. FLP fittings provided 23. Earthing and bonding provided on equipment and line 24. PTW system is available 25. RCC flooring available	4	6	24	MODERATE	1. Provide Pressure switch on pump TFP-108B discharge line interlock with pump at high pressure or Rupture disc to be provided.	4	4	16	
5.32	No / Less Quantity of recovered solvent S transferred from storage tank ST-11118 to reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 by pump P-11118 due to pump drain valve open / pass in suction line open	1. It will lead to material loss. 2. It will lead to leakage causing Health & Environment issue. 3. Leakage will cause burn injuries. 4. It may lead to dry running of pump. 5. It may lead to fire in case external source of ignition	6	6	36	HIGH	1. WG provided on reactor 2. LI on storage tank ST-11118 3. QC analysis of running samples 5-6 times. 4. Side glass on inlet transfer line 5. Process under supervision 6. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 7.Underload protection for Pump tripping 8. TI provided onreactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 9. Suitable MOC of pipelines and valve (SS-316). 10. Jacketed pipeline and valve with insulation for steam heating. 11. PG on Pump discharge line. 12. Suitable MOC of packing (teflon). 13. Spill kit available. 14. Side Glass on pump P-11118 discharge line. 15. Spare valve is available 16. Fire fighting system is available 17. FLP fittings provided 18. Earthing and bonding provided on equipment and line 19. PTW system is available 20. RCC flooring available	4	6	24	MODERATE	1. Provide flange guards on the lines.	4	6	24	
5.33	No / Less Quantity of recovered solvent S transferred from storage tank ST-11118 to reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 by pump P-11118 due to LI malfunction of storage tank ST-11118.	1. It will lead to material loss. 2. It may lead to dry running of pump. 3.It will lead to process delay and quality issue	6	4	24	MODERATE	1. WG provided on reactors 2. Visual Inspection of LI on storage tank ST-11118 3. Side glass on inlet transfer line 4. Process under supervision 5. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 6. TI provided on storage tank ST-11118 7. Isolation valve provided on both sides of LI 8. Underload protection provided on pump P-11118 9. PG on Pump discharge line. 10. Spill kit available. 11. Side Glass on pump P-11118 discharge line. 12. Drain valve provided on LI.	4	4	16	LOW	1. Provide flange guards on the lines. 2. Float type LI to be provided on storage tank TF-108	4	4	16	
5.34	No / Less Quantity of recovered solvent S transferred from storage tank ST-11118 to reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 by pump P-11118 due to NRV Failure of pump P-11118	1. It will lead to generation of back pressure in pump resulting into seal leakage / impeller jam which further resulting into pump failure. 2. Seal leakage will lead to spillage from the pump leads to health / environment issue. 3.It may lead to burn injury 4. It may lead to fire in case of external source of ignition	6	6	36	HIGH	1. Suitable MOC of NRV (SS316). 2. PMS of Pump and NRV. 3. Suitable MOC with pressure rating of Seal. 4. Process under supervision 5. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 6. TI provided on storage tank ST-11118 7. Jacketed pipeline with insulation on transfer system. 8. PG on Pump discharge line. 9. Spill kit available. 10. Side Glass on pump P-11118 discharge line. 11. Fire fighting system is available 12. FLP fittings provided 13. Earthing and bonding provided on equipment and line 14. PTW system is available 15. RCC flooring available	4	6	24	MODERATE					
5.35	No / Less Quantity of fresh SOL-S transferred from receivers RC-13104A, RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A to reactor R-13104, R-14105 / R-14106 / R-14111 / R-13110 / R-13126 twice by gravity due to human error	1. It will lead to material loss and qulaity issue	6	2	12	LOW	1. LT provided with field display and HMI display on Receivers RC-13104A, RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A. 2. WG provided on reactor 3. Emergency Stop button for pump provided in storage tank farm area. 4. Sight glass on transfer line from receiver to reactor. 5. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 6. Pump tripping indication on HMI. 7. TI provided on receivers RC-13104A, RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A 8. TI on reactor R-13104, R-14105 / R-14106 / R-14111 / R-13110 / R-13126	4	2	8	EXTREMELY LOW	1. Ensure Receiver is empty before second transfer of Sol-S from storage tank to receivers RC-13104A, RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A	4	2	8	

5.36	No / Less Quantity of fresh SOL-S transferred from receivers RC-13104A, RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A to reactor R-13104, R-14105 / R-14106 / R-14111 / R-13110 / R-13126 twice by gravity due to transfer Line choke up / valve choke up	1. It will lead to quality issue and process delay	6	2	12	LOW	1. LT provided with field display and HMI display on Receivers RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A. 2. Sight glass on transfer line from receiver to reactor. 3.WG provided on reactors 4. Process under supervision 5. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 6. TI provided on receivers RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A 7. TI on reactor R-13104, R-14105 / R-14106 / R-14111 / R-13110 / R-13126 8. Suitable MOC of pipelines and valve (SS316). 9. Jacketed pipeline and valve with insulation for steam heating. 10. Suitable MOC of packing (teflon). 11. Spill kit available 12. Spare valve is available	4	2	8	EXTREMELY LOW					
5.37	No / Less Quantity of fresh SOL-S transferred from receivers RC-13104A, RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A to reactor R-13104, R-14105 / R-14106 / R-14111 / R-13110 / R-13126 twice by gravity due to leakage in transfer line	1. It will lead to material loss. 2. It will lead to leakage causing Health & Environment issue. 3. Leakage will cause burn injuries. 4. It will lead to **fire** in presence of external ignition source.	6	6	36	HIGH	1. LT provided with field display and HMI display on Receivers RC-13104A, RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A. 2. Sight glass on transfer line from receiver to reactor. 3. Process under supervision 4. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 5. TI provided on receivers RC-13104A, RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A 6. Suitable MOC of pipelines and valves (SS316). 7. Jacketed pipeline and valve with insulation for steam heating. 8. Suitable MOC of packing (teflon). 9. Spill kit available.. 10. RCC florring in plant area 11. Double valve provided in transfer line. 12. PTW system in place. 13. Flameproof fittings installed. 14. Earthing, flange to flange bonding / jumpers provided to all equipment. 15. WG provided on reactor.	4	6	24	MODERATE	1. Provide flange guards on the lines. 2. HAC study to be conducted.	4	4	16	
5.38	No / Less Quantity of fresh SOL-S transferred from receivers RC-13104A, RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A to reactor R-13104, R-14105 / R-14106 / R-14111 / R-13110 / R-13126 twice by gravity due to reactor bottom valve open / pass	1. It will lead to material loss. 2. It will lead to leakage causing Health & Environment issue. 3. Leakage will cause burn injuries. 4. It will lead to **fire** in presence of external ignition source.	6	6	36	HIGH	1. LT provided with field display and HMI display on Receivers RC-13104A, RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A. 2. Sight glass on transfer line from receiver to reactor. 3. Process under supervision 4. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 5. TI provided on receivers RC-13104A, RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A 6. Suitable MOC of pipelines and valves (SS316). 7. Jacketed pipeline and valve with insulation for steam heating. 8. Suitable MOC of packing (teflon). 9. Spill kit available.. 10. RCC florring in plant area 11. Double valve on bottom of reactor. 12. Blind flange on bottom drain valve of reactor 13. PTW system in place. 14. Flameproof fittings installed. 15. Earthing, flange to flange bonding / jumpers provided to all equipment. 16. WG provided on reactor 17. Spare valve is available.	4	6	24	MODERATE	1. Provide flange guards on the lines. 2. HAC study to be conducted.	4	6	24	
5.39	No / Less Quantity of fresh SOL-S transferred from receivers RC-13104A, RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A to reactor R-13104, R-14105 / R-14106 / R-14111 / R-13110 / R-13126 twice by gravity due to receiver LT malfunction	1. It will lead to process delay, yield loss and quality issue	6	4	24	MODERATE	1. Calibration and PM of LT done on Receivers RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A. 2. Sight glass on transfer line from receiver to reactor. 3. View glass on reactor. 4. Process under supervision 5. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 6. Suitable selection of LT (non contact, PTFE coated with SS-316). 7. Glass LI provided on storage tank TF-107 8. To take equavalent quantity in receiver RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A. as per the batch size in reactor R-13104, R-14105 / R-14106 / R-14111 / R-13110 / R-13126	4	4	16	LOW					
5.40	No / Less Quantity of fresh SOL-S transferred from receivers RC-13104A, RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A to reactor R-13104, R-14105 / R-14106 / R-14111 / R-13110 / R-13126 twice by gravity due to steam failure in receivers	1. It will lead to line choke up and further causes batch delay.	6	2	12	LOW	1. LT provided with field display and HMI display on Receivers RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A. 2. Side glass on inlet line of reactor. 3. Process under supervision 4. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 6. TI provided on receivers RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A 8. PG on steam line. 9. Stand by steam supply available. 10. PG on inlet line and PT in outlet line with Hooter in plant area of PRS system provided. 11. Steam trap provided on steam condensate line. 12. PG on receiver jacket.	4	2	8	EXTREMELY LOW					

5.41	No / Less Quantity of fresh SOL-S transferred from receivers RC-13104A, RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A to reactor R-13104, R-14105 / R-14106 / R-14111 / R-13110 / R-13126 twice by gravity due to steam trap malfunctioning	1. It will lead to line choke up and further causes batch delay.	6	2	12	LOW	1. LT provided with field display and HMI display on Receivers RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A. 2. Side glass on inlet line of reactor. 3. Process under supervision 4. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 6. TI provided on receivers RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A 8. PG on steam line. 9. Stand by steam supply available. 10. PG on inlet line and PT in outlet line with Hooter in plant area of PRS system provided. 11. By-pass line provided on Steam trap to remove steam condensate. 12. PG on receiver jacket.	4	2	8	EXTREMELY LOW					
5.42	No / Less Quantity of fresh SOL-S transferred from receivers RC-13104A, RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A to reactor R-13104, R-14105 / R-14106 / R-14111 / R-13110 / R-13126 twice by gravity due to TI malfunctions on receivers	1. It will lead to process delay, yield loss and quality issue.	6	4	24	MODERATE	1. LT provided on Receivers RC-13104A / RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A with indication on HMI. 2. Sight glass on transfer line from receiver to reactor. 3. Calibration of TI is done as per schedule 4. View glass on reactor. 5. Process under supervision 6. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 7. Suitable selection of TI is done	4	4	16	LOW					
5.43	No/less quantity of K2CO3 charged due to human error.	1. It may lead to remain acidic pH which may cause corrosion of equipment.	6	4	24	MODERATE	1. The material is received from store as per issue slip. 2. The material is weighed before charging in the plant. 3. The neutral pH is checked during and after charging. 4. Process under supervision.	4	4	16	LOW					
5.44	No/less quantity of K2CO3 charged due to weigh balance malfunction.	1. It may lead to remain acidic pH which may cause corrosion of equipment.	6	4	24	MODERATE	1. The material is received from store as per issue slip. 2. The material is weighed before charging in the plant. 3. The neutral pH is checked during and after charging. 4. Process under supervision. 5. Calibration of weigh scale is done (weekly, monthly, yearly). 6. spare weigh balance is available.	4	4	16	LOW					
5.45	No/less quantity of K2CO3 charged due to spillage	1. It may lead to material loss. 2. It may lead to helth and envriomentissue	6	4	24	MODERATE	1. The material is received from store as per issue slip. 2. The material is weighed before charging in the plant. 3. The neutral pH is checked during and after charging. 4. Process under supervision. 5. Secondary containment is provided 6 RCC floor provided 7. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron)	4	4	16	LOW					
5.46	No/less quantity of KF charged due to human error.	1. It will lead to quality issue. 2. It will lead to material loss.	6	2	12	LOW	1. The material is received from store as per issue slip. 2. The material is weighed before charging in the plant. 3. Empty bag checked and counted after charging (two times). 4. Process under supervision. 5. QC sample check during the reaction.	4	2	8	EXTREMELY LOW					
5.47	No/less quantity of KF charged due to weigh balance malfunction.	1. It will lead to quality issue. 2. It will lead to material loss.	6	2	12	LOW	1. The material is received from store as per issue slip. 2. The material is weighed before charging in the plant. 3. Spare weigh balance is available 4. Process under supervision. 5. Calibration of weigh scale is done (weekly, monthly, yearly). 6. QC sample check during the reaction. 7. Empty bag checked and counted after charging (two times).	4	2	8	EXTREMELY LOW					
5.48	No/less quantity of KF charged due to less quantity received from stores.	1. It will lead to quality issue. 2. It will lead to material loss.	6	2	12	LOW	1. The material is received from store as per issue slip. 2. The material is weighed before charging in the plant. 3. Empty bag checked and counted after charging (two times). 4. Process under supervision. 5. QC sample check during the reaction.	4	2	8	EXTREMELY LOW					
5.49	No/less quantity of KF charged due to left over material in bag	1. It will lead to quality issue. 2. It will lead to material loss.	6	2	12	LOW	1. The material is received from store as per issue slip. 2. The material is weighed before charging in the plant. 3. Empty bag checked and counted after charging (two times). 4. Process under supervision. 5. QC sample check during the reaction.	4	2	8	EXTREMELY LOW					
5.50	No/less quantity of KF charged due to spillage of material.	1. It will lead to quality issue. 2. It will lead to material loss. 3. It will lead to health and environment issues.	6	4	24	MODERATE	1. The material is received from store as per issue slip. 2. The material is weighed before charging in the plant. 3. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 4. Process under supervision. 5. QC sample check during the reaction. 6. Empty bag checked and counted after charging (two times). 7. RCC flooring provided 8. Secondary containment provided during charging.	4	4	16	LOW					

5.51	No/less quantity of solvent-S+moisture received in receiver RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C / RC-13104C due to human error.	1. It will lead to process delay and yield loss	6	4	24	MODERATE	1. TT provided on reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 and connected with HMI. 2. TI provided on reactor vapour column of reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126. 3. SG provided below condenser of reactor. 4. SG provided on reactor reflux line. 5. SG provided on inlet line of receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 6. LI provided on receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 7. Primary condenser provided with cooling water and secondary condenser provided with chilling water. 8. TI provided on receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 9. WG provided on receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 10. VG provided on reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 and its header.	4	4	16	LOW					
5.52	No/less quantity of solvent-S+moisture received in receiver RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C due to < 130°C temperature in reactor.	1. It will lead to process delay.	6	2	12	LOW	1. TT provided on reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 interlock with oil heating line and connected with HMI. 2. TI provided on reactor vapour column of reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126. 3. SG provided below condenser of reactor. 4. SG provided on reactor reflux line. 5. SG provided on inlet line of receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 6. LI provided on receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 7. Primary condenser provided with cooling water and secondary condenser provided with chilling water. 8. TI provided on receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 9. WG provided on receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 10. VG provided on reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 and its header. 11. PG on reactor jacket inlet and outlet line provided. 13. TI provided on jacket of reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 interlock with reactor temperature and connected with HMI.	4	2	8	EXTREMELY LOW					
5.53	No/less quantity of solvent-S+moisture received in receiver RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C due to oil heating failure.	1. It will lead to process delay.	6	2	12	LOW	1. TT provided on reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 interlock with oil heating line and connected with HMI. 2. TI provided on reactor vapour column of reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126. 3. SG provided below condenser of reactor. 4. SG provided on reactor reflux line. 5. SG provided on inlet line of receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 6. LI provided on receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 7. Primary condenser provided with cooling water and secondary condenser provided with chilling water. 8. TI provided on receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 9. WG provided on receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 10. VG provided on reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 and its header. 11. PG on reactor jacket inlet and outlet line provided. 12. TI provided on jacket of reactor R-13104 / R-13105 / R-14106 / R-14111 / R-13110 / R-13126 interlock with reactor temperature and connected with HMI. 13. Indication on HMI of oil heating system failure.	4	2	8	EXTREMELY LOW					
5.54	No/less quantity of solvent-S+moisture received in receiver RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C due to less vaccuum.	1. It will lead to process delay.	6	2	12	LOW	1. TT provided on reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 interlock with oil heating line and connected with HMI. 2. TI provided on reactor vapour column of reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126. 3. SG provided below condenser of reactor. 4. SG provided on reactor reflux line. 5. SG provided on inlet line of receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 6. LI provided on receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 7. Primary condenser provided with cooling water and secondary condenser provided with chilling water. 8. TI provided on receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 9. WG provided on receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 10. VG provided on reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 and its header. 11. PG on reactor jacket inlet and outlet line provided. 12. TI provided on jacket of reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 interlock with reactor temperature and connected with HMI. 13. Alarm provided for steam ejector vacuum pump failure.	4	2	8	EXTREMELY LOW					

5.55	No/less quantity of solvent-S+moisture received in receiver RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C due to cooling failure in primary condenser HE-13104A, HE-13110A, HE-13126A, HE-14105A, HE-14106A, HE-14111A.	1. Solvent vapour escape from vaccuum pump in environment will lead to environment issue. 2. It will lead to material loss.	6	4	24	MODERATE	1. TT provided on reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 interlock with oil heating line and connected with HMI. 2. TI provided on reactor vapour column of reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126. 3. SG provided below condenser of reactor. 4. SG provided on reactor reflux line. 5. SG provided on inlet line of receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 6. LI provided on receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 7. Secondary condenser HE-13104B, HE-13110B, HE-13126B, HE-14105B, HE-14106B, HE-14111B provided with chilling water. 8. TI provided on receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 9. WG provided on receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 10. VG provided on reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 and its header. 11. Vaccuum trap with cooling provided in vaccuum line. 12. PG on reactor jacket inlet and outlet line provided. 13. TI provided on jacket of reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 interlock with reactor temperature and connected with HMI. 14. Alarm provided for steam ejector vacuum pump failure. 15. PG provided in inlet and outlet line of primary condenser HE-13104A, HE-13110A, HE-13126A, HE-14105A, HE-14106A, HE-14111A in header of cooling line. 16. Secodary condenser HE-13104B, HE-13110B, HE-13126B,	4	4	16	LOW					
5.56	No/less quantity of solvent-S+moisture received in receiver RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C due to chilling failure in secondary condenser HE-13104B, HE-13110B, HE-13126B, HE-14105B, HE-14106B, HE-14111B.	1. Solvent vapour escape in environment from vaccuum pump will lead to environment issue. 2. It will lead to material loss.	6	4	24	MODERATE	1. TT provided on reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 interlock with oil heating line and connected with HMI. 2. TI provided on reactor vapour column of reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126. 3. SG provided below condenser of reactor. 4. SG provided on reactor reflux line. 5. SG provided on inlet line of receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 6. LI provided on receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 7. Primary condenser HE-13104A, HE-13110A, HE-13126A, HE-14105A, HE-14106A, HE-14111A provided with cooling water. 8. TI provided on receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 9. WG provided on receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 10. VG provided on reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 and its header. 11. Moisture check after distillation in QC. 12. PG on reactor jacket inlet and outlet line provided. 13. TI provided on jacket of reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 interlock with reactor temperature and connected with HMI. 14. Alarm provided for steam ejector vacuum pump failure. 15. PG provided in inlet and outlet line of secondary condenser HE-13104B, HE-13110B, HE-13126B, HE-14105B, HE-14106B, HE-14111B in header of chilling line. 16. Vaccuum trap with cooling provided in vaccuum line.	4	4	16	LOW					
5.57	No/less quantity of solvent-S+moisture received in receiver RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C due to TT malfunction of reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126.	1. It will lead to drop in temperature from the actual temperature may cause process delay.	6	2	12	LOW	1. Calibration of TT of reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 is done. 2. TI provided on reactor vapour column of reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126. 3. SG provided below condenser of reactor. 4. SG provided on reactor reflux line. 5. SG provided on inlet line of receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 6. LI provided on receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 7. Primary condenser provided with cooling water and secondary condenser provided with chilling water. 8. TI provided on receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 9. WG provided on receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 10. VG provided on reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 and its header. 11. TI provided on jacket of reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 interlock with reactor temperature and connected with HMI.	4	2	8	EXTREMELY LOW					
5.58	No/less quantity of catalyst 37 charged in reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 due to human error.	1. It will lead to process delay (due to slow reaction rate).	6	2	12	LOW	1. The material is received from store as per issue slip. 2. The material is weighed before charging. 3. Process under supervision. 4. QC sample check during the reaction.	4	2	8	EXTREMELY LOW					
5.59	No/less quantity of catalyst 37 charged in reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 due to weigh scale malfunction.	1. It will lead to process delay (due to slow reaction rate).	6	2	12	LOW	1. The material is received from store as per issue slip. 2. The material is weighed before charging. 3. Process under supervision. 4. QC sample check during the reaction. 5. Calibration of weigh scale is done (weekly, monthly, yearly). 6. Spare weigh scale is available.	4	2	8	EXTREMELY LOW					
5.60	No/less quantity of catalyst 37 charged in reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 due to spillage/ leakage.	1. It will lead to health and environmental issues. 2. It will lead to material loss.	6	4	24	MODERATE	1. The material is received from store as per issue slip. 2. The material is weighed before charging. 3. Process under supervision. 4. QC sample check during the reaction. 5. RCC flooring provided 6. Spill kit is available. 7. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 8. Material is charged with 10-litre buckets through funnel.	4	4	16	LOW					

5.61	No/less quantity of catalyst 37 charged in reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126due to less quantity received from stores.	1. It will lead to process delay (due to slow reaction rate).	6	2	12	LOW	1. The material is received from store as per issue slip. 2. The material is weighed before charging in the plant. 3. Empty bag checked and counted after charging (two times). 4. Process under supervision. 5. QC sample check during the reaction.	4	2	8	EXTREMELY LOW						
5.62	No/less quantity of 2,4 DCNB addition in reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 from receiver RC-13104B / RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B by gravity due to human error.	1.It may lead to process delay 2.It may lead to quality issue & yield loss	6	4	24	MODERATE	1.Process under supervision 2.LT provided on recivers RC-13104B / RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B with local display & as well as HMI display 3.SG provided in addition line 4.WG provided on reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 5.QC analysis check after reaction 6.Total quantity to be add in reactors from respective recievers	4	4	16	LOW						
5.63	No/less quantity of 2,4 DCNB addition in reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 from receiver RC-13104B / RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B by gravity due to valve malfunction.	1.It may lead to process delay 2.It may lead to quality issue & yield loss	6	4	24	MODERATE	1.Process under supervision 2.LT provided on recivers RC-13104B / RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B with local display & as well as HMI display 3.SG provided in addition line 4.WG provided on reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 5.QC analysis check after reaction 6.Total quantity to be add in reactors from respective recievers 7.Suitable MOC of valve SS316 is selected 8.Double valve provided in addition line	4	4	16	LOW						
5.64	No/less quantity of 2,4 DCNB addition in reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 from receiver RC-13104B / RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B by gravity due to LT malfunction of receiver.	1.It may lead to process delay 2.It may lead to quality issue & yield loss	6	4	24	MODERATE	1.Process under supervision 2.Calibration & PM of LT is done 3.SG provided in addition line 4.WG provided on reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 5.QC analysis check after reaction 6.Total quantity to be add in reactors from respective recievers	4	4	16	LOW						
5.65	No/less quantity of 2,4 DCNB addition in reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 from receiver RC-13104B / RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B by gravity due to addition line leakage.	1. It will lead to material loss. 2. It will lead to leakage causing Health & Environment issue. 3. Leakage will cause burn injuries. 4.It may lead to Fire in presence of external ignition source.	6	6	36	HIGH	1.Process under supervision 2.LT provided on recivers RC-13104B / RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B with local display & as well as HMI display 3.SG provided in addition line 4.WG provided on reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 5.QC analysis check after reaction 6.Total quantity to be add in reactors from respective recievers 7. Jacketed pipeline and valve provided. 8. Suitable MOC of packing (teflon). 9. Spill kit available. 10.Suitable MOC of SS316 pipe is selected 11. Earthing / bonding provided in transfer line & connected equipment 12. Fire protection system available 13. Flameproof fittings installed 14 RCC Flooring available 15. PTW system available	4	6	24	MODERATE						
5.66	No/less quantity of Solvent S +moisture transferred from receiver RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C/ RC-13104C to drum by gravity due to human error	1. It may lead to process delay	6	2	12	LOW	1. Process under supervision. 2.LI provided on receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 3. Weighing of drum during drum filling 4. Transfer all material from receiver to drums. 5. WG provided on receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 6. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 7. Fill drum quantity and weight check after filling.	4	2	8	EXTREMELY LOW						
5.67	No/less quantity of Solvent S +moisture transferred from receiver RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C / RC-13104C to drum by gravity due to transfer line valve malfunction	1. It may lead to process delay	6	2	12	LOW	1. Process under supervision. 2.LI provided on receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 3. Weighing of drum during drum filling 4. Transfer all material from receiver to drums. 5. WG provided on receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 6. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 7. Fill drum quantity and weight check after filling. 8. Suitable MOC of valve SS-316 is selected. 9. Spare valve is available.	4	2	8	EXTREMELY LOW						
5.68	No/less quantity of Solvent S +moisture transferred from receiver RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C /RC-13104C to drum by gravity due to transfer line leakage / spillage	1. It may lead to health and envionment issue 2. It may lead to material loss 3. It may lead to fire in case of external source of ignition	6	6	36	HIGH	1. Process under supervision. 2.LI provided on receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 3. Weighing of drum during drum filling 4. Transfer all material from receiver to drums. 5. WG provided on receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 6. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 7. Fill drum quantity and weight check after filling. 8. Suitable MOC of transfer line SS-316 is selected. 9. RCC flooring provided 10. Spill kit is available. 11. Suitable MOC of hose pipe SS-304 is selected. 12. Earthing / bonding provided in transfer line & connected equipment 13. Fire protection system available 14. Flameproof fittings installed 15. PTW system available	4	6	24	MODERATE						

		5.68	No/less quantity of Solvent S +moisture transferred from receiver RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C / RC-13104C to drum by gravity due to weigh balance malfunction	1. It may lead to process delay	6	2	12	LOW	1. Process under supervision. 2.LI provided on receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 3. Calibration of weigh scale is done (monthly, yearly). 4. Transfer all material from receiver to drums. 5. WG provided on receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 6. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 7. Fill drum quantity and weight check after filling. 8.Spare weigh scale is available. 9. Verification of weigh balance is done on a daily basis	4	2	8	EXTREMELY LOW					
More	Quantity	6.1	More Quantity of 2,4 DCNB transferred from storage tank TF-108 to receivers RC-13104B / RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B by pump TFP-108B due to human error	1. It will lead to process delay 2. It will lead to material loss 3. It will lead to over flow from receivers may cause heath and enviornment issue	6	4	24	MODERATE	1. LT provided with field display and HMI display on Receivers RC-13104B, RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B with pump TFP-108B interlock at High level with alert indication on HMI. 2. LI on storage tank TF-108 3. WG on receivers 4. Side glass on inlet transfer line 5. Process under supervision 6. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 7. Emergency push button available on floor near storage tank 8. TI provided on receivers RC-13104B, RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B 9. Spill kit available 10. RCC flooring available.	4	4	16	LOW					
		6.2	More Quantity of 2,4 DCNB transferred from storage tank TF-108 to receivers RC-13104B / RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B by pump TFP-108B due to LT malfunction	1. It will lead to process delay 2. It will lead to material loss 3. It will lead to over flow from receivers may cause heath and enviornment issue	6	4	24	MODERATE	1. Calibration and PM of LT done on Receivers RC-13104B, RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B. 2. LI on storage tank TF-108 3. WG on receivers 4. Side glass on inlet transfer line 5. Process under supervision 6. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 7. Emergency push button available on floor near storage tank 8. TI provided on receivers RC-13104B, RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B 9. Spill kit available 10. RCC flooring available. 11. Suitable selection of LT (non contact, PTFE coated with SS316).	4	4	16	LOW					
		6.3	More Quantity of 2,4 DCNB transferred from storage tank TF-108 to receivers RC-13104B / RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B by pump TFP-108B due to LI malfunction of storage tank TF-108	1. It will lead to process delay 2. It will lead to material loss 3. It will lead to over flow from receivers may cause heath and enviornment issue	6	4	24	MODERATE	1. LT provided with field display and HMI display on Receivers RC-13104B, RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B with pump TFP-108B interlock at High level with alert indication on HMI. 2. Visual Inspection of LI on storage tank TF-108 3. Side glass on inlet transfer line 4. Process under supervision 5. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 6. Spill kit available. 7. RCC flooring available 8. Two stage LI with protection guard provided. 9. Data sheet maintained to check storage tank level	4	4	16	LOW					
		6.4	More Quantity of SOL-S transferred from storage tank TF-107 to receivers RC-13104A, RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A twice by pump TFP-107 due to human error	1. It will lead to process delay 2. It will lead to material loss 3. It will lead to over flow from receivers may cause heath and enviornment issue 4, It may lead to fire due to external source of ignition	6	6	36	HIGH	1. LT provided with field display and HMI display on Receivers RC-13104A, RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A with pump TFP-107 interlock at High level with alert indication on HMI. 2. LI on storage tank TF-107 3. WG on receivers 4. Side glass on inlet transfer line 5. Process under supervision 6. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 7. Emergency push button available on floor near storage tank 8. TI provided on receivers RC-13104A, RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A 9. Spill kit available 10. RCC flooring available. 11. FLP fitting provided 12. Fire fighting system available 13. Double earthing / bondng provided for equipment and transfer line 14. PTW system available	4	6	24	MODERATE					
		6.5	More Quantity of SOL-S transferred from storage tank TF-107 to receivers RC-13104A, RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A by pump TFP-107 due to LT malfunction	1. It will lead to process delay 2. It will lead to material loss 3. It will lead to over flow from receivers may cause heath and enviornment issue 4, It may lead to fire due to external source of ignition	6	6	36	HIGH	1. Calibration and PM of LT done on Receivers RC-13104A, RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A. 2. LI on storage tank TF-107 3. WG on receivers 4. Side glass on inlet transfer line 5. Process under supervision 6. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 7. Emergency push button available on floor near storage tank 8. TI provided on receivers RC-13104A, RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A 9. Spill kit available 10. RCC flooring available. 11. FLP fitting provided 12. Fire fighting system available 13. Double earthing / bondng provided for equipment and transfer line 14. PTW system available 15. Suitable selection of LT (non contact, PTFE coated with SS316).	4	6	24	MODERATE					

6.6	More Quantity of SOL-S transferred from storage tank TF-107 to receivers RC-13104A, RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A by pump TFP-107 due to LI malfunction of storage tank TF-107	1. It will lead to process delay 2. It will lead to material loss 3. It will lead to over flow from receivers may cause heath and enviornment issue 4, It may lead to fire due to external source of ignition	6	6	36	HIGH	1. LT provided with field display and HMI display on Receivers RC-13104A, RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A with pump TFP-107 interlock at High level with alert indication on HMI. 2. Visual Inspection of LI on storage tank TF-107 3. Side glass on inlet transfer line 4. Process under supervision 5. Spill kit available 6. RCC flooring available. 7. FLP fitting provided 8. Fire fighting system available 9. Double earthing / bondng provided for equipment and transfer line 10. PTW system available 11. Two stage LI with protection guard provided. 12. Data sheet maintained to check storage tank level 13. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron)	4	6	24	MODERATE						
6.7	More Quantity of recovered solvent S transferred from storage tank ST-11118 to reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 by pump P-11118 due to human error	1. It will lead to process delay	6	2	12	LOW	1. WG provided on reactors 2. LI on storage tank ST-11118 3. QC analysis of running samples 5-6 times. 4. Side glass on inlet transfer line 5. Process under supervision 6. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 7. Emergency push button available on floor 8. TI provided on reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126	4	2	8	EXTREMELY LOW						
6.8	More Quantity of recovered solvent S transferred from storage tank ST-11118 to reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 by pump P-11118 due to LI malfunction of storage tank ST-11118.	1. It will lead to process delay	6	2	12	LOW	1. WG provided on reactors 2. Visual Inspection of LI on storage tank ST-11118 3. Side glass on inlet transfer line 4. Process under supervision 5. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 6. TI provided on storage tank ST-11118 7. Side Glass on pump P-11118 discharge line. 8. Emergency push button available on floor	4	2	8	EXTREMELY LOW						
6.9	More Quantity of fresh SOL-S transferred from receivers RC-13104A, RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A to reactor R-13104, R-14105 / R-14106 / R-14111 / R-13110 / R-13126 twice by gravity due to human error	1. No consequences due to total quantity received in respective reactors from respective receivers					1. LT provided with field display and HMI display on Receivers RC-13104A, RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A. 2. WG provided on reactor 3. Emergency Stop button for pump provided in storage tank farm area. 4. Sight glass on transfer line from receiver to reactor. 5. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 6. Pump tripping indication on HMI. 7. TI provided on receivers RC-13104A, RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A 8. TI on reactor R-13104, R-14105 / R-14106 / R-14111 / R-13110 / R-13126										
6.10	More Quantity of fresh SOL-S transferred from receivers RC-13104A, RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A to reactor R-13104, R-14105 / R-14106 / R-14111 / R-13110 / R-13126 twice by gravity due to transfer Line pass / open	1. No consequences due to total quantity received in respective reactors from respective receivers					1. LT provided with field display and HMI display on Receivers RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A. 2. Sight glass on transfer line from receiver to reactor. 3.WG provided on reactors 4. Process under supervision 5. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 6. TI provided on receivers RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A 7. TI on reactor R-13104, R-14105 / R-14106 / R-14111 / R-13110 / R-13126 8. Suitable MOC of pipelines and valve (SS316). 9. Jacketed pipeline and valve with insulation for steam heating. 10. Suitable MOC of packing (teflon). 11. Spill kit available 12. Spare valve is available										
6.11	More Quantity of fresh SOL-S transferred from receivers RC-13104A, RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A to reactor R-13104, R-14105 / R-14106 / R-14111 / R-13110 / R-13126 twice by gravity due to receiver LT malfunction	1. No consequences due to total quantity received in respective reactors from respective receivers					1. Calibration and PM of LT done on Receivers RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A. 2. Sight glass on transfer line from receiver to reactor. 3. View glass on reactor. 4. Process under supervision 5. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 6. Suitable selection of LT (non contact, PTFE coated with SS-316). 7. Glass LI provided on storage tank TF-107 8. To take equavalent quantity in receiver RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A. as per the batch size in reactor R-13104, R-14105 / R-14106 / R-14111 / R-13110 / R-13126										
6.12	More quantity of K2CO3 charged due to human error.	1. It may lead to RM loss	6	2	12	LOW	1. The material is received from store as per issue slip. 2. The material is weighed before charging 3. The neutral pH is checked during and after charging. 4. Process under supervision.	4	2	8	EXTREMELY LOW						
6.13	More quantity of K2CO3 charged due to weigh balance malfunction.	1. It may lead to RM loss	6	2	12	LOW	1. The material is received from store as per issue slip. 2. The material is weighed before charging. 3. The neutral pH is checked during and after charging. 4. Process under supervision. 5. Calibration of weigh scale is done (weekly, monthly, yearly). 6. Spare weigh balance is available.	4	2	8	EXTREMELY LOW						
6.14	More quantity of K2CO3 charged due to more quantity received from stores.	1. It may lead to RM loss	6	2	12	LOW	1. The material is received from store as per issue slip. 2. The material is weighed before charging 3. Empty bag checked and counted after charging (two times). 4. Process under supervision. 5. QC sample check during the reaction.	4	2	8	EXTREMELY LOW						

6.15	More quantity of KF charged due to human error.	1. It will lead to process delay and material loss	6	2	12	LOW	1. The material is received from store as per issue slip. 2. The material is weighed before charging 3. Empty bag checked and counted after charging (two times). 4. Process under supervision. 5. QC sample check during the reaction.	4	2	8	EXTREMELY LOW						
6.16	More quantity of KF charged due to weigh balance malfunction.	1. It will lead to process delay and material loss	6	2	12	LOW	1. The material is received from store as per issue slip. 2. The material is weighed before charging 3. Spare weigh balance is available 4. Process under supervision. 5. Calibration of weigh scale is done (weekly, monthly, yearly). 6. QC sample check during the reaction. 7. Empty bag checked and counted after charging (two times).	4	2	8	EXTREMELY LOW						
6.17	More quantity of KF charged due to more quantity received from stores.	1. It will lead to process delay and material loss	6	2	12	LOW	1. The material is received from store as per issue slip. 2. The material is weighed before charging 3. Empty bag checked and counted after charging (two times). 4. Process under supervision. 5. QC sample check during the reaction.	4	2	8	EXTREMELY LOW						
6.18	More quantity of solvent-S+moisture received in receiver RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C / RC-13104C due to human error.	1. It may lead to process delay	6	2	12	LOW	1. TT provided on reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 and connected with HMI. 2. TI provided on reactor vapour column of reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126. 3. SG provided below condenser of reactor. 4. SG provided on reactor reflux line. 5. SG provided on inlet line of receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 6. LI provided on receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 7. Primary condenser provided with cooling water and secondary condenser provided with chilling water. 8. TI provided on receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 9. WG provided on receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 10. VG provided on reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 and its header.	4	2	8	EXTREMELY LOW						
6.19	More quantity of solvent-S+moisture received in receiver RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C due to > 135°C temperature in reactor.	1. It will lead to process delay.	6	2	12	LOW	1. TT provided on reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 interlock with oil heating line and connected with HMI. 2. TI provided on reactor vapour column of reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126. 3. SG provided below condenser of reactor. 4. SG provided on reactor reflux line. 5. SG provided on inlet line of receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 6. LI provided on receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 7. Primary condenser provided with cooling water and secondary condenser provided with chilling water. 8. TI provided on receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 9. WG provided on receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 10. VG provided on reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 and its header. 11. PG on reactor jacket inlet and outlet line provided. 13. TI provided on jacket of reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 interlock with reactor temperature and connected with HMI.	4	2	8	EXTREMELY LOW						
6.20	More quantity of solvent-S+moisture received in receiver RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C due to TT malfunction of reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126.	1. It may lead to process delay	6	2	12	LOW	1. Calibration of TT of reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 is done. 2. TI provided on reactor vapour column of reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126. 3. SG provided below condenser of reactor. 4. SG provided on reactor reflux line. 5. SG provided on inlet line of receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 6. LI provided on receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 7. Primary condenser provided with cooling water and secondary condenser provided with chilling water. 8. TI provided on receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 9. WG provided on receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 10. VG provided on reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 and its header. 11. TI provided on jacket of reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 interlock with reactor temperature and connected with HMI.	4	2	8	EXTREMELY LOW						

6.21	More quantity of solvent-S+moisture received in receiver RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C due to LI malfunction of receivers RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C	1. It may lead to process delay	6	2	12	LOW	1. TT provided on reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 2. TI provided on reactor vapour column of reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126. 3. SG provided below condenser of reactor. 4. SG provided on reactor reflux line. 5. SG provided on inlet line of receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 6. Visual check and inspection of LI 7. Primary condenser provided with cooling water and secondary condenser provided with chilling water. 8. TI provided on receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 9. WG provided on receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 10. VG provided on reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 and its header. 11. TI provided on jacket of reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 interlock with reactor temperature and connected with HMI.	4	2	8	EXTREMELY LOW					
6.22	More quantity of catalyst 37 charged in reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 due to human error.	1. It may cause fast reaction	6	2	12	LOW	1. The material is received from store as per issue slip. 2. The material is weighed before charging in calibrated bucket in the plant. 3. Process under supervision. 4. QC sample check during the reaction. 5 TT provided on reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 and connected with HMI. 6. Process under vaccum 7. VG provided on reactor 8. Process is endothermic so temperature is down during fast reaction	4	2	8	EXTREMELY LOW					
6.23	More quantity of catalyst 37 charged in reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 due to weigh scale malfunction.	1. It may cause fast reaction	6	2	12	LOW	1. The material is received from store as per issue slip. 2. The material is weighed before charging in calibrated bucket in the plant. 3. Process under supervision. 4. QC sample check during the reaction. 5. Calibration of weigh scale is done (weekly, monthly, yearly). 6. PMS of weigh scale is done. 7. Spare weigh scale is available. 8 TT provided on reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 and connected with HMI. 9. Process under vaccum 10. VG provided on reactor 11. Process is endothermic so temperature is down during fast reaction	4	2	8	EXTREMELY LOW					
6.24	More quantity of catalyst 37 charged in reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 due to more quantity received from stores.	1. It may cause fast reaction	6	2	12	LOW	1. The material is received from store as per issue slip. 2. The material is weighed before charging in the plant. 3. Empty bag checked and counted after charging (two times). 4. Process under supervision. 5. QC sample check during the reaction.	4	2	8	EXTREMELY LOW					
6.25	More quantity of 2,4 DCNB addition in reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 from receiver RC-13104B / RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B by gravity due to human error.	1.It may lead to process delay 2.It may lead to quality issue	6	2	12	LOW	1.Process under supervision 2.LT provided on recivers RC-13104B / RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B with local display & as well as HMI display 3.SG provided in addition line 4.WG provided on reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 5.QC analysis check after reaction 6.Total quantity to be add in reactors from respective recievers	4	2	8	EXTREMELY LOW					
6.26	More quantity of 2,4 DCNB addition in reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 from receiver RC-13104B / RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B by gravity due to valve malfunction.	1.It may lead to process delay 2.It may lead to quality issue	6	2	12	LOW	1.Process under supervision 2.LT provided on recivers RC-13104B / RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B with local display & as well as HMI display 3.SG provided in addition line 4.WG provided on reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 5.QC analysis check after reaction 6.Total quantity to be add in reactors from respective recievers 7.Suitable MOC of valve SS316 is selected 8.Double valve provided in addition line	4	2	8	EXTREMELY LOW					
6.27	More quantity of 2,4 DCNB addition in reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 from receiver RC-13104B / RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B by gravity due to LT malfunction of receiver.	1.It may lead to process delay 2.It may lead to quality issue	6	2	12	LOW	1.Process under supervision 2.Calibration & PM of LT is done 3.SG provided in addition line 4.WG provided on reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 5.QC analysis check after reaction 6.Total quantity to be add in reactors from respective recievers	4	2	8	EXTREMELY LOW					

		6.28	More quantity of Solvent S +moisture transferred from receiver RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C/ RC-13104C to drum by gravity due to human error	1. It may lead to overflow of drum may cause health and enviornment issue. 2. It may lead to fire due to external source of ignition 3. It may lead to material loss	6	6	36	HIGH	1. Process under supervision. 2.LI provided on receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 3. Weighing of drum during drum filling 4. Transfer all material from receiver to drums. 5. WG provided on receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 6. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 7. Fill drum quantity and weight check after filling. 8. RCC flooring available 9. Fire fighting system available 10.PTW system available 11. FLP fittings provided 12. Crocodile clamp provided for drum 13. Earthing provided on equipment	4	6	24	MODERATE					
		6.29	More quantity of Solvent S +moisture transferred from receiver RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C / RC-13104C to drum by gravity due to transfer line valve malfunction	1. It may lead to overflow of drum may cause health and enviornment issue. 2. It may lead to fire due to external source of ignition 3. It may lead to material loss	6	6	36	HIGH	1. Process under supervision. 2.LI provided on receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 3. Weighing of drum during drum filling 4. Transfer all material from receiver to drums. 5. WG provided on receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 6. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 7. Fill drum quantity and weight check after filling. 8. Suitable MOC of valve SS-316 is selected. 9. Spare valve is available. 10. RCC flooring available 11. Fire fighting system available 12.PTW system available 13. FLP fittings provided 14. Crocodile clamp provided for drum 15. Earthing provided on equipment	4	6	24	MODERATE					
		6.32	More quantity of Solvent S +moisture transferred from receiver RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C / RC-13104C to drum by gravity due to weigh balance malfunction	1. It may lead to overflow of drum may cause health and enviornment issue. 2. It may lead to fire due to external source of ignition 3. It may lead to material loss	6	6	36	HIGH	1. Process under supervision. 2.LI provided on receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 3. Calibration of weigh scale is done (monthly, yearly). 4. Transfer all material from receiver to drums. 5. WG provided on receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 6. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 7. Fill drum quantity and weight check after filling. 8.Spare weigh scale is available. 9. Verification of weigh balance is done on a daily basis 10. RCC flooring available 11. Fire fighting system available 12.PTW system available 13. FLP fittings provided 14. Crocodile clamp provided for drum 15. Earthing provided on equipment	4	6	24	MODERATE					
NO/Less	Pressure	7.1	No / Less nitrogen pressure during vaccum release from reactor due to human error	1. It may lead to process delay	6	2	12	LOW	1. Process under supervision 2. PG provided on nitrogen supply header 3. VG provided on reactor 4. PG provided on plant floor main header 5. PG provided on reactor	4	2	8	EXTREMELY LOW					
		7.2	No / Less nitrogen pressure during vaccum release from reactor due to nitrogen line valve malfunction	1.It may lead to process delay	6	2	12	LOW	1. Process under supervision 2. PG provided on nitrogen supply header 3. VG provided on reactor 4. PG provided on plant floor main header 5. Suitable MOC of valve MS is selected 6. Spare valve is available. 7. PG provided on reactor	4	2	8	EXTREMELY LOW					
		7.3	No / Less nitrogen pressure during vaccum release from reactor due to nitrogen supply failure	1.It may lead to process delay	6	2	12	LOW	1. Process under supervision 2. PG provided on nitrogen supply header 3. VG provided on reactor 4. PG provided on plant floor main header 5.PM of nitrogen plant is done regularly 6. Stand by nitrogen supply provision is available 7. PT provided on nitrogen plant receiver 8. PG provided on nitrogen plant receiver 9. PG provided on reactor	4	2	8	EXTREMELY LOW					
		7.4	No / Less nitrogen pressure during vaccum release from reactor due to PG malfunction of reactor	1. It may lead to process delay	6	2	12	LOW	1. Process under supervision 2. PG provided on nitrogen supply header 3. VG provided on reactor 4. PG provided on plant floor main header 5. Calibration of PG is done regularly 6. Spare PG is available	4	2	8	EXTREMELY LOW					
		8.1	More nitrogen pressure > 1 kg/cm2during vaccum release from reactor due to human error	1. It may lead to process delay and pressurisation in reactor	6	4	24	MODERATE	1. Process under supervision 2. PG provided on nitrogen supply header 3. VG provided on reactor 4. PG provided on plant floor main header 5. 2 no's valve provided on nitrogen supply line (1 no for particular floor and 1 no on reactor or receiver). 6. Maximum nitrogen supply pressure is 5kg /cm2 in nitrogen line. 7. PRS station provided with set pressure at 5 kg/cm2. 8. PG provided on inlet / outlet of PRS station 9. PG provided on reactor	4	4	16	LOW	1. Regulator to be provided on nitrogen line to control pressure < 1 kg/cm2 2. 2 no;s valve to be provided on nitrogen supply line of reactor	2	4	8	

More	Pressure	8.2	More nitrogen pressure > 1 kg/cm2during vaccum release from reactor due to nitrogen line valve malfunction	1. It may lead to process delay and pressurisation in reactor	6	6	36	HIGH	1. Process under supervision 2. PG provided on nitrogen supply header 3. VG provided on reactor 4. PG provided on plant floor main header 5. 2 no's valve provided on nitrogen supply line (1 no for particular floor and 1 no on reactor or receiver). 6. Maximum nitrogen supply pressure is 5kg /cm2 in nitrogen line. 7. PRS station provided with set pressure at 5 kg/cm2. 8. PG provided on inlet / outlet of PRS station 9. Suitable MOC of valve MS is selected 10. Spare valve is available. 11. PG provided on reactor	4	4	16	LOW					
		8.3	More nitrogen pressure > 1 kg/cm2during vaccum release from reactor due to PG malfunction	1. It may lead to process delay and pressurisation in reactor	6	4	24	MODERATE	1. Process under supervision 2. PG provided on nitrogen supply header 3. VG provided on reactor 4. PG provided on plant floor main header 5. 2 no's valve provided on nitrogen supply line (1 no for particular floor and 1 no on reactor or receiver). 6. Maximum nitrogen supply pressure is 5kg /cm2 in nitrogen line. 7. PRS station provided with set pressure at 5 kg/cm2. 8. PG provided on inlet / outlet of PRS station 9. Calibration of PG is done regularly. 10 Spare PG is available	4	4	16	LOW	1. Regulator t be provided on nitrogen line to control pressure < 1 kg/cm2 2. 2 no;s valve to be provided on nitrogen supply line of reactor	4	4	16	
Back	Pressure	9.1	NA																
Less	Temperature	10.1	Less temperature < 35°C during 2,4DCNB transfer from storage tank TF-108 to receiver RC-13104B / RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B by pump TFP-108B due to human error	1. It will lead to process delay.	6	2	12	LOW	1. TI provided on storage tank TF-108 2. WG provided onreceiver RC-13104B / RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B 3. SG provided on inlet line ofreceiver RC-13104B / RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B. 4. TI provided on receiver RC-13104B / RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B 5. LT provided onreceiver RC-13104B / RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B	4	2	8	EXTREMELY LOW					
		10.2	Less temperature < 35°C during 2,4DCNB transfer from storage tank TF-108 to receiver RC-13104B / RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B by pump TFP-108B due to steam heating failure.	1. It will lead to process delay.	6	2	12	LOW	1. TI provided on storage tank TF-108 2. WG provided on receiver RC-13104B / RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B 3. SG provided on inlet line ofreceiver RC-13104B / RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B. 4. TI provided on receiver RC-13104B / RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B 5. LT provided onreceiver RC-13104B / RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B 6. Stand by steam supply available 7. PG provided on steam supply header	4	2	8	EXTREMELY LOW					
		10.3	Less temperature < 35°C during 2,4DCNB transfer from storage tank TF-108 to receiver RC-13104B / RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B by pump TFP-108B due to TI malfunction of receiver RC-13104B / RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B	1. It will lead to process delay.	6	2	12	LOW	1. Calibration of TI of receiver RC-13104B / RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B is done. 2. TI provided on storage tank TF-108 3. WG provided on receiver RC-13104B / RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B 4. SG provided on inlet line ofreceiver RC-13104B / RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B. 5. Spare TI is available 6. LT provided onreceiver RC-13104B / RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B	4	2	8	EXTREMELY LOW					
		10.4	Less temperature < 35°C during Solvent S transfer from storage tank TF-107 to receiver RC-13104A / RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A by pump TFP-107 due to human error	1. It will lead to process delay.	6	2	12	LOW	1. TI provided on storage tank TF-107 2. WG provided on receiver RC-13104A / RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A 3. SG provided on inlet line of receiver RC-13104A / RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A 4. TI provided onreceiver RC-13104A / RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A 5. LT provided on receiver RC-13104A / RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A	4	2	8	EXTREMELY LOW					
		10.5	Less temperature < 35°C during Solvent S transfer from storage tank TF-107 to receiver RC-13104A / RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A by pump TFP-107 due to steam heating failure.	1. It will lead to process delay.	6	2	12	LOW	1. TI provided on storage tank TF-107 2. WG provided onreceiver RC-13104A / RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A 3. SG provided on inlet line of receiver RC-13104A / RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A. 4. TI provided onreceiver RC-13104A / RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A 5. LT provided onreceiver RC-13104A / RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A 6. Stand by steam supply available 7. PG provided on steam supply header	4	2	8	EXTREMELY LOW					
		10.6	Less temperature < 35°Cduring Solvent S transfer from storage tank TF-107 to receiver RC-13104A / RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A by pump TFP-107 due to TI malfunction of receiver RC-13104A / RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A	1. It will lead to process delay.	6	2	12	LOW	1. Calibration of TI of receiver RC-13104A / RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A is done. 2. TI provided on storage tank TF-107 3. WG provided onreceiver RC-13104A / RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A 4. SG provided on inlet line ofreceiver RC-13104A / RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A 5. Spare TI is available 6. LT provided on receiver RC-13104A / RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A	4	2	8	EXTREMELY LOW					

10.1	No/less temperature < 130°C in reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126. during solvent-S+moisture removed to receiver RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C due to human error	1. It will lead to process delay.	6	2	12	LOW	1. TT provided on reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 interlock with oil heating line and connected with HMI. 2. TI provided on reactor vapour column of reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126. 3. SG provided below condenser of reactor. 4. SG provided on reactor reflux line. 5. SG provided on inlet line of receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 6. LI provided on receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 7. Primary condenser provided with cooling water and secondary condenser provided with chilling water. 8. TI provided on receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 9. WG provided on receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 10. VG provided on reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 and its header. 11. Moisture check after distillation in QC. 12. PG on reactor jacket inlet and outlet line provided. 13. TI provided on jacket of reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 interlock with reactor temperature and connected with HMI.	4	2	8	EXTREMELY LOW					
10.2	No/less temperature < 130°C in reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126. during solvent-S+moisture removed to receiver RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C due to oil heating failure.	1. It will lead to process delay.	6	2	12	LOW	1. TT provided on reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 interlock with oil heating line and connected with HMI. 2. TI provided on reactor vapour column of reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126. 3. SG provided below condenser of reactor. 4. SG provided on reactor reflux line. 5. SG provided on inlet line of receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 6. LI provided on receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 7. Primary condenser provided with cooling water and secondary condenser provided with chilling water. 8. TI provided on receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 9. WG provided on receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 10. VG provided on reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 and its header. 11. Moisture check after distillation in QC. 12. PG on reactor jacket inlet and outlet line provided. 13. TI provided on jacket of reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 interlock with reactor temperature and connected with HMI. 14. Indication on HMI of oil heating system failure.	4	2	8	EXTREMELY LOW					
10.3	No/less temperature < 130°C in reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126. during solvent-S+moisture removed to receiver RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C due to TT malfunction of reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126.	1. It will lead to process delay.	6	2	12	LOW	1. Calibration of TT of reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 is done. 2. TI provided on reactor vapour column of reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126. 3. SG provided below condenser of reactor. 4. SG provided on reactor reflux line. 5. SG provided on inlet line of receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 6. LI provided on receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 7. Primary condenser provided with cooling water and secondary condenser provided with chilling water. 8. TI provided on receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 9. WG provided on receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 10. VG provided on reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 and its header. 11. TI provided on jacket of reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 interlock with reactor temperature and connected with HMI.	4	2	8	EXTREMELY LOW					

10.4	No/less temperature < 130^{O}C in reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126. during solvent-S+moisture removed to receiver RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C due to oil heating supply line control valve malfunction	1. It will lead to process delay.	6	2	12	LOW	1. TT provided on reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 interlock with oil heating line and connected with HMI. 2. TI provided on reactor vapour column of reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126. 3. SG provided below condenser of reactor. 4. SG provided on reactor reflux line. 5. SG provided on inlet line of receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 6. LI provided on receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 7. Primary condenser provided with cooling water and secondary condenser provided with chilling water. 8. TI provided on receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 9. WG provided on receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 10. VG provided on reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 and its header. 11. Moisture check after distillation in QC. 12. PG on reactor jacket inlet and outlet line provided. 13. TI provided on jacket of reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 interlock with reactor temperature and connected with HMI. 14. PM of control valve is done quarterly 15. Spare control valve is available. 16. 2 no's manual valve provided before and after control valve	4	2	8	EXTREMELY LOW					
10.5	No less temperature < 140^{O}C during addition of 2,4 DCNB (2.5 Ton) from respective receivers to respective reactors due to human error	1. It will lead to process delay.	6	2	12	LOW	1. TT provided on reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 interlock with oil heating line and connected with HMI. 2. TI provided on reactor vapour column of reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126. 3. SG provided below condenser of reactor. 4. SG provided on reactor reflux line. 5. SG provided on addition line of receiver RC-13104B / RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B 6. LI provided on receiver RC-13104B / RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B. 7. Primary condenser provided with cooling water and secondary condenser provided with chilling water. 8. TI provided on receiver RC-13104B / RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B. 9. WG provided on receiver RC-13104B / RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B 10. VG provided on reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 and its header. 11. Moisture check after distillation in QC. 12. PG on reactor jacket inlet and outlet line provided. 13. TI provided on jacket of reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 interlock with reactor temperature and connected with HMI.	4	2	8	EXTREMELY LOW					
10.6	No less temperature < 140^{O}C during addition of 2,4 DCNB (2.5 Ton) from respective receivers to respective reactors due to oil heating failure	1. It will lead to process delay.	6	2	12	LOW	1. TT provided on reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 interlock with oil heating line and connected with HMI. 2. TI provided on reactor vapour column of reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126. 3. SG provided below condenser of reactor. 4. SG provided on reactor reflux line. 5. SG provided on addition line of receiver RC-13104B / RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B. 6. LI provided on receiver RC-13104B / RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B 7. Primary condenser provided with cooling water and secondary condenser provided with chilling water. 8. TI provided on receiver RC-13104B / RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B. 9. WG provided on receiver RC-13104B / RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B 10. VG provided on reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 and its header. 11. Moisture check after distillation in QC. 12. PG on reactor jacket inlet and outlet line provided. 13. TI provided on jacket of reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 interlock with reactor temperature and connected with HMI. 14. Indication on HMI of oil heating system failure.	4	2	8	EXTREMELY LOW					

10.7	No less temperature < 140^{o}C during addition of 2,4 DCNB (2.5 Ton) from respective receivers to respective reactors due to TT malfunction	1. It will lead to process delay.	6	2	12	LOW	1. Calibration of TT of reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 is done. 2. TI provided on reactor vapour column of reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126. 3. SG provided below condenser of reactor. 4. SG provided on reactor reflux line. 5. SG provided on addition line of receiver RC-13104B / RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B. 6. LI provided on receiver RC-13104B / RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B 7. Primary condenser provided with cooling water and secondary condenser provided with chilling water. 8. TI provided on receiver RC-13104B / RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B 9. WG provided on receiver RC-13104B / RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B 10. VG provided on reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 and its header. 11. TI provided on jacket of reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 interlock with reactor temperature and connected with HMI.	4	2	8	EXTREMELY LOW						
10.8	No less temperature < 140^{o}C during addition of 2,4 DCNB (2.5 Ton) from respective receivers to respective reactors due to oil heating supply line control valve malfunction	1. It will lead to process delay.	6	2	12	LOW	1. TT provided on reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 interlock with oil heating line and connected with HMI. 2. TI provided on reactor vapour column of reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126. 3. SG provided below condenser of reactor. 4. SG provided on reactor reflux line. 5. SG provided on addition line of receiver RC-13104B / RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B 6. LI provided on receiver RC-13104B / RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B. 7. Primary condenser provided with cooling water and secondary condenser provided with chilling water. 8. TI provided on receiver RC-13104B / RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B 9. WG provided on receiver receiver RC-13104B / RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B 10. VG provided on reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 and its header. 11. Moisture check after distillation in QC. 12. PG on reactor jacket inlet and outlet line provided. 13. TI provided on jacket of reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 interlock with reactor temperature and connected with HMI. 14. PM of control valve is done quarterly 15. Spare control valve is available. 16. 2 no's manual valve provided before and after control valve	4	2	8	EXTREMELY LOW						
10.9	No less temperature < 140^{o}C during addition of 2,4 DCNB (2.5 Ton) from respective receivers to respective reactors due to addition line valve malfunction	1. It will lead to process delay.	6	2	12	LOW	1. TT provided on reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 interlock with oil heating line and connected with HMI. 2. TI provided on reactor vapour column of reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126. 3. SG provided below condenser of reactor. 4. SG provided on reactor reflux line. 5. SG provided on addition line of receiver RC-13104B / RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B 6. LI provided on receiver RC-13104B / RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B. 7. Primary condenser provided with cooling water and secondary condenser provided with chilling water. 8. TI provided on receiver RC-13104B / RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B. 9. WG provided on receiver RC-13104B / RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B 10. VG provided on reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 and its header. 11. Moisture check after distillation in QC. 12. PG on reactor jacket inlet and outlet line provided. 13. TI provided on jacket of reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 interlock with reactor temperature and connected with HMI. 14. Suitabe MOC of valve is selected. 15. Spare valve is available	4	2	8	EXTREMELY LOW						
10.10	No/less temperature < 180^{o}C in reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 during reaction due to human error	1. It will lead to process delay.	6	2	12	LOW	1. TT provided on reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 interlock with oil heating line and connected with HMI. 2. TI provided on reactor vapour column of reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126. 3. SG provided below condenser of reactor. 4. SG provided on reactor reflux line. 5. Primary condenser provided with cooling water and secondary condenser provided with chilling water. 6. VG provided on reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 and its header. 7. QC analysis done during reaction 8. PG on reactor jacket inlet and outlet line provided. 9. TI provided on jacket of reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 interlock with reactor temperature and connected with HMI.	4	2	8	EXTREMELY LOW						

		10.11	No/less temperature < 180°C in reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 during reaction due to oil heating failure.	1. It will lead to process delay.	6	2	12	LOW	1. TT provided on reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 interlock with oil heating line and connected with HMI. 2. TI provided on reactor vapour column of reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126. 3. SG provided below condenser of reactor. 4. SG provided on reactor reflux line. 5. Primary condenser provided with cooling water and secondary condenser provided with chilling water. 6. VG provided on reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 and its header. 7. QC analysis done during reaction 8. PG on reactor jacket inlet and outlet line provided. 9. TI provided on jacket of reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 interlock with reactor temperature and connected with HMI. 10. Indication on HMI of oil heating system failure.	4	2	8	EXTREMELY LOW					
		10.12	No/less temperature < 180°C in reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 during reaction due to TT malfunction of reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126.	1. It will lead to process delay.	6	2	12	LOW	1. Calibration of TT of reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 is done. 2. TI provided on reactor vapour column of reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126. 3. SG provided below condenser of reactor. 4. SG provided on reactor reflux line. 5. Primary condenser provided with cooling water and secondary condenser provided with chilling water. 6. VG provided on reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 and its header. 7. TI provided on jacket of reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 interlock with reactor temperature and connected with HMI.	4	2	8	EXTREMELY LOW					
		10.13	No/less temperature < 180°C in reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 during reaction due to oil heating supply line control valve malfunction	1. It will lead to process delay.	6	2	12	LOW	1. TT provided on reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 interlock with oil heating line and connected with HMI. 2. TI provided on reactor vapour column of reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126. 3. SG provided below condenser of reactor. 4. SG provided on reactor reflux line. 5. Primary condenser provided with cooling water and secondary condenser provided with chilling water. 6. VG provided on reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 and its header. 7. QC check done during reaction 8. PG on reactor jacket inlet and outlet line provided. 9. TI provided on jacket of reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 interlock with reactor temperature and connected with HMI. 10. PM of control valve is done quarterly 11. Spare control valve is available. 12. 2 no's manual valve provided before and after control valve	4	2	8	EXTREMELY LOW					
		11.1	More temperature > 40°C during 2,4DCNB transfer from storage tank TF-108 to receiver RC-13104B / RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B by pump TFP-108B due to human error	1. No consequences					1. TI provided on storage tank TF-108 2. WG provided onreceiver RC-13104B / RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B 3. SG provided on inlet line ofreceiver RC-13104B / RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B. 4. TI provided on receiver RC-13104B / RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B 5. LT provided onreceiver RC-13104B / RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B									
		11.2	More temperature > 40°C during 2,4DCNB transfer from storage tank TF-108 to receiver RC-13104B / RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B by pump TFP-108B due to TI malfunction of receiver RC-13104B / RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B	1. No consequences					1. Calibration of TI of receiver RC-13104B / RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B is done. 2. TI provided on storage tank TF-108 3. WG provided on receiver RC-13104B / RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B 4. SG provided on inlet line ofreceiver RC-13104B / RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B. 5. Spare TI is available 6. LT provided onreceiver RC-13104B / RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B									
		11.3	More temperature > 40°C during Solvent S transfer from storage tank TF-107 to receiver RC-13104A / RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A by pump TFP-107 due to human error	1. No consequences					1. TI provided on storage tank TF-107 2. WG provided on receiver RC-13104A / RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A 3. SG provided on inlet line of receiver RC-13104A / RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A 4. TI provided onreceiver RC-13104A / RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A 5. LT provided on receiver RC-13104A / RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A									
		11.4	More temperature > 40°Cduring Solvent S transfer from storage tank TF-107 to receiver RC-13104A / RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A by pump TFP-107 due to TI malfunction of receiver RC-13104A / RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A	1. No consequences					1. Calibration of TI of receiver RC-13104A / RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A is done. 2. TI provided on storage tank TF-107 3. WG provided onreceiver RC-13104A / RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A 4. SG provided on inlet line ofreceiver RC-13104A / RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A 5. Spare TI is available 6. LT provided on receiver RC-13104A / RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A									

11.5	More temperature > 135°C in reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126. during solvent-S+moisture removed to receiver RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C due to human error	1. It will lead to process delay	6	2	12	LOW	1. TT provided on reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 interlock with oil heating line and connected with HMI. 2. TI provided on reactor vapour column of reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126. 3. SG provided below condenser of reactor. 4. SG provided on reactor reflux line. 5. SG provided on inlet line of receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 6. LI provided on receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 7. Primary condenser provided with cooling water and secondary condenser provided with chilling water. 8. TI provided on receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 9. WG provided on receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 10. VG provided on reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 and its header. 11. QC analysis done during reaction. 12. PG on reactor jacket inlet and outlet line provided. 13. TI provided on jacket of reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 interlock with reactor temperature and connected with HMI.	4	2	8	EXTREMELY LOW					
11.6	More temperature > 135°C in reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126. during solvent-S+moisture removed to receiver RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C due to TT malfunction of reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126.	1. It will lead to process delay	6	2	12	LOW	1. Calibration of TT of reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 is done. 2. TI provided on reactor vapour column of reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126. 3. SG provided below condenser of reactor. 4. SG provided on reactor reflux line. 5. SG provided on inlet line of receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 6. LI provided on receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 7. Primary condenser provided with cooling water and secondary condenser provided with chilling water. 8. TI provided on receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 9. WG provided on receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 10. VG provided on reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 and its header. 11. TI provided on jacket of reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 interlock with reactor temperature and connected with HMI. 12. QC analysis done during reaction.	4	2	8	EXTREMELY LOW					
11.7	More temperature > 135°C in reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126. during solvent-S+moisture removed to receiver RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C due to oil heating supply line control valve malfunction	1. It will lead to process delay	6	2	12	LOW	1. TT provided on reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 interlock with oil heating line and connected with HMI. 2. TI provided on reactor vapour column of reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126. 3. SG provided below condenser of reactor. 4. SG provided on reactor reflux line. 5. SG provided on inlet line of receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 6. LI provided on receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 7. Primary condenser provided with cooling water and secondary condenser provided with chilling water. 8. TI provided on receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 9. WG provided on receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 10. VG provided on reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 and its header. 11. QC analysis done during reaction. 12. PG on reactor jacket inlet and outlet line provided. 13. TI provided on jacket of reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 interlock with reactor temperature and connected with HMI. 14. PM of control valve is done quarterly 15. Spare control valve is available. 16. 2 no's manual valve provided before and after control valve	4	2	8	EXTREMELY LOW					

More	Temperature	11.8	More temperature > 140^{O}C during addition of 2,4 DCNB (2.5 Ton) from respective receivers to respective reactors due to human error	1. It will lead to process delay.	6	2	12	LOW	1. TT provided on reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 interlock with oil heating line and connected with HMI. 2. TI provided on reactor vapour column of reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126. 3. SG provided below condenser of reactor. 4. SG provided on reactor reflux line. 5. SG provided on addition line of receiver RC-13104B / RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B 6. LI provided on receiver RC-13104B / RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B. 7. Primary condenser provided with cooling water and secondary condenser provided with chilling water. 8. TI provided on receiver RC-13104B / RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B. 9. WG provided on receiver RC-13104B / RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B 10. VG provided on reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 and its header. 11.Process in endothermic so temerature is down during 2 4 DCNB addition 12. PG on reactor jacket inlet and outlet line provided. 13. TI provided on jacket of reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 interlock with reactor temperature and connected with HMI.	4	2	8	EXTREMELY LOW						
		11.9	More temperature > 140^{O}C during addition of 2,4 DCNB (2.5 Ton) from respective receivers to respective reactors due to TT malfunction	1. It will lead to process delay.	6	2	12	LOW	1. Calibration of TT of reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 is done. 2. TI provided on reactor vapour column of reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126. 3. SG provided below condenser of reactor. 4. SG provided on reactor reflux line. 5. SG provided on additon line of receiver RC-13104B / RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B. 6. LI provided on receiver RC-13104B / RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B 7. Primary condenser provided with cooling water and secondary condenser provided with chilling water. 8. TI provided on receiver RC-13104B / RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B 9. WG provided on receiver RC-13104B / RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B 10. VG provided on reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 and its header. 11. TI provided on jacket of reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 interlock with reactor temperature and connected with HMI. 12. Process in endothermic so temerature is down during 2 4 DCNB addition	4	2	8	EXTREMELY LOW						
		11.10	More temperature > 140^{O}C during addition of 2,4 DCNB (2.5 Ton) from respective receivers to respective reactors due to oil heating supply line control valve malfunction	1. It will lead to process delay.	6	2	12	LOW	1. TT provided on reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 interlock with oil heating line and connected with HMI. 2. TI provided on reactor vapour column of reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126. 3. SG provided below condenser of reactor. 4. SG provided on reactor reflux line. 5. SG provided on addition line of receiver RC-13104B / RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B 6. LI provided on receiver RC-13104B / RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B. 7. Primary condenser provided with cooling water and secondary condenser provided with chilling water. 8. TI provided on receiver RC-13104B / RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B 9. WG provided on receiver receiver RC-13104B / RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B 10. VG provided on reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 and its header. 11.Process in endothermic so temerature is down during 2 4 DCNB addition 12. PG on reactor jacket inlet and outlet line provided. 13. TI provided on jacket of reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 interlock with reactor temperature and connected with HMI. 14. PM of control valve is done quarterly 15. Spare control valve is available. 16. 2 no's manual valve provided before and after control valve	4	2	8	EXTREMELY LOW						

11.11	More temperature > 140°C during addition of 2,4 DCNB (2.5 Ton) from respective receivers to respective reactors due to addition line valve malfunction	1. It will lead to process delay.	6	2	12	LOW	1. TT provided on reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 interlock with oil heating line and connected with HMI. 2. TI provided on reactor vapour column of reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126. 3. SG provided below condenser of reactor. 4. SG provided on reactor reflux line. 5. SG provided on addition line of receiver RC-13104B / RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B 6. LI provided on receiver RC-13104B / RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B. 7. Primary condenser provided with cooling water and secondary condenser provided with chilling water. 8. TI provided on receiver RC-13104B / RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B. 9. WG provided on receiver RC-13104B / RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B 10. VG provided on reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 and its header. 11Process in endothermic so temerature is down during 2 4 DCNB addition 12. PG on reactor jacket inlet and outlet line provided. 13. TI provided on jacket of reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 interlock with reactor temperature and connected with HMI. 14. Suitabe MOC of valve is selected. 15. Spare valve is available	4	2	8	EXTREMELY LOW					
11.12	More temperature > 185°C in reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 during reaction due to human error	1. It will lead to process delay 2. It may lead to pressurised of the reactor.	6	4	24	MODERATE	1. TT provided on reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 interlock with oil heating line and connected with HMI. 2. TI provided on reactor vapour column of reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126. 3. SG provided below condenser of reactor. 4. SG provided on reactor reflux line. 5. SG provided on inlet line of receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 6. LI provided on receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 7. Primary condenser provided with cooling water and secondary condenser provided with chilling water. 8. TI provided on receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 9. WG provided on receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 10. VG provided on reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 and its header. 11. QC analysis done during reaction. 12. PG on reactor jacket inlet and outlet line provided. 13. TI provided on jacket of reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 interlock with reactor temperature and connected with HMI. 14. TT provided on thermopack outlet line and temperature is set at 185°C for cut off in burner 15. Reaction carried out under vacuum system with On/Off valve interlock with vacuum pump.	4	4	16	LOW					
11.13	More temperature > 185°C in reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 during reaction due to TT malfunction of reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126.	1. It will lead to process delay 2. It may lead to pressurised of the reactor.	6	2	12	LOW	1. Calibration of TT of reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 is done. 2. TI provided on reactor vapour column of reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126. 3. SG provided below condenser of reactor. 4. SG provided on reactor reflux line. 5. SG provided on inlet line of receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 6. LI provided on receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 7. Primary condenser provided with cooling water and secondary condenser provided with chilling water. 8. TI provided on receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 9. WG provided on receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 10. VG provided on reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 and its header. 11. TI provided on jacket of reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 interlock with reactor temperature and connected with HMI. 12.QC analysis during reaction. 13. TT provided on thermopack outlet line and temperature is set at 185°C for cut off in burner 14. Reaction carried out under vacuum system with On/Off valve interlock with vacuum pump.	4	2	8	EXTREMELY LOW					

		11.14	More temperature > 185°C in reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 during reaction due to oil heating supply line control valve malfunction	1. It will lead to process delay 2. It may lead to pressurised of the reactor.	6	2	12	LOW	1. TT provided on reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 interlock with oil heating line and connected with HMI. 2. TI provided on reactor vapour column of reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126. 3. SG provided below condenser of reactor. 4. SG provided on reactor reflux line. 5. SG provided on inlet line of receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 6. LI provided on receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 7. Primary condenser provided with cooling water and secondary condenser provided with chilling water. 8. TI provided on receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 9. WG provided on receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 10. VG provided on reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 and its header. 11. QC analysis during crude recovery 12. PG on reactor jacket inlet and outlet line provided. 13. TI provided on jacket of reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 interlock with reactor temperature and connected with HMI. 14. PM of control valve is done quarterly 15. Spare control valve is available. 16. 2 no's manual valve provided before and after control valve 17. TT provided on thermopack outlet line and temperature is set at 185°C for cut off in burner.	4	2	8	EXTREMELY LOW					
NO/Less	Level	12.1	NA															
More	Level	13.1	NA															
Improper	Agitation	14.1	Agitation failure of reactors R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126	1.It will lead to quality issue 2.It will lead to process delay 3. It may lead to presurisation in reactor	6	4	24	MODERATE	1 PMS of reactor is done 2 Over load / under load tripping to agitator motor 3 Critical spare of reactor is available 4 Suitable MOC of agitator SS316 5. Emergency cooling sstem provision available for reactor 6. QC analysis done during reaction	4	4	16	LOW					
Changed	Composition	15.1	Improper quality of Solvent S	1.It will lead to quality issue	6	2	12	LOW	1 QC check of all raw material 2 COA received with material issue slip 3 Process under supervision	4	2	8	EXTREMELY LOW					
		15.2	Improper quality of KF	1.It will lead to quality issue	6	2	12	LOW	1 QC check of all raw material 2 COA received with material issue slip 3 Process under supervision	4	2	8	EXTREMELY LOW					
		15.3	Improper quality of K2CO3	1.It will lead to quality issue	6	2	12	LOW	1 QC check of all raw material 2 COA received with material issue slip 3 Process under supervision	4	2	8	EXTREMELY LOW					
		15.4	Improper quality of 24DCNB	1.It will lead to quality issue	6	2	12	LOW	1 QC check of all raw material 2 COA received with material issue slip 3 Process under supervision	4	2	8	EXTREMELY LOW					
Failure	Utility	16.1	Oil heating failure in reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-1312.	1. It will lead to process delay.	6	2	12	LOW	1. TT provided on reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 interlock with oil heating line and connected with HMI. 2. TI provided on reactor vapour column of reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126. 3. SG provided below condenser of reactor. 4. SG provided on reactor reflux line. 5. SG provided on inlet line of receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 6. LI provided on receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 7. Primary condenser provided with cooling water and secondary condenser provided with chilling water. 8. TI provided on receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 9. WG provided on receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 10. VG provided on reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 and its header. 11. Moisture check after distillation in QC. 12. PG on reactor jacket inlet and outlet line provided. 13. TI provided on jacket of reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 interlock with reactor temperature and connected with HMI. 14. Indication on HMI of oil heating system failure.	4	2	8	EXTREMELY LOW					

		16.2	Cooling failure in primary condenser HE-13104A, HE-13110A, HE-13126A, HE-14105A, HE-14106A, HE-14111A.	1. Solvent vapour escape from vaccuum pump in environment will lead to environment issue. 2. It will lead to material loss.	6	4	24	MODERATE	1. TT provided on reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 interlock with oil heating line and connected with HMI. 2. TI provided on reactor vapour column of reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126. 3. SG provided below condenser of reactor. 4. SG provided on reactor reflux line. 5. SG provided on inlet line of receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 6. LI provided on receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 7. Secondary condenser HE-13104B, HE-13110B, HE-13126B, HE-14105B, HE-14106B, HE-14111B provided with chilling water. 8. TI provided on receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 9. WG provided on receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 10. VG provided on reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 and its header. 11.QC analysis done after distillation. 12. PG on reactor jacket inlet and outlet line provided. 13. TI provided on jacket of reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 interlock with reactor temperature and connected with HMI. 14. Alarm provided for steam ejector vacuum pump failure. 15. PG provided in inlet and outlet line of primary condenser HE-13104A, HE-13110A, HE-13126A, HE-14105A, HE-14106A, HE-14111A in header of cooling line. 16. Vaccuum trap with cooling provided in vaccuum line.	4	4	16	LOW					
		16.3	Chilling failure in secondary condenser HE-13104B, HE-13110B, HE-13126B, HE-14105B, HE-14106B, HE-14111B.	1. Solvent vapour escape in environment from vaccuum pump will lead to environment issue. 2. It will lead to material loss.	6	4	24	MODERATE	1. TT provided on reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 interlock with oil heating line and connected with HMI. 2. TI provided on reactor vapour column of reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126. 3. SG provided below condenser of reactor. 4. SG provided on reactor reflux line. 5. SG provided on inlet line of receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 6. LI provided on receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 7. Primary condenser HE-13104A, HE-13110A, HE-13126A, HE-14105A, HE-14106A, HE-14111A provided with cooling water. 8. TI provided on receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 9. WG provided on receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 10. VG provided on reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 and its header. 11. QC analysis done after distillation. 12. PG on reactor jacket inlet and outlet line provided. 13. TI provided on jacket of reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 interlock with reactor temperature and connected with HMI. 14. Alarm provided for steam ejector vacuum pump failure. 15. PG provided in inlet and outlet line of secondary condenser HE-13104B, HE-13110B, HE-13126B, HE-14105B, HE-14106B, HE-14111B in header of chilling line. 16. Vaccuum trap with cooling provided in vaccuum line.	4	4	16	LOW					
		16.4	Nitrogen supply failure	1.It may lead to process delay	6	2	12	LOW	1. Process under supervision 2. PG provided on nitrogen supply header 3. VG provided on reactor 4. PG provided on plant floor main header 5.PM of nitrogen plant is done regularly 6. Stand by nitrogen supply provision is available 7. PT provided on nitrogen plant receiver 8. PG provided on nitrogen plant receiver 9. PG provided on reactor	4	2	8	EXTREMELY LOW					
		16.5	Vaccuum failure .	1. It will lead to process delay.	6	2	12	LOW	1. TT provided on reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 interlock with oil heating line and connected with HMI. 2. TI provided on reactor vapour column of reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126. 3. SG provided below condenser of reactor. 4. SG provided on reactor reflux line. 5. SG provided on inlet line of receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 6. LI provided on receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 7. Primary condenser provided with cooling water and secondary condenser provided with chilling water. 8. TI provided on receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 9. WG provided on receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 10. VG provided on reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 and its header. 11.QC analysis done after distillation. 12. PG on reactor jacket inlet and outlet line provided. 13. TI provided on jacket of reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 interlock with reactor temperature and connected with HMI. 14. Alarm provided for steam ejector vacuum pump failure.	4	2	8	EXTREMELY LOW	Require ON-OFF Valves on vaccum headers interlock on pump feedback(Pump off leads to ON-OFF Valve close)	4	2	8	
High	Viscosity	17.1	NA															
Low	Viscosity	18.1	NA															
Incorrect Sequence	Raw material Issues	19.1	KF charged before Solvent S charged	1. It may lead to stirrer jam and process delay	6	4	24	MODERATE	1. Process under supervision 2. Physical properties of solvent S and KF is different (one is liquid and the other is solid powder) 3. labelling is available on container. 4. PTC/ batch sheet is available 5. Agitator over load protection provided	4	4	16	LOW					

		19.2	2 4 DCNB charged before catalyst charged	1. It will lead to process delay	6	2	12	LOW	1. Process under supervision 2. Physical properties of 2 4 DCNB and catalyst is different. 3. labelling is available on container. 4. PTC/ batch sheet is available 5. Quantity of both materials is different	4	2	8	EXTREMELY LOW						
	Sampling Issues	20.1	Incorrect sampling of crude distilled material	1. It will lead to process delay	6	2	12	LOW	1. Process under supervision 2 QC analysis done of reaction mass upto desired result during reflux of reaction	4	2	8	EXTREMELY LOW						
Incompatibility	Raw Material	21.1	Other material / incompatible material is charged	1 Unexpected reaction due to unknown material	6	6	36	HIGH	1 QC check of all raw material 2 COA received with material issue slip 3 Process under supervision 4 Material checked against material issue slip at plant 5 labelling on raw material container is available	4	6	24	MODERATE						
Failure	PLC / HMI	22.1	PLC / HMI failure	1. It will lead to process delay	6	2	12	LOW	1. Hot standby PLC available 2.Standby HMI provided in plant 3. Configuration PC provided in plant	4	2	8	EXTREMELY LOW						
	Power	23.1	Power failure	1. It will lead to process delay	6	2	12	LOW	DG set available	4	2	8	EXTREMELY LOW						
		23.2																	
	Start up/Shut down	24	NA																
		24.1	NA																
	Loss of Containment (Leakage / Rupture)	25	No / Less Quantity of 2,4 DCNB transferred from storage tank TF-108 to receivers RC-13104B / RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B by pump TFP-108B due to leakage in system	1. It will lead to material loss. 2. It will lead to leakage causing Health & Environment issue. 3. Leakage will cause burn injuries.	6	4	24	MODERATE	1. LT provided with field display and HMI display on Receivers RC-13104B, RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B with pump TFP-108B interlock at High level with alert indication on HMI. 2. LI on storage tank TF-108 3. Side glass on inlet transfer line 4. Process under supervision 5. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 6. TI provided on receivers RC-13104B, RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B 7. Suitable MOC of pumps, pipelines and valves (SS316). 8. Jacketed pipeline and valve with insulation for steam heating. 9. PG on Pump discharge line. 10. Suitable MOC of packing (teflon). 11. Spill kit available. 12. Side Glass on pump TFP-108B discharge line. 13. Emergency Stop button for pump provided on shop floor.	4	4	16	LOW	1. Provide flange guards on the lines.	4	2	8	
		25.1	No / Less Quantity of SOL-S transferred from storage tank TF-107 to receivers RC-13104A, RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A by pump TFP-107 due to leakage in system	1. It will lead to material loss. 2. It will lead to leakage causing Health & Environment issue. 3. Leakage will cause burn injuries. 4. It may lead to fire in case of external source of ignition	6	4	24	MODERATE	1. LT provided with field display and HMI display on Receivers RC-13104A, RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A with pump TFP-107 interlock at High level with alert indication on HMI. 2. LI on storage tank TF-107 3. Side glass on inlet line of receiver. 4. Process under supervision 5. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 6. TI provided on receivers RC-13104A, RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A 7. Suitable MOC of pumps, pipelines and valves (SS316). 8. Jacketed pipeline and valve with insulation for steam heating. 9. PG on Pump discharge line. 10. Suitable MOC of packing (teflon). 11. Spill kit available. 12. Sight Glass on pump TFP-107 discharge line. 13. Emergency Stop button for pump provided on shop floor. 14. Dyke wall surrounding pump TFP-107 15. Fire hydrant system available 16. Earthing and bonding provided 17. OCP displayed at location 18. Spare valve is available 19. Suitable MOC of valve SS-316 is selected 20. RCC flooring available.	4	4	16	LOW	1. Provide flange guards on the lines.	4	2	8	
		25.2	No / Less Quantity of recovered solvent S transferred from storage tank ST-11118 to reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 by pump P-11118 due to leakage in system	1. It will lead to material loss. 2. It will lead to leakage causing Health & Environment issue. 3. Leakage will cause burn injuries. 4. It may lead to fire in case of external source of ignition	6	6	36	HIGH	1. WG provided on reactors 2. LI on storage tank ST-11118 3. QC analysis of running samples 5-6 times. 4. Side glass on inlet transfer line 5. Process under supervison 6. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 7. Emergency push button available on floor 8. TI provided on reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 9. Suitable MOC of pipelines and valve (SS-316). 10. Jacketed pipeline and valve with insulation for steam heating. 11. PG on Pump discharge line. 12. Suitable MOC of packing (teflon). 13. Spill kit available. 14. Side Glass on pump P-11118 discharge line. 15. Fire fighting system is available 16. FLP fittings provided 17. Earthing and bonding provided on equipment and line 18. PTW system is available 19. RCC flooring available	4	6	24	MODERATE	1. Provide flange guards on the lines.	4	2	8	

		25.3	No / Less Quantity of fresh SOL-S transferred from receivers RC-13104A, RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A to reactor R-13104, R-14105 / R-14106 / R-14111 / R-13110 / R-13126 twice by gravity due to leakage in transfer line	1. It will lead to material loss. 2. It will lead to leakage causing Health & Environment issue. 3. Leakage will cause burn injuries. 4. It will lead to **fire** in presence of external ignition source.	10	4	40	HIGH	1. LT provided with field display and HMI display on Receivers RC-13104A, RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A. 2. Sight glass on transfer line from receiver to reactor. 3. Process under supervision 4. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 5. TI provided on receivers RC-13104A, RC-14105A / RC-14106A / RC-14111A / RC-13110A / RC-13126A 6. Suitable MOC of pipelines and valves (SS316). 7. Jacketed pipeline and valve with insulation for steam heating. 8. Suitable MOC of packing (teflon). 9. Spill kit available.. 10. RCC florring in plant area 11. Double valve provided in transfer line. 12. PTW system in place. 13. Flameproof fittings installed. 14. Earthing, flange to flange bonding / jumpers provided to all equipment. 15. WG provided on reactor.	6	4	24	MODERATE	1. Provide flange guards on the lines. 2. HAC study to be conducted.	4	2	8	
		25.4	No/less quantity of K2CO3 charged due to spillage	1. It may lead to material loss. 2. It may lead to helth and envriomentissue	6	4	24	MODERATE	1. The material is received from store as per issue slip. 2. The material is weighed before charging in the plant. 3. The neutral pH is checked during and after charging. 4. Process under supervision. 5. Secondary containment is provided 6 RCC floor provided 7. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron)	4	4	16	LOW					
		25.5	No/less quantity of KF charged due to spillage of material.	1. It will lead to quality issue. 2. It will lead to material loss. 3. It will lead to health and environment issues.	6	4	24	MODERATE	1. The material is received from store as per issue slip. 2. The material is weighed before charging in the plant. 3. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 4. Process under supervision. 5. QC sample check during the reaction. 6. Empty bag checked and counted after charging (two times). 7. RCC flooring provided 8. Secondary containment provided during charging.	4	4	16	LOW					
		25.6	No/less quantity of catalyst 37 charged in reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 due to spillage/ leakage.	1. It will lead to health and environmental issues. 2. It will lead to material loss.	6	4	24	MODERATE	1. The material is received from store as per issue slip. 2. The material is weighed before charging. 3. Process under supervision. 4. QC sample check during the reaction. 5. RCC flooring provided 6. Spill kit is available. 7. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 8. Material is charged with 10-litre buckets through funnel.	4	4	16	LOW					
		25.7	No/less quantity of 2,4 DCNB addition in reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 from receiver RC-13104B / RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B by gravity due to addition line leakage.	1. It will lead to material loss. 2. It will lead to leakage causing Health & Environment issue. 3. Leakage will cause burn injuries. 4.It may lead to Fire in presence of external ignition source.	6	6	36	HIGH	1.Process under supervision 2.LT provided on recivers RC-13104B / RC-14105B / RC-14106B / RC-14111B / RC-13110B / RC-13126B with local display & as well as HMI display 3.SG provided in addition line 4.WG provided on reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 5.QC analysis check after reaction 6.Total quantity to be add in reactors from respective recievers 7. Jacketed pipeline and valve provided. 8. Suitable MOC of packing (teflon). 9. Spill kit available. 10.Suitable MOC of SS316 pipe is selected 11. Earthing / bonding provided in transfer line & connected equipment 12. Fire protection system available 13. Flameproof fittings installed 14 RCC Flooring available 15. PTW system available	4	6	24	MODERATE					
		25.8	No/less quantity of Solvent S +moisture transferred from receiver RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C /RC-13104C to drum by gravity due to transfer line leakage / spillage	1. It may lead to health and enviornment issue 2. It may lead to material loss 3. It may lead to fire in case of external source of ignition	6	6	36	HIGH	1. Process under supervision. 2.LI provided on receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 3. Weighing of drum during drum filling 4. Transfer all material from receiver to drums. 5. WG provided on receiver RC-13104C / RC-14105C / RC-14106C / RC-14111C / RC-13110C / RC-13126C. 6. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 7. Fill drum quantity and weight check after filling. 8. Suitable MOC of transfer line SS-316 is selected. 9. RCC flooring provided 10. Spill kit is available. 11. Suitable MOC of hose pipe SS-304 is selected. 12. Earthing / bonding provided in transfer line & connected equipment 13. Fire protection system available 14. Flameproof fittings installed 15. PTW system available	4	6	24	MODERATE					
MOC	Corrosion / Erosion	26	NA															
Improper	Maintenance	27	Improper maintenance	Process delay	4	2	8	EXTREMELY LOW	1 PMS of equipment is done 2 Trained technician and fitters 3 Maintenance work under supervision 4 Critical spare part is available	2	2	4	EXTREMELY LOW					
	Engineering issues/ Drawing Errors	28	Improper P& ID can lead to improper hazop	Improper hazop														

HAZOP WORK SHEET					Hazop Work Sheet Revision No	PHA-001.00
Product Name	2,4-DFNB				Hazop Work Sheet Effective Date	06-05-18
NODE NO :	4					
DESIGN INTENTION	Once getting required purity of material. Apply cooling in drowning reactor R-12107 / R-12112 / R-12118 while receiving the 12KL (considred two batch mass) mass from reactor R-13104 / R-14105 / R -14106 / R - 14111 / R-13110 / R-13126 at temperature 175-185 ^{0}C, the material will reach temperature between 100-110^{o}C while getting transferred in the drowning reactors R-12107 / R-12112 / R-12118 , Once we get the desired temperature,Take sample for QC testing. then charge 25 Kg K2CO3 in reactor R-12107 / R-12112 / R-12118 to bring neutral PH. Then applay vaccum in drowning reactors R-12107 / R-12112 / R-12118 and respective receivers RC-12112A/RC-12112B/RC-12107A/RC-12107B/RC-12118A/RC-12118B by respective steam Ejector pump SE-15107/RC-15112/SE-15118 .Then start heating in upto 120 to 130 ^{0}C.and Collect the mix material of 2,4 DFNB in respective receivers RC-12112A(RC-2)/RC-12112B(RC-1)/RC-12107A(RC-2)/RC-12107B(RC-1)/RC-12118A(RC-2)/RC-12118B(RC-1).Take sample for QC testing. (i.e RC-1 means 90-95% purity & RC-2 means 40-65% purity) and also take sample from reactors for QC testing. If result is OK, then the DNFB crude material(RC-1) transfer to storage tank ST-10111 & DFNB crude material (RC-2) transfer to storage tanak ST-10107 by gravity. Then cool down the reactore R-12107 / R-12112 / R-12118 by cooling water in jacket up to tempreture 30 to 35^{0}C. Then charge 25 kg K2CO3 in reactor R-12107 / R-12112 / R-12118.					
EQUIPMENTS COVERED IN THIS NODE	Reactor R-12107 / R-12112 / R-12118, Reactor R-13104 / R-14105 / R -14106 / R - 14111 / R-13110 / R-13126, Receivers RC-12112A/RC-12112B/RC-12107A/RC-12107B/RC-12118A/RC-12118B, Steam ejector pump SE-15107/RC-15112/SE-15118, Primary condenser HE-12112A, HE-12107A, HE-12118A, Secondary condenser HE-12112B, HE-12107B, HE-12118B, Storage tank ST-10111, Storage tank ST-10107					
DOCUMENT REFERRED	P& ID and PTC	DOCUMENT No.			DOCUMENT Revision No.	
HAZOP Revision No	01					
HAZOP Effective Date	12-03-22					

	Temperature (^{0}C)		Pressure (kg/cm^{2}g)		MOC	Capacity	
Equipment Details	Design	Working	Design	Working		Design	Working
Reactor R-12107 / R-12112 / R-12118	180	130	6 KG	ATM	SS-316	12 KL	18 KL
Reactor R-13104 / R-14105 / R -14106 / R - 14111 / R-13110 / R-13126	250	185	6	ATM	SS-316	8 KL	11 KL
Receivers RC-12112A/RC-12112B/RC-12107A/RC-12107B/RC-12118A/RC-12118B	170	AMB	4.5	ATM	SS-316	3KL	4.5 KL
Steam ejector pump SE-15107/RC-15112/SE-15118	150	AMB	3	3	SS-316	1 TORR	1 TORR
Primary condenser HE-12112A, HE-12107A, HE-12118A	250	130	3.5	ATM	SS-316	15m2	15m2
Secondary condenser HE-12112B, HE-12107B, HE-12118B	250	80	3.5	ATM	SS-316	5m2	5m2
Storage tank ST-10111	250	150	4.5	ATM	SS316L	10KL	14 KL
Storage tank ST-10107	250	150	4.5	ATM	SS316L	10KL	14 KL

Guide Word	Parameter	Sr. No.	CAUSES	CONSEQUENCES	Probability	Severity	RPN No	Risk Classification	SAFEGUARDS	Probability	Severity	RPN No	Risk Classification	RECOMMENDATIONS	Probability	Severity	RPN No	Remarks
NO/Less	Flow	1.1	NA															
More	Flow	2.1	NA															
Other than/ Misdirected	Flow	3.1	Transfer mass from reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 to reactor R-12107 instead of R-12112 / R-12118 by gravity vice versa due to human error	1. It may lead to overflow from the reactor which further results into spillage. 2. Spillage will cause health & Environment issue. 3. It may lead to Fire in presence of external source of ignition.	6	6	36	HIGH	1. Process under supervision. 2. WG provided on reactors. 3. Double valve provided on transfer line. 4. Flameproof electrical fittings provided. 5. Side glass on transfer line. 6. Work permit system followed. 7. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron). 8. RCC Flooring within the plant. 9. Spill kit available on floor. 10. Fire protection system is available. 11. TI provided on reactor R-12107 / R-12112 / R-12118 12. TT provided on reactor R-13104 / R-14105 / R-14106 / R-14111 / R-13110 / R-13126 13. Earthing and bonding provided on equipment.	2	6	12	LOW					
		3.2	Collect the mix material of 2,4 DFNB in respective receivers RC-12112A (RC-2) / RC-12107A (RC-2) / RC-12118A (RC-2) instead of RC-12112B (RC-1) / RC-12107B (RC-1) / RC-12118B (RC-1) from reactor R-12107 / R-12112 / R-12118 vice versa due to human error	1. It may lead to process delay.	6	2	12	LOW	1. Process under supervision. 2. WG provided on reactor. 3. Double valve provided on transfer line from diversion header to receiver. 4. Side glass on transfer line 5. Distillation carried out in vacuum. 6. Reflux system available. 7. TI provided on receiver. 8. Glass LI provided on receiver.	4	2	8	EXTREMELY LOW					
Reverse	Flow	4.1	NA															
		5.1	No / Less Quantity of mass transferred from reactor R-13104, R-14105 / R-14106 / R-14111 / R-13110 / R-13126 to Reactor R-12107 / R-12112 / R-12118 by gravity due to human error	1. It will lead to yield loss of the particular batch	6	4	24	MODERATE	1, Process under supervision 2. WG provided on reactor R-13104, R-14105 / R-14106 / R-14111 / R-13110 / R-13126 3.WG provided on Reactor R-12107 / R-12112 / R-12118 4.Manually check with dip stick in reactor R-13104, R-14105 / R-14106 / R-14111 / R-13110 / R-13126 5. TI provided on Reactor R-12107 / R-12112 / R-12118 6. TT on reactor R-13104, R-14105 / R-14106 / R-14111 / R-13110 / R-13126 7. Total material transfer from reactor R-13104, R-14105 / R-14106 / R-14111 / R-13110 / R-13126 to Reactor R-12107 / R-12112 / R-12118	4	4	16	LOW					
		5.2	No / Less Quantity of mass transferred from reactor R-13104, R-14105 / R-14106 / R-14111 / R-13110 / R-13126 to Reactor R-12107 / R-12112 / R-12118 by gravity due to transfer Line choke up / valve choke up	1. It will lead to process delay	6	2	12	LOW	1, Process under supervior 2. WG provided on reactor R-13104, R-14105 / R-14106 / R-14111 / R-13110 / R-13126 3.WG provided on Reactor R-12107 / R-12112 / R-12118 4.Manually check with dip stick in reactor R-13104, R-14105 / R-14106 / R-14111 / R-13110 / R-13126 5. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 6. TI provided on Reactor R-12107 / R-12112 / R-12118 7. TT on reactor R-13104, R-14105 / R-14106 / R-14111 / R-13110 / R-13126 8. Total material transfer from reactor R-13104, R-14105 / R-14106 / R-14111 / R-13110 / R-13126 to Reactor R-12107 / R-12112 / R-12118 9. Suitable MOC of vlave SS-316 is selected	4	2	8	EXTREMELY LOW					

5.3	No / Less Quantity of mass transferred from reactor R-13104, R-14105 / R-14106 / R-14111 / R-13110 / R-13126 to Reactor R-12107 / R-12112 / R-12118 by gravity due to leakage in transfer line	1. It will lead to material loss. 2. It will lead to leakage causing Health & Environment issue. 3. Leakage will cause burn injuries. 4. It may lead to fire in case of external source of ignition	6	6	36	HIGH	1, Process under supervior 2. WG provided on reactor R-13104, R-14105 / R-14106 / R-14111 / R-13110 / R-13126 3.WG provided on Reactor R-12107 / R-12112 / R-12118 4.Manually check with dip stick in reactor R-13104, R-14105 / R-14106 / R-14111 / R-13110 / R-13126 5. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 6. TI provided on Reactor R-12107 / R-12112 / R-12118 7. TT on reactor R-13104, R-14105 / R-14106 / R-14111 / R-13110 / R-13126 8. Total material transfer from reactor R-13104, R-14105 / R-14106 / R-14111 / R-13110 / R-13126 to Reactor R-12107 / R-12112 / R-12118 9. Suitable MOC of pipelines and valves (SS316). 10. Jacketed pipeline and valve with insulation for steam heating. 11. Suitable MOC of packing (teflon). 12.Spill kit available.. 13. RCC florring in plant area 14. Double valve provided in transfer line. 15. PTW system in place. 16. Flameproof fittings installed. 17. Earthing provided to all equipment. 18. Fire fighting system available	4	6	24	MODERATE					
5.4	No / Less Quantity of mass transferred from reactor R-13104, R-14105 / R-14106 / R-14111 / R-13110 / R-13126 to Reactor R-12107 / R-12112 / R-12118 by gravity due to reactor R-12107 / R-12112 / R-12118 bottom valve open / pass	1. It will lead to material loss. 2. It will lead to leakage causing Health & Environment issue. 3. Leakage will cause burn injuries. 4. It may lead to fire in case of external source of ignition	6	6	36	HIGH	1. Process under supervior. 2. WG provided on reactor R-13104, R-14105 / R-14106 / R-14111 / R-13110 / R-13126 3. WG provided on Reactor R-12107 / R-12112 / R-12118 4. Manually check with dip stick in reactor R-13104, R-14105 / R-14106 / R-14111 / R-13110 / R-13126 5. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 6. TI provided on Reactor R-12107 / R-12112 / R-12118 7. TT on reactor R-13104, R-14105 / R-14106 / R-14111 / R-13110 / R-13126 8. Total material transfer from reactor R-13104, R-14105 / R-14106 / R-14111 / R-13110 / R-13126 to Reactor R-12107 / R-12112 / R-12118 9. Suitable MOC of valves (SS316) 10. Double valave provided on Reactor R-12107 / R-12112 / R-12118 11. Blind provided on bottom drain valave of Reactor R-12107 / R-12112 / R-12118 12. Spill kit available. 13. RCC florring in plant area. 14. Double valve provided in transfer line. 15. PTW system in place. 16. Flameproof fittings installed. 17. Earthing provided to all equipment. 18. Fire fighting system available.	4	6	24	MODERATE					
5.5	No/less quantity of K2CO3 charge in reactor R-12107 / R-12112 / R-12118 due to human error.	1. It may lead to remain acidic pH which may cause corrosion of equipment.	6	4	24	MODERATE	1. The material is received from store as per issue slip. 2. The material is weighed before charging 3. The neutral pH is checked during and after charging. 4. Process under supervision. 5.Ensure pH before distillation	4	4	16	LOW					
5.6	No/less quantity of K2CO3 charge in reactor R-12107 / R-12112 / R-12118 due to weigh balance malfunction.	1. It may lead to remain acidic pH which may cause corrosion of equipment.	6	4	24	MODERATE	1. The material is received from store as per issue slip. 2. The material is weighed before charging 3. The neutral pH is checked during and after charging. 4. Process under supervision. 5. Calibration of weigh scale is done (weekly, monthly, yearly). 6. spare weigh balance is available. 7.Ensure pH before distillation	4	4	16	LOW					
5.7	No/less quantity of K2CO3 charge in reactor R-12107 / R-12112 / R-12118 due to spillage	1. It may lead to material loss. 2. It may lead to health and envriorment issue	6	4	24	MODERATE	1. The material is received from store as per issue slip. 2. The material is weighed before charging 3. The neutral pH is checked during and after charging. 4. Process under supervision. 5. Secondary containment is provided 6 RCC floor provided 7. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 8.Ensure pH before distillation	4	4	16	LOW					
5.8	No/less quantity of K2CO3 charge in reactor R-12107 / R-12112 / R-12118 due to left in bag	1. It may lead to remain acidic pH which may cause corrosion of equipment.	6	4	24	MODERATE	1. The material is received from store as per issue slip. 2. The material is weighed before charging 3. The neutral pH is checked during and after charging. 4. Process under supervision. 5.Ensure pH before distillation	4	4	16	LOW					
5.9	No/less quantity of K2CO3 charge in reactor R-12107 / R-12112 / R-12118 due to less quantity received from store	1. It may lead to remain acidic pH which may cause corrosion of equipment.	6	4	24	MODERATE	1. The material is received from store as per issue slip. 2. The material is weighed before charging 3. The neutral pH is checked during and after charging. 4. Process under supervision. 5.Ensure pH before distillation	4	4	16	LOW					

5.10	No/less quantity of crude received in receivers RC-12112A(RC-2) / RC-12107A (RC-2) / RC-12118A (RC-2) from reactor R-12107 / R-12112 / R-12118 due to human error.	1. It will lead to process delay.	6	2	12	LOW	1. Process under supervision. 2. TI provided on receiver RC-12112A(RC-2) / RC-12107A (RC-2) / RC-12118A (RC-2). 3. TI provided on reactor vapour column of reactor R-12107 / R-12112 / R-12118. 4. SG provided below condenser of reactor. 5. SG provided on reactor reflux line. 6. SG provided on inlet line of receiver RC-12112A(RC-2) / RC-12107A (RC-2) / RC-12118A (RC-2). 7. LI provided on receiver RC-12112A(RC-2) / RC-12107A (RC-2) / RC-12118A (RC-2). 8. Primary condenser provided with cooling water and secondary condenser provided with chilling water. 9. WG provided on receiver RC-12112A(RC-2) / RC-12107A (RC-2) / RC-12118A (RC-2). 10. VG provided on reactor R-12107 / R-12112 / R-12118 and its header. 11. TI provided on reactor R-12107 / R-12112 / R-12118.	4	2	8	EXTREMELY LOW					
5.11	No/less quantity of crude received in receivers RC-12112A(RC-2) / RC-12107A (RC-2) / RC-12118A (RC-2) from reactor R-12107 / R-12112 / R-12118 due to < 120^{o}C temperature in reactor.	1. It will lead to process delay.	6	2	12	LOW	1. Process under supervision. 2. TI provided on receiver RC-12112A(RC-2) / RC-12107A (RC-2) / RC-12118A (RC-2). 3. TI provided on reactor vapour column of reactor R-12107 / R-12112 / R-12118. 4. SG provided below condenser of reactor. 5. SG provided on reactor reflux line. 6. SG provided on inlet line of receiver RC-12112A(RC-2) / RC-12107A (RC-2) / RC-12118A (RC-2). 7. LI provided on receiver RC-12112A(RC-2) / RC-12107A (RC-2) / RC-12118A (RC-2). 8. Primary condenser provided with cooling water and secondary condenser provided with chilling water. 9. WG provided on receiver RC-12112A(RC-2) / RC-12107A (RC-2) / RC-12118A (RC-2). 10. VG provided on reactor R-12107 / R-12112 / R-12118 and its header. 11. TI provided on reactor R-12107 / R-12112 / R-12118.	4	2	8	EXTREMELY LOW					
5.12	No/less quantity of crude received in receivers RC-12112A(RC-2) / RC-12107A (RC-2) / RC-12118A (RC-2) from reactor R-12107 / R-12112 / R-12118 due to steam heating failure.	1. It will lead to process delay.	6	2	12	LOW	1. Process under supervision. 2. TI provided on receiver RC-12112A(RC-2) / RC-12107A (RC-2) / RC-12118A (RC-2). 3. TI provided on reactor vapour column of reactor R-12107 / R-12112 / R-12118. 4. SG provided below condenser of reactor. 5. SG provided on reactor reflux line. 6. SG provided on inlet line of receiver RC-12112A(RC-2) / RC-12107A (RC-2) / RC-12118A (RC-2). 7. LI provided on receiver RC-12112A(RC-2) / RC-12107A (RC-2) / RC-12118A (RC-2). 8. Primary condenser provided with cooling water and secondary condenser provided with chilling water. 9. WG provided on receiver RC-12112A(RC-2) / RC-12107A (RC-2) / RC-12118A (RC-2). 10. VG provided on reactor R-12107 / R-12112 / R-12118 and its header. 11. TI provided on reactor R-12107 / R-12112 / R-12118. 12. Stand by steam provision is available. 13. PG provided on steam line and reactor jacket. 14. low steam pressure alarm provided.	4	2	8	EXTREMELY LOW					
5.13	No/less quantity of crude received in receivers RC-12112A(RC-2) / RC-12107A (RC-2) / RC-12118A (RC-2) from reactor R-12107 / R-12112 / R-12118 due to less vacuum.	1. It will lead to process delay.	6	2	12	LOW	1. Process under supervision. 2. TI provided on receiver RC-12112A(RC-2) / RC-12107A (RC-2) / RC-12118A (RC-2). 3. TI provided on reactor vapour column of reactor R-12107 / R-12112 / R-12118. 4. SG provided below condenser of reactor. 5. SG provided on reactor reflux line. 6. SG provided on inlet line of receiver RC-12112A(RC-2) / RC-12107A (RC-2) / RC-12118A (RC-2). 7. LI provided on receiver RC-12112A(RC-2) / RC-12107A (RC-2) / RC-12118A (RC-2). 8. Primary condenser provided with cooling water and secondary condenser provided with chilling water. 9. WG provided on receiver RC-12112A(RC-2) / RC-12107A (RC-2) / RC-12118A (RC-2). 10. VG provided on reactor R-12107 / R-12112 / R-12118 and its header. 11. TI provided on reactor R-12107 / R-12112 / R-12118. 12. PM done of vacuum pump as per the schedule. 13. low vacuum alarm provided.	4	2	8	EXTREMELY LOW					

NO/Less	Quantity	5.14	No/less quantity of crude received in receivers RC-12112A(RC-2) / RC-12107A (RC-2) / RC-12118A (RC-2) from reactor R-12107 / R-12112 / R-12118 due to cooling failure in respective primary condenser.	1. Solvent vapour escape from vacuum pump in environment will lead to environment issue. 2. It will lead to material loss.	6	4	24	MODERATE	1. Process under supervision. 2. TI provided on receiver RC-12112A(RC-2) / RC-12107A (RC-2) / RC-12118A (RC-2). 3. TI provided on reactor vapour column of reactor R-12107 / R-12112 / R-12118. 4. SG provided below condenser of reactor. 5. SG provided on reactor reflux line. 6. SG provided on inlet line of receiver RC-12112A(RC-2) / RC-12107A (RC-2) / RC-12118A (RC-2). 7. LI provided on receiver RC-12112A(RC-2) / RC-12107A (RC-2) / RC-12118A (RC-2). 8. Primary condenser provided with cooling water and secondary condenser provided with chilling water. 9. WG provided on receiver RC-12112A(RC-2) / RC-12107A (RC-2) / RC-12118A (RC-2). 10. VG provided on reactor R-12107 / R-12112 / R-12118 and its header. 11. TI provided on reactor R-12107 / R-12112 / R-12118. 12. Secondary condenser provided with chilling water. 13. Standby cooling supply pump is available.	4	4	16	LOW					
		5.15	No/less quantity of crude received in receivers RC-12112A(RC-2) / RC-12107A (RC-2) / RC-12118A (RC-2) from reactor R-12107 / R-12112 / R-12118 due to chilling failure in respective secondary condenser.	1. Solvent vapour escape in environment from vaccuum pump will lead to environment issue. 2. It will lead to material loss.	6	4	24	MODERATE	1. Process under supervision. 2. TI provided on receiver RC-12112A(RC-2) / RC-12107A (RC-2) / RC-12118A (RC-2). 3. TI provided on reactor vapour column of reactor R-12107 / R-12112 / R-12118. 4. SG provided below condenser of reactor. 5. SG provided on reactor reflux line. 6. SG provided on inlet line of receiver RC-12112A(RC-2) / RC-12107A (RC-2) / RC-12118A (RC-2). 7. LI provided on receiver RC-12112A(RC-2) / RC-12107A (RC-2) / RC-12118A (RC-2). 8. WG provided on receiver RC-12112A(RC-2) / RC-12107A (RC-2) / RC-12118A (RC-2). 9. VG provided on reactor R-12107 / R-12112 / R-12118 and its header. 10. TI provided on reactor R-12107 / R-12112 / R-12118. 11. Primery condenser provided with cooling water. 12. Standby chilling supply pump is available.	4	4	16	LOW					
		5.16	No/less quantity of crude received in receivers RC-12112A(RC-2) / RC-12107A (RC-2) / RC-12118A (RC-2) from reactor R-12107 / R-12112 / R-12118 due to TI malfunction of reactor R-12107 / R-12112 / R-12118	1. It will lead to drop in temperature from the actual temperature may cause process delay.	6	2	12	LOW	1. Calibration of TI of reactor R-12107 / R-12112 / R-12118 is done as per the schedule. 2. TI provided on reactor vapour column of reactor R-12107 / R-12112 / R-12118. 3. SG provided below condenser of reactor. 4. SG provided below condenser of reactor. 5. SG provided on reactor reflux line. 6. SG provided on inlet line of receiver RC-12112A(RC-2) / RC-12107A (RC-2) / RC-12118A (RC-2). 7. LI provided on receiver RC-12112A(RC-2) / RC-12107A (RC-2) / RC-12118A (RC-2). 8. Primary condenser provided with cooling water and secondary condenser provided with chilling water. 9. WG provided on receiver RC-12112A(RC-2) / RC-12107A (RC-2) / RC-12118A (RC-2). 10. VG provided on reactor R-12107 / R-12112 / R-12118 and its header. 11. TI provided on reactor R-12107 / R-12112 / R-12118.	4	2	8	EXTREMELY LOW					
		5.17	No/less quantity of crude received in receivers RC-12112B(RC-1) / RC-12107B (RC-1) / RC-12118B (RC-1) from reactor R-12107 / R-12112 / R-12118 due to human error.	1. It will lead to process delay.	6	2	12	LOW	1. Process under supervision. 2. TI provided on receivers RC-12112B(RC-1) / RC-12107B (RC-1) / RC-12118B (RC-1) 3. TI provided on reactor vapour column of reactor R-12107 / R-12112 / R-12118. 4. SG provided below condenser of reactor. 5. SG provided on reactor reflux line. 6. SG provided on inlet line of receivers RC-12112B(RC-1) / RC-12107B (RC-1) / RC-12118B (RC-1) 7. LI provided on receivers RC-12112B(RC-1) / RC-12107B (RC-1) / RC-12118B (RC-1) 8. Primary condenser provided with cooling water and secondary condenser provided with chilling water. 9. WG provided on receivers RC-12112B(RC-1) / RC-12107B (RC-1) / RC-12118B (RC-1) 10. VG provided on reactor R-12107 / R-12112 / R-12118 and its header. 11. TI provided on reactor R-12107 / R-12112 / R-12118.	4	2	8	EXTREMELY LOW					

5.18	No/less quantity of crude received in receivers RC-12112B(RC-1) / RC-12107B (RC-1) / RC-12118B (RC-1) from reactor R-12107 / R-12112 / R-12118 due to < 120°C temperature in reactor.	1. It will lead to process delay.	6	2	12	LOW	1. Process under supervision. 2. TI provided on receivers RC-12112B(RC-1) / RC-12107B (RC-1) / RC-12118B (RC-1) 3. TI provided on reactor vapour column of reactor R-12107 / R-12112 / R-12118. 4. SG provided below condenser of reactor. 5. SG provided on reactor reflux line. 6. SG provided on inlet line of receivers RC-12112B(RC-1) / RC-12107B (RC-1) / RC-12118B (RC-1) 7. LI provided on receivers RC-12112B(RC-1) / RC-12107B (RC-1) / RC-12118B (RC-1) 8. Primary condenser provided with cooling water and secondary condenser provided with chilling water. 9. WG provided on receivers RC-12112B(RC-1) / RC-12107B (RC-1) / RC-12118B (RC-1) 10. VG provided on reactor R-12107 / R-12112 / R-12118 and its header. 11. TI provided on reactor R-12107 / R-12112 / R-12118.	4	2	8	EXTREMELY LOW					
5.19	No/less quantity of crude received in receivers RC-12112B(RC-1) / RC-12107B (RC-1) / RC-12118B (RC-1) from reactor R-12107 / R-12112 / R-12118 due to steam heating failure.	1. It will lead to process delay.	6	2	12	LOW	1. Process under supervision. 2. TI provided on receivers RC-12112B(RC-1) / RC-12107B (RC-1) / RC-12118B (RC-1) 3. TI provided on reactor vapour column of reactor R-12107 / R-12112 / R-12118. 4. SG provided below condenser of reactor. 5. SG provided on reactor reflux line. 6. SG provided on inlet line of receivers RC-12112B(RC-1) / RC-12107B (RC-1) / RC-12118B (RC-1) 7. LI provided on receivers RC-12112B(RC-1) / RC-12107B (RC-1) / RC-12118B (RC-1) 8. Primary condenser provided with cooling water and secondary condenser provided with chilling water. 9. WG provided on receivers RC-12112B(RC-1) / RC-12107B (RC-1) / RC-12118B (RC-1) 10. VG provided on reactor R-12107 / R-12112 / R-12118 and its header. 11. TI provided on reactor R-12107 / R-12112 / R-12118. 12. Stand by steam provision is available. 13. PG provided on steam line and reactor jacket. 14. low steam pressure alarm provided.	4	2	8	EXTREMELY LOW					
5.20	No/less quantity of crude received in receivers RC-12112B(RC-1) / RC-12107B (RC-1) / RC-12118B (RC-1) from reactor R-12107 / R-12112 / R-12118 due to less vacuum.	1. It will lead to process delay.	6	2	12	LOW	1. Process under supervision. 2. TI provided on receivers RC-12112B(RC-1) / RC-12107B (RC-1) / RC-12118B (RC-1) 3. TI provided on reactor vapour column of reactor R-12107 / R-12112 / R-12118. 4. SG provided below condenser of reactor. 5. SG provided on reactor reflux line. 6. SG provided on inlet line of receivers RC-12112B(RC-1) / RC-12107B (RC-1) / RC-12118B (RC-1) 7. LI provided on receivers RC-12112B(RC-1) / RC-12107B (RC-1) / RC-12118B (RC-1) 8. Primary condenser provided with cooling water and secondary condenser provided with chilling water. 9. WG provided on receivers RC-12112B(RC-1) / RC-12107B (RC-1) / RC-12118B (RC-1) 10. VG provided on reactor R-12107 / R-12112 / R-12118 and its header. 11. TI provided on reactor R-12107 / R-12112 / R-12118. 12. PM done of vacuum pump as per the schedule. 13. low vacuum alarm provided.	4	2	8	EXTREMELY LOW					
5.21	No/less quantity of crude received in receivers RC-12112B(RC-1) / RC-12107B (RC-1) / RC-12118B (RC-1) from reactor R-12107 / R-12112 / R-12118 due to cooling failure in respective primary condenser.	1. Solvent vapour escape from vacuum pump in environment will lead to environment issue. 2. It will lead to material loss.	6	4	24	MODERATE	1. Process under supervision. 2. TI provided on receivers RC-12112B(RC-1) / RC-12107B (RC-1) / RC-12118B (RC-1) 3. TI provided on reactor vapour column of reactor R-12107 / R-12112 / R-12118. 4. SG provided below condenser of reactor. 5. SG provided on reactor reflux line. 6. SG provided on inlet line of receivers RC-12112B(RC-1) / RC-12107B (RC-1) / RC-12118B (RC-1) 7. LI provided on receivers RC-12112B(RC-1) / RC-12107B (RC-1) / RC-12118B (RC-1) 8. Primary condenser provided with cooling water and secondary condenser provided with chilling water. 9. WG provided on receivers RC-12112B(RC-1) / RC-12107B (RC-1) / RC-12118B (RC-1) 10. VG provided on reactor R-12107 / R-12112 / R-12118 and its header. 11. TI provided on reactor R-12107 / R-12112 / R-12118. 12. Secondary condenser provided with chilling water. 13. Standby cooling supply pump is available.	4	4	16	LOW					

5.22	No/less quantity of crude received in receivers RC-12112B(RC-1) / RC-12107B (RC-1) / RC-12118B (RC-1) from reactor R-12107 / R-12112 / R-12118 due to chilling failure in respective secondary condenser.	1. Solvent vapour escape in environment from vaccuum pump will lead to environment issue. 2. It will lead to material loss.	6	4	24	MODERATE	1. Process under supervision. 2. TI provided on receivers RC-12112B(RC-1) / RC-12107B (RC-1) / RC-12118B (RC-1) 3. TI provided on reactor vapour column of reactor R-12107 / R-12112 / R-12118. 4. SG provided below condenser of reactor. 5. SG provided on reactor reflux line. 6. SG provided on inlet line of receivers RC-12112B(RC-1) / RC-12107B (RC-1) / RC-12118B (RC-1) 7. LI provided on receivers RC-12112B(RC-1) / RC-12107B (RC-1) / RC-12118B (RC-1) 8. WG provided on receivers RC-12112B(RC-1) / RC-12107B (RC-1) / RC-12118B (RC-1) 9. VG provided on reactor R-12107 / R-12112 / R-12118 and its header. 10. TI provided on reactor R-12107 / R-12112 / R-12118. 11. Primery condenser provided with cooling water. 12. Standby chilling supply pump is available.	4	4	16	LOW					
5.23	No/less quantity of crude received in receivers RC-12112B(RC-1) / RC-12107B (RC-1) / RC-12118B (RC-1) from reactor R-12107 / R-12112 / R-12118 due to TI malfunction of reactor R-12107 / R-12112 / R-12118	1. It will lead to drop in temperature from the actual temperature may cause process delay.	6	2	12	LOW	1. Calibration of TI of reactor R-12107 / R-12112 / R-12118 is done as per the schedule. 2. TI provided on reactor vapour column of reactor R-12107 / R-12112 / R-12118. 3. SG provided below condenser of reactor. 4. SG provided below condenser of reactor. 5. SG provided on reactor reflux line. 6. SG provided on inlet line of receivers RC-12112B(RC-1) / RC-12107B (RC-1) / RC-12118B (RC-1) 7. LI provided on receivers RC-12112B(RC-1) / RC-12107B (RC-1) / RC-12118B (RC-1) 8. Primary condenser provided with cooling water and secondary condenser provided with chilling water. 9. WG provided on receivers RC-12112B(RC-1) / RC-12107B (RC-1) / RC-12118B (RC-1) 10. VG provided on reactor R-12107 / R-12112 / R-12118 and its header. 11. TI provided on reactor R-12107 / R-12112 / R-12118.	4	2	8	EXTREMELY LOW					
5.25	No / Less Quantity of crude (RC 1) transferred from receivers RC-12112B(RC-1) / RC-12107B (RC-1) / RC-12118B (RC-1) to storage tank ST-10111 by gravity due to human error	1. No consequences due to total material transfer from receiver to storage tank														
5.25	No / Less Quantity of crude (RC 1) transferred from receivers RC-12112B(RC-1) / RC-12107B (RC-1) / RC-12118B (RC-1) to storage tank ST-10111 by gravity due to transfer Line choke up / valve choke up	1. No consequences due to total material transfer from receiver to storage tank														
5.26	No / Less Quantity of crude (RC 1) transferred from receivers RC-12112B(RC-1) / RC-12107B (RC-1) / RC-12118B (RC-1) to storage tank ST-10111 by gravity due to leakage in transfer line	1. It will lead to material loss. 2. It will lead to leakage causing Health & Environment issue. 3. Leakage will cause burn injuries. 4. It may lead to fire in case of external source of ignition	6	6	36	HIGH	1, Process under supervior 2. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 3. LI provided on receiver and storage tank 4. Suitable MOC of pipelines and valves (SS316). 5. Fire fighting system available 6. Suitable MOC of packing (teflon). 7.Spill kit available.. 8. RCC florring in plant area 9. Double valve provided in transfer line. 10. PTW system in place. 11. Flameproof fittings installed. 12. Earthing provided to all equipment.	4	6	24	MODERATE					
5.27	No / Less Quantity of crude (RC 2) transferred from receivers RC-12112A(RC-2) / RC-12107A (RC-2) / RC-12118A (RC-2) to storage tank ST-10107 by gravity due to human error	1. No consequences due to total material transfer from receiver to storage tank														

		5.28	No / Less Quantity of crude (RC 2) transferred from receivers RC-12112A(RC-2) / RC-12107A (RC-2) / RC-12118A (RC-2) to storage tank ST-10107 by gravity due to transfer Line choke up / valve choke up	1. No consequences due to total material transfer from receiver to storage tank														
		5.29	No / Less Quantity of crude (RC 2) transferred from receivers RC-12112A(RC-2) / RC-12107A (RC-2) / RC-12118A (RC-2) to storage tank ST-10107 by gravity due to leakage in transfer line	1. It will lead to material loss. 2. It will lead to leakage causing Health & Environment issue. 3. Leakage will cause burn injuries. 4. It may lead to fire in case of external source of ignition	6	6	36	HIGH	1, Process under supervior 2. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 3. LI provided on receiver and storage tank 4. Suitable MOC of pipelines and valves (SS316). 5. Fire fighting system available 6. Suitable MOC of packing (teflon). 7.Spill kit available.. 8. RCC florring in plant area 9. Double valve provided in transfer line. 10. PTW system in place. 11. Flameproof fittings installed. 12. Earthing provided to all equipment.	4	6	24	MODERATE					
		5.30	No/less quantity of K2CO3 charge in reactor R-12107 / R-12112 / R-12118 due to human error.	1. It may lead to remain acidic pH which may cause corrosion of equipment.	6	4	24	MODERATE	1. The material is received from store as per issue slip. 2. The material is weighed before charging 3. The neutral pH is checked during and after charging. 4. Process under supervision. 5.Ensure pH before distillation	4	4	16	LOW					
		5.31	No/less quantity of K2CO3 charge in reactor R-12107 / R-12112 / R-12118 due to weigh balance malfunction.	1. It may lead to remain acidic pH which may cause corrosion of equipment.	6	4	24	MODERATE	1. The material is received from store as per issue slip. 2. The material is weighed before charging 3. The neutral pH is checked during and after charging. 4. Process under supervision. 5. Calibration of weigh scale is done (weekly, monthly, yearly). 6. spare weigh balance is available. 7.Ensure pH before distillation	4	4	16	LOW					
		5.32	No/less quantity of K2CO3 charge in reactor R-12107 / R-12112 / R-12118 due to spillage	1. It may lead to material loss. 2. It may lead to health and envriomentissue	6	4	24	MODERATE	1. The material is received from store as per issue slip. 2. The material is weighed before charging 3. The neutral pH is checked during and after charging. 4. Process under supervision. 5. Secondary containment is provided 6 RCC floor provided 7. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 8.Ensure pH before distillation	4	4	16	LOW					
		5.33	No/less quantity of K2CO3 charge in reactor R-12107 / R-12112 / R-12118 due to left in bag	1. It may lead to remain acidic pH which may cause corrosion of equipment.	6	4	24	MODERATE	1. The material is received from store as per issue slip. 2. The material is weighed before charging 3. The neutral pH is checked during and after charging. 4. Process under supervision. 5.Ensure pH before distillation	4	4	16	LOW					
		5.34	No/less quantity of K2CO3 charge in reactor R-12107 / R-12112 / R-12118 due to less quantity received from store	1. It may lead to remain acidic pH which may cause corrosion of equipment.	6	4	24	MODERATE	1. The material is received from store as per issue slip. 2. The material is weighed before charging 3. The neutral pH is checked during and after charging. 4. Process under supervision. 5.Ensure pH before distillation	4	4	16	LOW					
		6.1	More Quantity of mass transferred from reactor R-13104, R-14105 / R-14106 / R-14111 / R-13110 / R-13126 to Reactor R-12107 / R-12112 / R-12118 by gravity due to human error	1. It may lead to over flow of material from reactors R-12107 / R-12112 / R-12118 may cause health and enviornment issue 2. It may lead to fire in case of external source of ignition 3. It may lead to process delay and material loss	6	6	36	HIGH	1, Process under supervision 2. WG provided on reactor R-13104, R-14105 / R-14106 / R-14111 / R-13110 / R-13126 3.WG provided on Reactor R-12107 / R-12112 / R-12118 4.PTW system available 5. TI provided on Reactor R-12107 / R-12112 / R-12118 6. TT on reactor R-13104, R-14105 / R-14106 / R-14111 / R-13110 / R-13126 7. Total material transfer from reactor R-13104, R-14105 / R-14106 / R-14111 / R-13110 / R-13126 to Reactor R-12107 / R-12112 / R-12118 8. Check empty reactors R-12107 / R-12112 / R-12118 before mass transfer 9. Fire fighting system available 10. SPill kit available 11. RCC flooring available 12. PPE kit available 13. FLP fitting available 14. Earthing provided on equipment	4	6	24	MODERATE					

6.2	More Quantity of mass transferred from reactor R-13104, R-14105 / R-14106 / R-14111 / R-13110 / R-13126 to reactor R-12107 / R-12112 / R-12118 by gravity due to reactor R-13104, R-14105 / R-14106 / R-14111 / R-13110 / R-13126 bottom valve open / pass	1. It will lead to material loss. 2. It will lead to leakage causing Health & Environment issue. 3. Leakage will cause burn injuries. 4. It may lead to fire in case of external source of ignition	6	6	36	HIGH	1. Process under supervision. 2. WG provided on reactor R-13104, R-14105 / R-14106 / R-14111 / R-13110 / R-13126 3. WG provided on Reactor R-12107 / R-12112 / R-12118 4. Manually check with dip stick in reactor R-13104, R-14105 / R-14106 / R-14111 / R-13110 / R-13126 5. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 6. TI provided on Reactor R-12107 / R-12112 / R-12118 7. TT on reactor R-13104, R-14105 / R-14106 / R-14111 / R-13110 / R-13126 8. Total material transfer from reactor R-13104, R-14105 / R-14106 / R-14111 / R-13110 / R-13126 to Reactor R-12107 / R-12112 / R-12118 9. Suitable MOC of valves (SS316) 10. Double valave provided on Reactor R-12107 / R-12112 / R-12118 11. Blind provided on bottom drain valave of Reactor R-12107 / R-12112 / R-12118 12. Spill kit available. 13. RCC florring in plant area. 14. Double valve provided in transfer line. 15. PTW system in place. 16. Flameproof fittings installed. 17. Suiatbe MOC of valve SS-316 is selected 17. Earthing provided to all equipment	4	6	24	MODERATE					
6.3	More quantity of K2CO3 charged in reactor R-12107 / R-12112 / R-12118 due to human error.	1. It may lead to material loss	6	2	12	LOW	1. The material is received from store as per issue slip. 2. The material is weighed before charging 3. The neutral pH is checked during and after charging. 4. Process under supervision. 5.Ensure pH before distillation 6. Empty bag check and count	4	2	8	EXTREMELY LOW					
6.4	More quantity of K2CO3 charged in reactor R-12107 / R-12112 / R-12118 due to weigh balance malfunction.	1. It may lead to material loss	6	2	12	LOW	1. The material is received from store as per issue slip. 2. The material is weighed before charging 3. The neutral pH is checked during and after charging. 4. Process under supervision. 5. Calibration of weigh scale is done (weekly, monthly, yearly). 6.Spare weigh balance is available. 7.Ensure pH before distillation 8. Empty bag check and count	4	2	8	EXTREMELY LOW					
6.5	More quantity of K2CO3 charged in reactor R-12107 / R-12112 / R-12118 due to more quantity received from store	1. It may lead to material loss	6	2	12	LOW	1. The material is received from store as per issue slip. 2. The material is weighed before charging 3. The neutral pH is checked during and after charging. 4. Process under supervision. 5.Ensure pH before distillation 6. Empty bag check and count	4	2	8	EXTREMELY LOW					
6.6	More quantity of crude received in receivers RC-12112A(RC-2) / RC-12107A (RC-2) / RC-12118A (RC-2) from reactor R-12107 / R-12112 / R-12118 due to human error.	1. It will lead to process delay. 2. It may lead to reduction in purity of the crude material (RC-2)	6	2	12	LOW	1. Process under supervision. 2. TI provided on receiver RC-12112A(RC-2) / RC-12107A (RC-2) / RC-12118A (RC-2). 3. TI provided on reactor vapour column of reactor R-12107 / R-12112 / R-12118. 4. SG provided below condenser of reactor. 5. SG provided on reactor reflux line. 6. SG provided on inlet line of receiver RC-12112A(RC-2) / RC-12107A (RC-2) / RC-12118A (RC-2). 7.Glass LI provided on receiver RC-12112A(RC-2) / RC-12107A (RC-2) / RC-12118A (RC-2). 8. Primary condenser provided with cooling water and secondary condenser provided with chilling water. 9. WG provided on receiver RC-12112A(RC-2) / RC-12107A (RC-2) / RC-12118A (RC-2). 10. VG provided on reactor R-12107 / R-12112 / R-12118 and its header. 11. TI provided on reactor R-12107 / R-12112 / R-12118.	4	2	8	EXTREMELY LOW					
6.7	More quantity of crude received in receivers RC-12112A(RC-2) / RC-12107A (RC-2) / RC-12118A (RC-2) from reactor R-12107 / R-12112 / R-12118 due to > 130°C temperature in reactor.	1. It will lead to process delay. 2. It may lead to reduction in purity of the crude material (RC-2)	6	2	12	LOW	1. Process under supervision. 2. TI provided on receiver RC-12112A(RC-2) / RC-12107A (RC-2) / RC-12118A (RC-2). 3. TI provided on reactor vapour column of reactor R-12107 / R-12112 / R-12118. 4. SG provided below condenser of reactor. 5. SG provided on reactor reflux line. 6. SG provided on inlet line of receiver RC-12112A(RC-2) / RC-12107A (RC-2) / RC-12118A (RC-2). 7. LI provided on receiver RC-12112A(RC-2) / RC-12107A (RC-2) / RC-12118A (RC-2). 8. Primary condenser provided with cooling water and secondary condenser provided with chilling water. 9. WG provided on receiver RC-12112A(RC-2) / RC-12107A (RC-2) / RC-12118A (RC-2). 10. VG provided on reactor R-12107 / R-12112 / R-12118 and its header. 11. TI provided on reactor R-12107 / R-12112 / R-12118.	4	2	8	EXTREMELY LOW					

More	Quantity	6.8	More quantity of crude received in receivers RC-12112A(RC-2) / RC-12107A (RC-2) / RC-12118A (RC-2) from reactor R-12107 / R-12112 / R-12118 due to More vacuum.	1. It will lead to process delay. 2. It may lead to reduction in purity of the crude material (RC-2)	6	2	12	LOW	1. Process under supervision. 2. TI provided on receiver RC-12112A(RC-2) / RC-12107A (RC-2) / RC-12118A (RC-2). 3. TI provided on reactor vapour column of reactor R-12107 / R-12112 / R-12118. 4. SG provided below condenser of reactor. 5. SG provided on reactor reflux line. 6. SG provided on inlet line of receiver RC-12112A(RC-2) / RC-12107A (RC-2) / RC-12118A (RC-2). 7. LI provided on receiver RC-12112A(RC-2) / RC-12107A (RC-2) / RC-12118A (RC-2). 8. Primary condenser provided with cooling water and secondary condenser provided with chilling water. 9. WG provided on receiver RC-12112A(RC-2) / RC-12107A (RC-2) / RC-12118A (RC-2). 10. VG provided on reactor R-12107 / R-12112 / R-12118 and its header. 11. TI provided on reactor R-12107 / R-12112 / R-12118. 12. PM done of vacuum pump as per the schedule.	4	2	8	EXTREMELY LOW					
		6.9	More quantity of crude received in receivers RC-12112A(RC-2) / RC-12107A (RC-2) / RC-12118A (RC-2) from reactor R-12107 / R-12112 / R-12118 due to TI malfunction of reactor R-12107 / R-12112 / R-12118	1. It will lead to process delay. 2. It may lead to reduction in purity of the crude material (RC-2)	6	2	12	LOW	1. Calibration of TI of reactor R-12107 / R-12112 / R-12118 is done as per the schedule. 2. TI provided on reactor vapour column of reactor R-12107 / R-12112 / R-12118. 3. SG provided below condenser of reactor. 4. SG provided below condenser of reactor. 5. SG provided on reactor reflux line. 6. SG provided on inlet line of receiver RC-12112A(RC-2) / RC-12107A (RC-2) / RC-12118A (RC-2). 7. LI provided on receiver RC-12112A(RC-2) / RC-12107A (RC-2) / RC-12118A (RC-2). 8. Primary condenser provided with cooling water and secondary condenser provided with chilling water. 9. WG provided on receiver RC-12112A(RC-2) / RC-12107A (RC-2) / RC-12118A (RC-2). 10. VG provided on reactor R-12107 / R-12112 / R-12118 and its header. 11. TI provided on receiver RC-12112A(RC-2) / RC-12107A (RC-2) / RC-12118A (RC-2).	4	2	8	EXTREMELY LOW					
		6.10	More quantity of crude received in receivers RC-12112B(RC-1) / RC-12107B (RC-1) / RC-12118B (RC-1) from reactor R-12107 / R-12112 / R-12118 due to human error.	1. It will lead to process delay. 2. It may lead to reduction in purity of the crude material (RC-1)	6	2	12	LOW	1. Process under supervision. 2. TI provided on receivers RC-12112B(RC-1) / RC-12107B (RC-1) / RC-12118B (RC-1) 3. TI provided on reactor vapour column of reactor R-12107 / R-12112 / R-12118. 4. SG provided below condenser of reactor. 5. SG provided on reactor reflux line. 6. SG provided on inlet line of receivers RC-12112B(RC-1) / RC-12107B (RC-1) / RC-12118B (RC-1) 7. LI provided on receivers RC-12112B(RC-1) / RC-12107B (RC-1) / RC-12118B (RC-1) 8. Primary condenser provided with cooling water and secondary condenser provided with chilling water. 9. WG provided on receivers RC-12112B(RC-1) / RC-12107B (RC-1) / RC-12118B (RC-1) 10. VG provided on reactor R-12107 / R-12112 / R-12118 and its header. 11. TI provided on reactor R-12107 / R-12112 / R-12118.	4	2	8	EXTREMELY LOW					
		6.11	More quantity of crude received in receivers RC-12112B(RC-1) / RC-12107B (RC-1) / RC-12118B (RC-1) from reactor R-12107 / R-12112 / R-12118 due to >130oC temperature in reactor.	1. It will lead to process delay. 2. It may lead to reduction in purity of the crude material (RC-1)	6	2	12	LOW	1. Process under supervision. 2. TI provided on receivers RC-12112B(RC-1) / RC-12107B (RC-1) / RC-12118B (RC-1) 3. TI provided on reactor vapour column of reactor R-12107 / R-12112 / R-12118. 4. SG provided below condenser of reactor. 5. SG provided on reactor reflux line. 6. SG provided on inlet line of receivers RC-12112B(RC-1) / RC-12107B (RC-1) / RC-12118B (RC-1) 7. LI provided on receivers RC-12112B(RC-1) / RC-12107B (RC-1) / RC-12118B (RC-1) 8. Primary condenser provided with cooling water and secondary condenser provided with chilling water. 9. WG provided on receivers RC-12112B(RC-1) / RC-12107B (RC-1) / RC-12118B (RC-1) 10. VG provided on reactor R-12107 / R-12112 / R-12118 and its header. 11. TI provided on reactor R-12107 / R-12112 / R-12118.	4	2	8	EXTREMELY LOW					

		6.12	More quantity of crude received in receivers RC-12112B(RC-1) / RC-12107B (RC-1) / RC-12118B (RC-1) from reactor R-12107 / R-12112 / R-12118 due to More vacuum.	1. It will lead to process delay. 2. It may lead to reduction in purity of the crude material (RC-1)	6	2	12	LOW	1. Process under supervision. 2. TI provided on receivers RC-12112B(RC-1) / RC-12107B (RC-1) / RC-12118B (RC-1) 3. TI provided on reactor vapour column of reactor R-12107 / R-12112 / R-12118. 4. SG provided below condenser of reactor. 5. SG provided on reactor reflux line. 6. SG provided on inlet line of receivers RC-12112B(RC-1) / RC-12107B (RC-1) / RC-12118B (RC-1) 7. LI provided on receivers RC-12112B(RC-1) / RC-12107B (RC-1) / RC-12118B (RC-1) 8. Primary condenser provided with cooling water and secondary condenser provided with chilling water. 9. WG provided on receivers RC-12112B(RC-1) / RC-12107B (RC-1) / RC-12118B (RC-1) 10. VG provided on reactor R-12107 / R-12112 / R-12118 and its header. 11. TI provided on reactor R-12107 / R-12112 / R-12118. 12. PM done of vacuum pump as per the schedule.	4	2	8	EXTREMELY LOW					
		6.13	More quantity of crude received in receivers RC-12112B(RC-1) / RC-12107B (RC-1) / RC-12118B (RC-1) from reactor R-12107 / R-12112 / R-12118 due to TI malfunction of reactor R-12107 / R-12112 / R-12118	1. It will lead to process delay. 2. It may lead to reduction in purity of the crude material (RC-1)	6	2	12	LOW	1. Calibration of TI of reactor R-12107 / R-12112 / R-12118 is done as per the schedule. 2. TI provided on reactor vapour column of reactor R-12107 / R-12112 / R-12118. 3. SG provided below condenser of reactor. 4. SG provided below condenser of reactor. 5. SG provided on reactor reflux line. 6. SG provided on inlet line of receivers RC-12112B(RC-1) / RC-12107B (RC-1) / RC-12118B (RC-1) 7. LI provided on receivers RC-12112B(RC-1) / RC-12107B (RC-1) / RC-12118B (RC-1) 8. Primary condenser provided with cooling water and secondary condenser provided with chilling water. 9. WG provided on receivers RC-12112B(RC-1) / RC-12107B (RC-1) / RC-12118B (RC-1) 10. VG provided on reactor R-12107 / R-12112 / R-12118 and its header. 11. TI provided on receivers RC-12112B(RC-1) / RC-12107B (RC-1) / RC-12118B (RC-1)	4	2	8	EXTREMELY LOW					
		6.14	More Quantity of crude (RC 1) transferred from receivers RC-12112B(RC-1) / RC-12107B (RC-1) / RC-12118B (RC-1) to storage tank ST-10111 by gravity due to human error	1. No consequences due to total material transfer from receiver to storage tank														
		6.15	More Quantity of crude (RC 2) transferred from receivers RC-12112A(RC-2) / RC-12107A (RC-2) / RC-12118A (RC-2) to storage tank ST-10107 by gravity due to human error	1. No consequences due to total material transfer from receiver to storage tank														
		6.16	More quantity of K2CO3 charge in reactor R-12107 / R-12112 / R-12118 due to human error.	1. It may lead to RM loss	6	2	12	LOW	1. The material is received from store as per issue slip. 2. The material is weighed before charging 3. The neutral pH is checked during and after charging. 4. Process under supervision.	4	2	8	EXTREMELY LOW					
		6.17	More quantity of K2CO3 charge in reactor R-12107 / R-12112 / R-12118 due to weigh balance malfunction.	1. It may lead to RM loss	6	2	12	LOW	1. The material is received from store as per issue slip. 2. The material is weighed before charging. 3. The neutral pH is checked during and after charging. 4. Process under supervision. 5. Calibration of weigh scale is done (weekly, monthly, yearly). 6. Spare weigh balance is available.	4	2	8	EXTREMELY LOW					
		6.18	More quantity of K2CO3 charge in reactor R-12107 / R-12112 / R-12118 due to More quantity received from store	1. It may lead to RM loss	6	2	12	LOW	1. The material is received from store as per issue slip. 2. The material is weighed before charging 3. Empty bag checked and counted after charging (two times). 4. Process under supervision. 5. QC sample check during the reaction.	4	2	8	EXTREMELY LOW					
NO/Less	Pressure	7.1	NA															
More	Pressure	8.1	NA															
Back	Pressure	9.1	NA															

		10.1	No/less temperature < 100°C maintaiing during K2CO3 charging in reactor R-12107/ R-12112 / R-12118 during K2CO3 charging due to human error	1. No consequences														
		10.2	No/less temperature < 100°C maintaiing during K2CO3 charging in reactor R-12107/ R-12112 / R-12118 during K2CO3 charging due to TI malfunction of reactor R-12107/ R-12112 / R-12118	1. No consequences														
		10.3	No/less temperature < 120°C maintaining during distillation in receivers RC-12112A(RC-2) / RC-12107A (RC-2) / RC-12118A (RC-2) from reactor R-12107 / R-12112 / R-12118 due to human error.	1. It will lead to process delay.	6	2	12	LOW	1. Process under supervision. 2. TI provided on receiver RC-12112A(RC-2) / RC-12107A (RC-2) / RC-12118A (RC-2). 3. TI provided on reactor vapour column of reactor R-12107 / R-12112 / R-12118. 4. SG provided below condenser of reactor. 5. SG provided on reactor reflux line. 6. SG provided on inlet line of receiver RC-12112A(RC-2) / RC-12107A (RC-2) / RC-12118A (RC-2). 7. LI provided on receiver RC-12112A(RC-2) / RC-12107A (RC-2) / RC-12118A (RC-2). 8. Primary condenser provided with cooling water and secondary condenser provided with chilling water. 9. WG provided on receiver RC-12112A(RC-2) / RC-12107A (RC-2) / RC-12118A (RC-2). 10. VG provided on reactor R-12107 / R-12112 / R-12118 and its header. 11. TI provided on reactor R-12107 / R-12112 / R-12118.	4	2	8	EXTREMELY LOW					
		10.4	No/less temperature < 120°C maintaining during distillation in receivers RC-12112A(RC-2) / RC-12107A (RC-2) / RC-12118A (RC-2) from reactor R-12107 / R-12112 / R-12118 due to TI malfunction of reactor	1. It will lead to process delay.	6	2	12	LOW	1. Process under supervision. 2. TI provided on receiver RC-12112A(RC-2) / RC-12107A (RC-2) / RC-12118A (RC-2). 3. TI provided on reactor vapour column of reactor R-12107 / R-12112 / R-12118. 4. SG provided below condenser of reactor. 5. SG provided on reactor reflux line. 6. SG provided on inlet line of receiver RC-12112A(RC-2) / RC-12107A (RC-2) / RC-12118A (RC-2). 7. LI provided on receiver RC-12112A(RC-2) / RC-12107A (RC-2) / RC-12118A (RC-2). 8. Primary condenser provided with cooling water and secondary condenser provided with chilling water. 9. WG provided on receiver RC-12112A(RC-2) / RC-12107A (RC-2) / RC-12118A (RC-2). 10. VG provided on reactor R-12107 / R-12112 / R-12118 and its header. 11. Calibration of TI as per schedule	4	2	8	EXTREMELY LOW					
		10.5	No/less temperature < 120°C maintaining during distillation in receivers RC-12112A(RC-2) / RC-12107A (RC-2) / RC-12118A (RC-2) from reactor R-12107 / R-12112 / R-12118 due to steam heating failure.	1. It will lead to process delay.	6	2	12	LOW	1. Process under supervision. 2. TI provided on receiver RC-12112A(RC-2) / RC-12107A (RC-2) / RC-12118A (RC-2). 3. TI provided on reactor vapour column of reactor R-12107 / R-12112 / R-12118. 4. SG provided below condenser of reactor. 5. SG provided on reactor reflux line. 6. SG provided on inlet line of receiver RC-12112A(RC-2) / RC-12107A (RC-2) / RC-12118A (RC-2). 7. LI provided on receiver RC-12112A(RC-2) / RC-12107A (RC-2) / RC-12118A (RC-2). 8. Primary condenser provided with cooling water and secondary condenser provided with chilling water. 9. WG provided on receiver RC-12112A(RC-2) / RC-12107A (RC-2) / RC-12118A (RC-2). 10. VG provided on reactor R-12107 / R-12112 / R-12118 and its header. 11. TI provided on reactor R-12107 / R-12112 / R-12118. 12. Stand by steam provision is available. 13. PG provided on steam line and reactor jacket. 14. low steam pressure alarm provided.	4	2	8	EXTREMELY LOW					

Less	Temperature		No/less temperature < 120°C maintaining during distillation in receivers RC-12112B(RC-1) / RC-12107B (RC-1) / RC-12118B (RC-1) from reactor R-12107 / R-12112 / R-12118 due to human error.	1. It will lead to process delay.	6	2	12	LOW	1. Process under supervision. 2. TI provided on receivers RC-12112B(RC-1) / RC-12107B (RC-1) / RC-12118B (RC-1) 3. TI provided on reactor vapour column of reactor R-12107 / R-12112 / R-12118. 4. SG provided below condenser of reactor. 5. SG provided on reactor reflux line. 6. SG provided on inlet line ofreceivers RC-12112B(RC-1) / RC-12107B (RC-1) / RC-12118B (RC-1) 7. LI provided on receivers RC-12112B(RC-1) / RC-12107B (RC-1) / RC-12118B (RC-1) 8. Primary condenser provided with cooling water and secondary condenser provided with chilling water. 9. WG provided on receivers RC-12112B(RC-1) / RC-12107B (RC-1) / RC-12118B (RC-1) 10. VG provided on reactor R-12107 / R-12112 / R-12118 and its header. 11. TI provided on reactor R-12107 / R-12112 / R-12118.	4	2	8	EXTREMELY LOW					
			No/less temperature < 120°C maintaining during distillation in receivers RC-12112B(RC-1) / RC-12107B (RC-1) / RC-12118B (RC-1) from reactor R-12107 / R-12112 / R-12118 due to TI malfunction of reactor	1. It will lead to process delay.	6	2	12	LOW	1. Process under supervision. 2. TI provided onreceivers RC-12112B(RC-1) / RC-12107B (RC-1) / RC-12118B (RC-1) 3. TI provided on reactor vapour column of reactor R-12107 / R-12112 / R-12118. 4. SG provided below condenser of reactor. 5. SG provided on reactor reflux line. 6. SG provided on inlet line ofreceivers RC-12112B(RC-1) / RC-12107B (RC-1) / RC-12118B (RC-1) 7. LI provided on receivers RC-12112B(RC-1) / RC-12107B (RC-1) / RC-12118B (RC-1). 8. Primary condenser provided with cooling water and secondary condenser provided with chilling water. 9. WG provided on receivers RC-12112B(RC-1) / RC-12107B (RC-1) / RC-12118B (RC-1) 10. VG provided on reactor R-12107 / R-12112 / R-12118 and its header. 11. Calibration of TI as per schedule	4	2	8	EXTREMELY LOW					
			No/less temperature < 120°C maintaining during distillation in receivers RC-12112B(RC-1) / RC-12107B (RC-1) / RC-12118B (RC-1) from reactor R-12107 / R-12112 / R-12118 due to steam heating failure.	1. It will lead to process delay.	6	2	12	LOW	1. Process under supervision. 2. TI provided on receivers RC-12112B(RC-1) / RC-12107B (RC-1) / RC-12118B (RC-1) 3. TI provided on reactor vapour column of reactor R-12107 / R-12112 / R-12118. 4. SG provided below condenser of reactor. 5. SG provided on reactor reflux line. 6. SG provided on inlet line of receivers RC-12112B(RC-1) / RC-12107B (RC-1) / RC-12118B (RC-1) 7. LI provided on receivers RC-12112B(RC-1) / RC-12107B (RC-1) / RC-12118B (RC-1) 8. Primary condenser provided with cooling water and secondary condenser provided with chilling water. 9. WG provided on receivers RC-12112B(RC-1) / RC-12107B (RC-1) / RC-12118B (RC-1) 10. VG provided on reactor R-12107 / R-12112 / R-12118 and its header. 11. TI provided on reactor R-12107 / R-12112 / R-12118. 12. Stand by steam provision is available. 13. PG provided on steam line and reactor jacket. 14. low steam pressure alarm provided.	4	2	8	EXTREMELY LOW					
		10.8	No/less temperature < 30°C in reactor R-12107 / R-12112 / R-12118 before centrifuge due to human error	1. No consequences														
		10.9	No/less temperature < 30°C in reactor R-12107 / R-12112 / R-12118 before centrifuge due to cooling failure	1. No consequences														
		10.10	No/less temperature < 30°Cin reactor R-12107 / R-12112 / R-12118 before centrifuge due to TI malfunction of reactor R-12107/R-12112/R-12118	1. No consequences														

		10.11	No/less temperature < 30°C in reactor R-12107 / R-12112 / R-12118 before centrifuge due to cooling supply linel valve malfunction	1. No consequences														
More	Temperature	11.1	More temperature > 110°C maintaiing during K2CO3 charging in reactor R-12107/ R-12112 / R-12118 during K2CO3 charging due to human error	1. It may lead to process delay due to if vapor generate of high temperature may cause health and environment issue	6	4	24	MODERATE	1. Process under supervision. 2. TI provided on reactor vapour column of reactor R-12107 / R-12112 / R-12118. 3. WG provided on reactor R-12107 / R-12112 / R-12118 4. TI provided on reactor R-12107 / R-12112 / R-12118.	4	4	16	LOW					
		11.2	More temperature > 110°C maintaining during K2CO3 charging in reactor R-12107/ R-12112 / R-12118 during K2CO3 charging due to TI malfunction of reactor R-12107/ R-12112 / R-12118	1. It may lead to process delay due to if vapor generate of high temperature may cause health and environment issue	6	4	24	MODERATE	1. Process under supervision. 2. TI provided on reactor vapour column of reactor R-12107 / R-12112 / R-12118. 3. WG provided on reactor R-12107 / R-12112 / R-12118 4. calibration of TI provided on reactor R-12107 / R-12112 / R-12118.	4	4	16	LOW					
		11.3	More temperature > 130°C maintaining during distillation in receivers RC-12112A(RC-2) / RC-12107A (RC-2) / RC-12118A (RC-2) from reactor R-12107 / R-12112 / R-12118 due to human error.	1. No consequences due to use of low pressure steam					1. Process under supervision. 2. TI provided on receiver RC-12112A(RC-2) / RC-12107A (RC-2) / RC-12118A (RC-2). 3. TI provided on reactor vapour column of reactor R-12107 / R-12112 / R-12118. 4. SG provided below condenser of reactor. 5. SG provided on reactor reflux line. 6. SG provided on inlet line of receiver RC-12112A(RC-2) / RC-12107A (RC-2) / RC-12118A (RC-2). 7. LI provided on receiver RC-12112A(RC-2) / RC-12107A (RC-2) / RC-12118A (RC-2). 8. Primary condenser provided with cooling water and secondary condenser provided with chilling water. 9. WG provided on receiver RC-12112A(RC-2) / RC-12107A (RC-2) / RC-12118A (RC-2). 10. VG provided on reactor R-12107 / R-12112 / R-12118 and its header. 11. TI provided on reactor R-12107 / R-12112 / R-12118.								
		11.4	More temperature > 130oC maintaining during distillation in receivers RC-12112A(RC-2) / RC-12107A (RC-2) / RC-12118A (RC-2) from reactor R-12107 / R-12112 / R-12118 due to TI malfunction of reactor	1. No consequences due to use of low pressure steam					1. Process under supervision. 2. TI provided on receiver RC-12112A(RC-2) / RC-12107A (RC-2) / RC-12118A (RC-2). 3. TI provided on reactor vapour column of reactor R-12107 / R-12112 / R-12118. 4. SG provided below condenser of reactor. 5. SG provided on reactor reflux line. 6. SG provided on inlet line of receiver RC-12112A(RC-2) / RC-12107A (RC-2) / RC-12118A (RC-2). 7. LI provided on receiver RC-12112A(RC-2) / RC-12107A (RC-2) / RC-12118A (RC-2). 8. Primary condenser provided with cooling water and secondary condenser provided with chilling water. 9. WG provided on receiver RC-12112A(RC-2) / RC-12107A (RC-2) / RC-12118A (RC-2). 10. VG provided on reactor R-12107 / R-12112 / R-12118 and its header. 11. Calibration of TI as per schedule								
		11.5	More temperature > 130°C maintaining during distillation in receivers RC-12112B(RC-1) / RC-12107B (RC-1) / RC-12118B (RC-1) from reactor R-12107 / R-12112 / R-12118 due to human error.	1. No consequences due to use of low pressure steam					1. Process under supervision. 2. TI provided on receivers RC-12112B(RC-1) / RC-12107B (RC-1) / RC-12118B (RC-1) 3. TI provided on reactor vapour column of reactor R-12107 / R-12112 / R-12118. 4. SG provided below condenser of reactor. 5. SG provided on reactor reflux line. 6. SG provided on inlet line ofreceivers RC-12112B(RC-1) / RC-12107B (RC-1) / RC-12118B (RC-1) 7. LI provided on receivers RC-12112B(RC-1) / RC-12107B (RC-1) / RC-12118B (RC-1) 8. Primary condenser provided with cooling water and secondary condenser provided with chilling water. 9. WG provided on receivers RC-12112B(RC-1) / RC-12107B (RC-1) / RC-12118B (RC-1) 10. VG provided on reactor R-12107 / R-12112 / R-12118 and its header. 11. TI provided on reactor R-12107 / R-12112 / R-12118.								

		11.6	More temperature > 130°C maintaining during distillation in receivers RC-12112B(RC-1) / RC-12107B (RC-1) / RC-12118B (RC-1) from reactor R-12107 / R-12112 / R-12118 due to TI malfunction of reactor	1. No consequences due to use of low pressure steam					1. Process under supervision. 2. TI provided onreceivers RC-12112B(RC-1) / RC-12107B (RC-1) / RC-12118B (RC-1) 3. TI provided on reactor vapour column of reactor R-12107 / R-12112 / R-12118. 4. SG provided below condenser of reactor. 5. SG provided on reactor reflux line. 6. SG provided on inlet line ofreceivers RC-12112B(RC-1) / RC-12107B (RC-1) / RC-12118B (RC-1) 7. LI provided on receivers RC-12112B(RC-1) / RC-12107B (RC-1) / RC-12118B (RC-1). 8. Primary condenser provided with cooling water and secondary condenser provided with chilling water. 9. WG provided on receivers RC-12112B(RC-1) / RC-12107B (RC-1) / RC-12118B (RC-1) 10. VG provided on reactor R-12107 / R-12112 / R-12118 and its header. 11. Calibration of TI as per schedule								
		11.7	More temperature > 35°C in reactor R-12107 / R-12112 / R-12118 before centrifuge due to human error	1. It may lead to process delay due to salt carry forward with ML 2. It may lead to material loss	6	2	12	LOW	1. Process under supervision. 2. TI provided on reactor vapour column of reactor R-12107 / R-12112 / R-12118. 3. WG provided on reactor R-12107 / R-12112 / R-12118 4. TI provided on reactor R-12107 / R-12112 / R-12118. 5. Primary HE wih cooling water provided	4	2	8	EXTREMELY LOW					
		11.8	More temperature > 35°C in reactor R-12107 / R-12112 / R-12118 before centrifuge due to cooling failure	1. It may lead to process delay due to salt carry forward with ML 2. It may lead to material loss	6	2	12	LOW	1. Process under supervision. 2. TI provided on reactor vapour column of reactor R-12107 / R-12112 / R-12118. 3. WG provided on reactor R-12107 / R-12112 / R-12118 4. TI provided on reactor R-12107 / R-12112 / R-12118. 5. Stand by cooling supply pump availble	4	2	8	EXTREMELY LOW					
		11.9	More temperature > 35°Cin reactor R-12107 / R-12112 / R-12118 before centrifuge due to TI malfunction of reactor R-12107/R-12112/R-12118	1. It may lead to process delay due to salt carry forward with ML 2. It may lead to material loss	6	2	12	LOW	1. Process under supervision. 2. TI provided on reactor vapour column of reactor R-12107 / R-12112 / R-12118. 3. WG provided on reactor R-12107 / R-12112 / R-12118 4. calibration of TI provided on reactor R-12107 / R-12112 / R-12118. 5. Primary HE wih cooling water provided	4	2	8	EXTREMELY LOW					
		11.1	More temperature > 35°C in reactor R-12107 / R-12112 / R-12118 before centrifuge due to cooling supply linel valve malfunction	1. It may lead to process delay due to salt carry forward with ML 2. It may lead to material loss	6	2	12	LOW	1. Process under supervision. 2. TI provided on reactor vapour column of reactor R-12107 / R-12112 / R-12118. 3. WG provided on reactor R-12107 / R-12112 / R-12118 4. TI provided on reactor R-12107 / R-12112 / R-12118. 5. Suitable MOC of valve MS is selected 6. Primary HE wih cooling water provided	4	2	8	EXTREMELY LOW					
NO/Less	Level	12.1	NA															
More	Level	13.1	NA															
Improper	Agitation	14	Agitation failure	1.It will lead to process delay	6	2	12	LOW	1 PMS of reactor is done 2 Over load / under load tripping to agitator motor 3 Critical spare of reactor is available 4 Suitable MOC of agitator SS316	4	2	8	EXTREMELY LOW					
Changed	Composition	15	Improper quality of K2CO3	1.It will lead to acidic pH may casue equipment damage	6	4	24	MODERATE	1 QC check of all raw material 2 COA received with material issue slip 3 Process under supervision 4. pH check during K2CO3 charging	4	4	16	LOW					
		16.1	Cooling failure in reactor	It may lead to process delay	6	2	12	LOW	1. Process under supervision 2. TI provided on recator R-12107,R-12112,R-12118 3. PG provided on reactor jacket 5. PM of pump is done as schedule 6.Standby cooling water supply pump is available 7.PG provided on cooling supply line header 8.Alarm provided on cooling water supply pump on tripping condition	4	2	8	EXTREMELY LOW					
		16.2	Cooling failure in primary condenser	1. Material vapour escape from vaccuum trap in environment will lead to health and environment issue. 2. It will lead to material loss.	6	4	24	MODERATE	1. TI provided on reactor R-12107,R-12112,R-12118 2. TI provided on reactor vapour column of reactor R-12107,R-12112,R-12118 3. SG provided below condenser of reactor. 4. SG provided on reactor reflux line. 5. SG provided on inlet line of receivers 6. LI provided on receivers 7. Secondary condenser provided with chilling water. 8. TI provided on receivers 9. WG provided on receivers 10.Vaccuum trap with cooling / chilling provided 11. PG on reactor jacket inlet and outlet line provided. 12. PG provided in inlet and outlet line of primary condenser in header of cooling line.	4	4	16	LOW					

Failure	Utility	16.3	Chilling failure in secondary condenser	1. Material vapour escape from vaccuum trap in environment will lead to health and environment issue. 2. It will lead to material loss.	6	4	24	MODERATE	1. TI provided on reactor R-12107,R-12112,R-12118 2. TI provided on reactor vapour column of reactor R-12107,R-12112,R-12118 3. SG provided below condenser of reactor. 4. SG provided on reactor reflux line. 5. SG provided on inlet line of receivers 6. LI provided on receivers 7. Primary condenser provided with chooling water. 8. TI provided on receivers 9. WG provided on receivers 10.Vaccuum trap with cooling / chilling provided 11. PG on reactor jacket inlet and outlet line provided. 12. PG provided in inlet and outlet line of primary condenser in header of cooling line.	4	4	16	LOW					
		16.4	Nitrogen supply failure	1.It may lead to process delay	6	2	12	LOW	1. Process under supervision 2. PG provided on nitrogen supply header 3. VG provided on reactor 4. PG provided on plant floor main header 5.PM of nitrogen plant is done regularly 6. Stand by nitrogen supply provision is available 7. PT provided on nitrogen plant receiver 8. PG provided on nitrogen plant receiver 9. PG provided on reactor	4	2	8	EXTREMELY LOW					
		16.5	Steam heating failure In reactor R-12107 / R-12112 / R-12118	1. It will lead to process delay.	6	2	12	LOW	1. Process under supervision. 2. TI provided on receivers RC-12112A(RC-2)/RC-12112B(RC-1)/RC-12107A(RC-2)/RC-12107B(RC-1)/RC-12118A(RC-2)/RC-12118B(RC-1) 3. TI provided on reactor vapour column of reactor R-12107 / R-12112 / R-12118. 4. SG provided below condenser of reactor. 5. SG provided on reactor reflux line. 6. SG provided on inlet line ofreceivers RC-12112A(RC-2)/RC-12112B(RC-1)/RC-12107A(RC-2)/RC-12107B(RC-1)/RC-12118A(RC-2)/RC-12118B(RC-1) 7. LI provided on receivers RC-12112A(RC-2)/RC-12112B(RC-1)/RC-12107A(RC-2)/RC-12107B(RC-1)/RC-12118A(RC-2)/RC-12118B(RC-1) 8. Primary condenser provided with cooling water and secondary condenser provided with chilling water. 9. WG provided on receivers RC-12112A(RC-2)/RC-12112B(RC-1)/RC-12107A(RC-2)/RC-12107B(RC-1)/RC-12118A(RC-2)/RC-12118B(RC-1) 10. VG provided on reactor R-12107 / R-12112 / R-12118 and its header. 11. TI provided on reactor R-12107 / R-12112 / R-12118. 12. Stand by steam provision is available. 13. PG provided on steam line and reactor jacket. 14. low steam pressure alarm provided.	4	2	8	EXTREMELY LOW					
		16.6	vacuum failure in reactor R-12107 / R-12112 / R-12118 during distillation	1. It will lead to process delay.	6	2	12	LOW	1. Process under supervision. 2. TI provided on receivers RC-12112A(RC-2)/RC-12112B(RC-1)/RC-12107A(RC-2)/RC-12107B(RC-1)/RC-12118A(RC-2)/RC-12118B(RC-1) 3. TI provided on reactor vapour column of reactor R-12107 / R-12112 / R-12118. 4. SG provided below condenser of reactor. 5. SG provided on reactor reflux line. 6. SG provided on inlet line of receivers RC-12112A(RC-2)/RC-12112B(RC-1)/RC-12107A(RC-2)/RC-12107B(RC-1)/RC-12118A(RC-2)/RC-12118B(RC-1) 7. LI provided onreceivers RC-12112A(RC-2)/RC-12112B(RC-1)/RC-12107A(RC-2)/RC-12107B(RC-1)/RC-12118A(RC-2)/RC-12118B(RC-1). 8. Primary condenser provided with cooling water and secondary condenser provided with chilling water. 9. WG provided onreceivers RC-12112A(RC-2)/RC-12112B(RC-1)/RC-12107A(RC-2)/RC-12107B(RC-1)/RC-12118A(RC-2)/RC-12118B(RC-1) 10. VG provided on reactor R-12107 / R-12112 / R-12118 and its header. 11. TI provided on reactor R-12107 / R-12112 / R-12118. 12. PM done of vacuum pump as per the schedule. 13. low vacuum alarm provided.	4	2	8	EXTREMELY LOW	1. Vacuum control valve need to be convert to On/Off valve with interlock with steam ejector for avoid water suck in system.	4	2	8	
High	Viscosity	17	NA															
Low	Viscosity	18	NA															
Incorrect Sequence	Raw material Issues	19	NA															
	Sampling Issues	20	NA															
Incompatibility	Raw Material	21	NA															
Failure	DCS	22	NA															
	Power	23	Power failure	1. It will lead to process delay	6	2	12	LOW	DG set available	4	2	8	EXTREMELY LOW					
	Start up/Shut down	24	NA															

	Loss of Containment (Leakage / Rupture)	25.1	No / Less Quantity of mass transferred from reactor R-13104, R-14105 / R-14106 / R-14111 / R-13110 / R-13126 to Reactor R-12107 / R-12112 / R-12118 by gravity due to leakage in transfer line	1. It will lead to material loss. 2. It will lead to leakage causing Health & Environment issue. 3. Leakage will cause burn injuries. 4. It may lead to fire in case of external source of ignition	6	6	36	HIGH	1, Process under supervior 2. WG provided on reactor R-13104, R-14105 / R-14106 / R-14111 / R-13110 / R-13126 3.WG provided on Reactor R-12107 / R-12112 / R-12118 4.Manually check with dip stick in reactor R-13104, R-14105 / R-14106 / R-14111 / R-13110 / R-13126 5. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 6. TI provided on Reactor R-12107 / R-12112 / R-12118 7. TT on reactor R-13104, R-14105 / R-14106 / R-14111 / R-13110 / R-13126 8. Total material transfer from reactor R-13104, R-14105 / R-14106 / R-14111 / R-13110 / R-13126 to Reactor R-12107 / R-12112 / R-12118 9. Suitable MOC of pipelines and valves (SS316). 10. Jacketed pipeline and valve with insulation for steam heating. 11. Suitable MOC of packing (teflon). 12.Spill kit available.. 13. RCC florring in plant area 14. Double valve provided in transfer line. 15. PTW system in place. 16. Flameproof fittings installed. 17. Earthing provided to all equipment. 18. Fire fighting system available	4	6	24	MODERATE					
		25.2	No/less quantity of K2CO3 charge in reactor R-12107 / R-12112 / R-12118 due to spillage	1. It may lead to material loss. 2. It may lead to health and envriomentissue	6	4	24	MODERATE	1. The material is received from store as per issue slip. 2. The material is weighed before charging 3. The neutral pH is checked during and after charging. 4. Process under supervision. 5. Secondary containment is provided 6 RCC floor provided 7. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 8.Ensure pH before distillation	4	4	16	LOW					
		25.3	No / Less Quantity of crude (RC 1) transferred from receivers RC-12112B(RC-1) / RC-12107B (RC-1) / RC-12118B (RC-1) to storage tank ST-10111 by gravity due to leakage in transfer line	1. It will lead to material loss. 2. It will lead to leakage causing Health & Environment issue. 3. Leakage will cause burn injuries. 4. It may lead to fire in case of external source of ignition	6	6	36	HIGH	1, Process under supervior 2. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 3. LI provided on receiver and storage tank 4. Suitable MOC of pipelines and valves (SS316). 5. Fire fighting system available 6. Suitable MOC of packing (teflon). 7.Spill kit available.. 8. RCC florring in plant area 9. Double valve provided in transfer line. 10. PTW system in place. 11. Flameproof fittings installed. 12. Earthing provided to all equipment.	4	6	24	MODERATE					
		25.4	No/less quantity of K2CO3 charge in reactor R-12107 / R-12112 / R-12118 due to spillage	1. It may lead to material loss. 2. It may lead to health and envriomentissue	6	4	24	MODERATE	1. The material is received from store as per issue slip. 2. The material is weighed before charging 3. The neutral pH is checked during and after charging. 4. Process under supervision. 5. Secondary containment is provided 6 RCC floor provided 7. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 8.Ensure pH before distillation	4	4	16	LOW					
MOC	Corrosion / Erosion	26.1	No/less quantity of K2CO3 charge in reactor R-12107 / R-12112 / R-12118	1. It may lead to remain acidic pH which may cause corrosion of equipment.	6	4	24	MODERATE	1. The material is received from store as per issue slip. 2. The material is weighed before charging 3. The neutral pH is checked during and after charging. 4. Process under supervision. 5.Ensure pH before distillation	4	4	16	LOW					
Improper	Maintenance	27.1	Improper maintenance	Process delay	4	2	8	EXTREMELY LOW	1 PMS of equipment is done 2 Trained technician and fitters 3 Maintenance work under supervision 4 Critical spare part is available	2	2	4	EXTREMELY LOW					
	Engineering issues/ Drawing Errors	28.1	Improper P& ID can lead to improper hazop	Improper hazop														

HAZOP WORK SHEET		Hazop Work Sheet Revision No	PHA-001.00
Product Name	2,4-DFNB	Hazop Work Sheet Effective Date	06-05-18

NODE NO :	5
DESIGN INTENTION	After that, start transferring the mass to centrifuge CF-11102/CF-11103/CF-11104/CF-11105. During centrifuging work, collect the mother liquor in ML tank CF-RC-11102A/CF-RC-11104A by gravity and transfer mother liquor to storage tanks ST-10104 by gravity. Give solvent-s wash with 500 -1000 kg from the respective receivers CF-RC-11102B/ CF-RC-11104B/ CF-RC-11105B by gravity and transfer mother liquor to storage tanks ST-10104 by gravity. Collect salt in bags from the centrifuge CF-11102/CF-11103/CF-11104/CF-11105 and send to hazardous storage area Then after mother liquor transfer to reactor R-12107/R-12112/-R-121118 from storage tank ST-10104 by respective pump P-10102, After that, start transferring the mother liquor to centrifuge CF-11105 from respective reactors R-12107/R-12112/-R-121118 by gravity for re-centrifuge. During re-centrifuging work, collect the mother liquor in ML tank CF-RC-11105A by gravity and transfer mother liquor to storage tanks ST-10105 by gravity. Collect salt in bags from the centrifuge CF-11105 and send to hazardous storage area.
EQUIPMENTS COVERED IN THIS NODE	Centrifuge CF-11102/CF-11103/CF-11104/CF-11105, ML tank CF-RC-11102A/CF-RC-11104A, ML tank CF-RC-11105A, Storage tanks ST-10104, Receivers CF-RC-11102B/ CF-RC-11104B/ CF-RC-11105B, Reactor R-12107/R-12112/-R-121118, Storage tanks ST-10105

DOCUMENT REFERRED	P& ID and PTC	**DOCUMENT No.**		**DOCUMENT Revision No**
HAZOP Revision No	01			
HAZOP Effective Date	19-03-22			

	Temperature (^{0}C)		Pressure (kg/cm^{2}g)		MOC	Capacity	
Equipment Details	**Design**	**Working**	**Design**	**Working**		**Design**	**Working**
Centrifuge CF-11102/CF-11103/CF-11104/CF-11105	**AMB**	**AMB**	**ATM**	**ATM**	**SS316**	**550 LTR**	**550 LTR**
ML tank CF-RC-11102A/CF-RC-11104A	**AMB**	**AMB**	**ATM**	**ATM**	**SS316**	**1 KL**	**1.5 KL**
ML tank CF-RC-11105A	**150**	**120**	**3.5**	**3.5**	**SS316**	**0.5 KL**	**0.75 KL**
Storage tanks ST-10104	**250**	**150**	**4.5**	**ATM**	**SS316L**	**10KL**	**14 KL**
Receivers CF-RC-11102B/ CF-RC-11104B/ CF-RC-11105B	**150**	**120**	**3.5**	**3.5**	**SS316**	**0.5 KL**	**0.75 KL**
Reactor R-12107/R-12112/-R-121118	**180**	**130**	**6 KG**	**3.5**	**SS-316**	**12 KL**	**18 KL**
Storage tanks ST-10105	**250**	**150**	**4.5**	**ATM**	**SS316L**	**10KL**	**14 KL**

Guide Word	Parameter	Sr. No.	CAUSES	CONSEQUENCES	Probability	Severity	RPN No	Risk Classification	SAFEGUARDS	Probability	Severity	RPN No	Risk Classification	RECOMMENDATIONS	Probability	Severity	RPN No	Remarks
NO/Less	Flow	1.1	NA															
More	Flow	2.1	NA															
Other than/ Misdirected	Flow	3.1	Transfer mass from reactor reactor R-12107 / R-12112 / R-12118 to centrifuge CF-11103, CF-11104, CF-11105 instead of CF-11102 by gravity due to human error vice versa	1. It may lead to overflow from the centrifuge which further results into spillage. 2. Spillage will cause health & Environment issue. 3. It may lead to Fire in presence of external source of ignition. 4. It may lead to material loss. 5. centrifuge get overloaded resulted in equipment damage.	6	6	36	HIGH	1. Process under supervision 2. WG provided on centrifuge 3. Double valve provided on transfer line from diversion header to centrifuge and one more valve provided on reactor bottom to header. 4. Side glass on transfer line 5. Spill kit available on floor. 6. Feeding valve located nearby at particular centrifuge with side glass provision. 7. RCC Flooring within the plant. 8. Work permit system followed. 9. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 10. Flameproof electrical fittings(FLP) provided. 11. Fire protection system is available. 12. Earthing provided on equipment. 13. Overload protection available. 14. Emergency stop button available on control panel at floor.	2	6	12	LOW					
		3.2	Transfer mass from reactor reactor R-12107 / R-12112 / R-12118. to centrifuge CF-11103,CF-11104, CF-11105 instead of CF-11102 by gravity due to due to transfer line valve malfunction vice versa	1. It may lead to overflow from the centrifuge which further results into spillage. 2. Spillage will cause health & Environment issue. 3. It may lead to Fire in presence of external source of ignition. 4. It may lead to material loss. 5. centrifuge get overloaded resulted in equipment damage.	6	6	36	HIGH	1. Process under supervision 2. WG provided on centrifuge 3. Double valve provided on transfer line from diversion header to centrifuge and one more valve provided on reactor bottom to header. 4. Side glass on transfer line 5. Spill kit available on floor. 6. Spare valve is available. 7. RCC Flooring within the plant. 8. Work permit system followed. 9. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 10. Flameproof electrical fittings(FLP) provided. 11. Fire protection system is available. 12. Earthing provided on equipment. 13. Overload protection available. 14. Emergency stop button available on control panel at floor. 15. Suitable MOC of valve SS-316 is selected.	2	6	12	LOW					
			Mother liquor transfer to reactor R-12112 / R-121118 from storage tank ST-10104 instead of R-12107 by respective Pump P-10102 due to Human error vice versa	1. It may lead to overflow from the reactor which further results into spillage. 2. Spillage will cause health & Environment issue. 3. It may lead to Fire in presence of external source of ignition. 4. It may lead to material loss.	6	6	36	HIGH	1. Process under supervision 2. WG provided on centrifuge 3. Double valve provided on ML transfer line from storage tank to reactors. 4. Side glass on transfer line 5. Spill kit available on floor. 6. Feeding valve located nearby at particular reactors with side glass provision. 7. RCC Flooring within the plant. 8. Work permit system followed. 9. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 10. Flameproof electrical fittings(FLP) provided. 11. Fire protection system is available. 12. Earthing provided on equipment. 13. Overload protection available. 14. Emergency stop button for pump available at floor.	2	6	12	LOW					

			Mother liquor transfer to reactor R-12112 / R-121118 from storage tank ST-10104 instead of R-12107 by respective Pump P-10102 due to transfer line valve malfunction vice versa	1. It may lead to overflow from the reactor which further results into spillage. 2. Spillage will cause health & Environment issue. 3. It may lead to Fire in presence of external source of ignition. 4. It may lead to material loss.	6	6	36	HIGH	1. Process under supervision 2. WG provided on centrifuge 3. Double valve provided on ML transfer line from storage tank to reactors. 4. Side glass on transfer line 5. Spill kit available on floor. 6. Suitable MOC of valve SS-316 is selected and spare valve is available. 7. RCC Flooring within the plant. 8. Work permit system followed. 9. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 10. Flameproof electrical fittings(FLP) provided. 11. Fire protection system is available. 12. Earthing provided on equipment. 13. Overload protection available. 14. Emergency stop button for pump available at floor.	2	6	12	LOW					
Reverse	Flow	4.1	NA															
		5.1	No / Less Quantity of Remaning mass transferred from reactor R-12107 / R-12112 / R-12118 to centrifuge CF-11102 / CF-11103 / CF-11104 / CF-11105 by gravity due to human error	1. It may lead to process delay.	6	2	12	LOW	1, Process under supervision. 2. WG provided on reactor R-12107 / R-12112 / R-12118 3.WG provided on centrifuge CF-11102 / CF-11103 / CF-11104 / CF-11105 4. Sight glass provided in mass transfer line.	4	2	8	EXTREMELY LOW					
		5.2	No / Less Quantity of Remaning mass transferred from reactor R-12107 / R-12112 / R-12118 to centrifuge CF-11102 / CF-11103 / CF-11104 / CF-11105 by gravity due to transfer Line choke up / valve choke up	1. It may lead to process delay.	6	2	12	LOW	1, Process under supervision. 2. WG provided on reactor R-12107 / R-12112 / R-12118 3.WG provided on centrifuge CF-11102 / CF-11103 / CF-11104 / CF-11105 4. Sight glass provided in mass transfer line. 5. Suitable MOC of line and valve SS-316 is selected. 6. Jacketed line provided. 7. N2 provision available for transfer remaining material in header. 8. spare valve is available.	4	2	8	EXTREMELY LOW					
		5.3	No / Less Quantity of Remaning mass transferred from reactor R-12107 / R-12112 / R-12118 to centrifuge CF-11102 / CF-11103 / CF-11104 / CF-11105 by gravity due to leakage in transfer line	1. It will lead to material loss. 2. It will lead to leakage causing Health & Environment issue. 3. Leakage will cause burn injuries. 4. It may lead to fire in presence of external ignition source.	6	6	36	HIGH	1. Process under supervision. 2. WG provided on reactor R-12107 / R-12112 / R-12118 3.WG provided on centrifuge CF-11102 / CF-11103 / CF-11104 / CF-11105 4. Sight glass provided in mass transfer line. 5. Suitable MOC of line and valve SS-316 is selected. 6. Jacketed line provided. 7. Fire protection system available. 8. spare valve is available. 9. Suitable MOC of packing (teflon). 10.Spill kit available.. 11. RCC flooring in plant area 12. Double valve provided in transfer line. 13. PTW system in place. 14. Flameproof fittings installed. 15. Earthing provided to all equipment.	4	6	24	MODERATE					

5.4	No / Less Quantity of Remaning mass transferred from reactor R-12107 / R-12112 / R-12118 to centrifuge CF-11102 / CF-11103 / CF-11104 / CF-11105 by gravity due to CF cloth torn	1. It may lead to mass carry forword with ML	6	2	12	LOW	1. Process under supervision 2. Visual checkin of cloth before. centrifuge filling 3. WG provided on Centrifuge 4. WG provided on reactor 5. Suitable MOC of cloth is selected 7. Double valve provided on transfer line 8. SG provided on ML outlet line of centrifuge.	4	2	8	EXTREMELY LOW					
5.5	No/less ML received in ML storage tank ST-10104 from centrifuge CF-11102 / CF-11103 / CF-11104 / CF-11105 via square tank due to human error	1.It will lead to process delay 2.ML left over with salt may cause material loss	10	2	20	MODERATE	1.Process under supervision 2.WG provided on ML tank 3.WG provided on Centrifuge 4. LI provided on storage tank 5.Wash given to salt after ML recovery in centrifuge with solvent S	6	2	12	LOW					
5.6	No/less ML received in ML storage tank ST-10104 from centrifuge CF-11102 / CF-11103 / CF-11104 / CF-11105 via square tank due to pipe line spillage /leakage	1.It will lead to process delay 2. It may lead to Health and enviornment issue. 3 Fire due to presence of external source of ignition. 4. It may lead to material loss.	6	6	36	HIGH	1.Process under supervision 2.WG provided on ML tank 3.WG provided on Centrifuge 4. LI provided on storage tank 5.Suitable MOC of transfer line is selected (SS-316 braided hose pipe) 6 RCC flooring available 7 Suitable PPE (hand gloves, safety shoes, safety googles/ face shield, cannister mask/ airline, apron) is used 8 Fire fighting system available 9 PTW system available 10 FLP fittings available 11 Earthing and flange to flange bondng is provided. 12 Double valve provided between ML square tank to storage tank.	4	6	24	MODERATE					
5.7	No/less ML received in ML storage tank ST-10104 from centrifuge CF-11102 / CF-11103 / CF-11104 / CF-11105 via square tank due to square tank transfer line and valve(Discharge / inlet) malfunction	1.It will lead to process delay 2. It may lead to centrifuge unbalance due to over loading and may cause spillage / leakage 3. It may lead to Health and enviornment issue. 4 Fire due to presence of external source of ignition. 5. It may lead to material loss.	6	6	36	HIGH	1.Process under supervision 2.SG provided on ML transfer line 3.WG provided on Centrifuge 4.WG provided on receiver 5.LI provided on storage tank 6. Overload protection provided 7.Emergency stop button available on floor. 6 RCC flooring available 7 Suitable PPE (hand gloves, safety shoes, safety googles/ face shield, cannister mask/ airline, apron) is used 8 Fire fighting system available 9 PTW system available 10 FLP fittings available 11 Earthing and flange to flange bondng is provided. 12. Suitable MOC of valve SS-316 is selected	4	6	24	MODERATE					

5.8	No/less ML received in ML storage tank ST-10104 from centrifuge CF-11102 / CF-11103 / CF-11104 / CF-11105 via square tank due to cloth choke up	1.It will lead to process delay 2. It may lead to centrifuge unbalance due to over loading and may cause spillage / leakage 3. It may lead to Health and enviornment issue. 4 Fire due to presence of external source of ignition. 5. It may lead to material loss.	6	6	36	HIGH	1.Process under supervision 2.SG provided on ML transfer line 3.WG provided on Centrifuge 4.WG provided on receiver 5.LI provided on storage tank 6. Overload protection provided 7.Emergency stop button available on floor. 6 RCC flooring available 7 Suitable PPE (hand gloves, safety shoes, safety googles/ face shield, cannister mask/ airline, apron) is used 8 Fire fighting system available 9 PTW system available 10 FLP fittings available 11 Earthing and flange to flange bondng is provided. 12. Suitable MOC of cloth pp is selected 13. Visual check of cloth befor ML transfer in centrifuge.	4	6	24	MODERATE					
5.9	No/ less washing of solvent S from receivers CF-RC-11102B/ CF-RC-11104B/ CF-RC-11105B to centrifuge CF-10102 / CF-10103 / CF-10104 / CF-10105 by gravity due to human error	1.. It will lead to yield loss	6	4	24	MODERATE	1.Process under supervision 2.SG provided on solvent transfer line 3.WG provided on Centrifuge 4.WG provided on receiver 5.LI provided on receiver. 6. Manual visual inspection of salt	4	4	16	LOW					
5.10	No/ less washing of solvent S from receivers CF-RC-11102B/ CF-RC-11104B/ CF-RC-11105B to centrifuge CF-10102 / CF-10103 / CF-10104 / CF-10105 by gravity due to transfer line valve malfunctioning	1. It may lead to yield loss	6	4	24	MODERATE	1.Process under supervision 2.SG provided on solvent transfer line 3.WG provided on Centrifuge 4.WG provided on receiver 5.LI provided on receiver. 6. Manual visual inspection of salt 7.Suitable MOC of Valve is selected (SS316)	4	4	16	LOW					
5.11	No/ less washing of solvent S from receivers CF-RC-11102B/ CF-RC-11104B/ CF-RC-11105B to centrifuge CF-10102 / CF-10103 / CF-10104 / CF-10105 by gravity due to spillage/ leakage	1. It may lead to heath and enviornment issue 2 Fire due to presence of external source of ignition 3. It will lead to yield loss	6	6	36	HIGH	1.Process under supervision 2.SG provided on solvent transfer line 3.WG provided on Centrifuge 4.WG provided on receiver 5.LI provided on receiver. 6. Manual visual inspection of salt 7 RCC flooring available 8 Suitable PPE (hand gloves, safety shoes, safety googles/ face shield, cannister mask/ airline, apron) is used 9 Fire fighting system available 10 PTW system available 11 FLP fittings available 12 Earthing and flange to flange bondng is provided 13 Double valve provided on transfer line 14.Suitable MOC of Valve / line is selected (SS316)	4	6	24	MODERATE					
5.12	No/less ML received in ML storage tank ST-10104 from centrifuge CF-11102 / CF-11103 / CF-11104 / CF-11105 via square tank due to human error	1.It will lead to process delay 2.ML left over with salt may cause yield loss	6	4	24	MODERATE	1.Process under supervision 2.WG provided on ML tank 3.WG provided on Centrifuge 4. LI provided on storage tank 5.Manual visual inspection of salt	4	4	16	LOW					

5.13	No/less ML received in ML storage tank ST-10104 from centrifuge CF-11102 / CF-11103 / CF-11104 / CF-11105 via square tank due to pipe line spillage /leakage	1.It will lead to process delay 2. It may lead to Health and enviornment issue. 3 Fire due to presence of external source of ignition. 4. It may lead to yield loss.	6	6	36	HIGH	1.Process under supervision 2.WG provided on ML tank 3.WG provided on Centrifuge 4. LI provided on storage tank 5.Suitable MOC of transfer line is selected (SS-316 braided hose pipe) 6 RCC flooring available 7 Suitable PPE (hand gloves, safety shoes, safety googles/ face shield, cannister mask/ airline, apron) is used 8 Fire fighting system available 9 PTW system available 10 FLP fittings available 11 Earthing and flange to flange bondng is provided. 12 Double valve provided between ML square tank to storage tank.	4	6	24	MODERATE					
5.14	No/less ML received in ML storage tank ST-10104 from centrifuge CF-11102 / CF-11103 / CF-11104 / CF-11105 via square tank due to square tank transfer line and valve(Discharge / inlet) malfunction	1.It will lead to process delay 2. It may lead to centrifuge unbalance due to over loading and may cause spillage / leakage 3. It may lead to Health and enviornment issue. 4 Fire due to presence of external source of ignition. 5. It may lead to yield loss.	6	6	36	HIGH	1.Process under supervision 2.SG provided on ML transfer line 3.WG provided on Centrifuge 4.WG provided on receiver 5.LI provided on storage tank 6. Overload protection provided 7.Emergency stop button available on floor. 6 RCC flooring available 7 Suitable PPE (hand gloves, safety shoes, safety googles/ face shield, cannister mask/ airline, apron) is used 8 Fire fighting system available 9 PTW system available 10 FLP fittings available 11 Earthing and flange to flange bondng is provided. 12. Suitable MOC of valve SS-316 is selected	4	6	24	MODERATE					
5.15	No/less ML received in ML storage tank ST-10104 from centrifuge CF-11102 / CF-11103 / CF-11104 / CF-11105 via square tank due to holes in cloth choke up	1.It will lead to process delay 2. It may lead to centrifuge unbalance due to over loading and may cause spillage / leakage 3. It may lead to Health and enviornment issue. 4 Fire due to presence of external source of ignition. 5. It may lead to yield loss.	6	6	36	HIGH	1.Process under supervision 2.SG provided on ML transfer line 3.WG provided on Centrifuge 4.WG provided on receiver 5.LI provided on storage tank 6. Overload protection provided 7.Emergency stop button available on floor. 6 RCC flooring available 7 Suitable PPE (hand gloves, safety shoes, safety googles/ face shield, cannister mask/ airline, apron) is used 8 Fire fighting system available 9 PTW system available 10 FLP fittings available 11 Earthing and flange to flange bondng is provided. 12. Suitable MOC of cloth pp is selected 13. Visual check of cloth befor ML transfer in centrifuge.	4	6	24	MODERATE					
5.16	No/less quantity of salt received from centrifuge CF-10102 / CF-10103 / CF-10104 / CF-10105 / to bag due to human error	No consequences					1. Process under supervision 2. Secondary containment is provided 3 suitable PPE (hand gloves, safety shoes, safety googles/ face shield, , apron) is used 4.Salt weighing done after CF unloading 5. Visual inspection of filter cloth done after unloading of CF 6. CF filter cloth scrapping done after salt unloading.									

NO/Less	Quantity	5.17	No/less quantity of salt received from centrifuge CF-10102 / CF-10103 / CF-10104 / CF-10105 / to bag due to weigh balance malfunction	No consequences					1. Process under supervision 3. Secondary containment is provided 4 suitable PPE (hand gloves, safety shoes, safety googles/ face shield, apron) is used 5. Calibration of weigh balance is done (internal monthly , External yearly) 6. Spare weigh balance is available									
		5.18	No/less quantity of salt received from centrifuge CF-10102 / CF-10103 / CF-10104 / CF-10105 / to bag due to material spillage	1. It may lead to health and enviornment issue	6	4	24	MODERATE	1. Process under supervision 2 RCC flooring is avaliable 3. Secondary containment is provided 4 suitable PPE (hand gloves, safety shoes, safety googles/ face shield, apron) is used 5. Salt weighing after unloading 6. Spill kit avaiable	4	4	16	LOW					
		5.19	No/less quantity of salt received from centrifuge CF-10102 / CF-10103 / CF-10104 / CF-10105 / to bag due to filter cloth torn	1 It will lead to material carry forword with filter ML may cause yield loss	6	2	12	LOW	1. Process under supervision 2. WG provided on centrifuge 3. Visual inspection of filter cloth before filtering of batch 4. Material recover in next batch during dry material removal 5. Scrap material from centrifuge after dry material unloading 6. Dry material weighing after centrifuge unloading 7.Carry forwarded Material recover from centrifuge & its ML Tank 8. Suitable MOC(PP) and Microns of filter cloth is selected .	4	2	8	EXTREMELY LOW					
		5.20	No / Less Quantity of ML transferred from storage tank ST-10104 to reactor R-12107 / R-12112 / R-12118 by pump P-10102 due to human error	1. It will lead to process delay.	6	2	12	LOW	1. WG provided on reactors 2. LI on storage tank ST-10104 3. Side glass on inlet transfer line 4. Process under supervision 5. SG provided on pump discharge line 6. PG on Pump discharge line.	4	2	8	EXTREMELY LOW					
		5.21	No / Less Quantity of ML transferred from storage tank ST-10104 to reactor R-12107 / R-12112 / R-12118 by pump P-10102 due to discharge line valve malfunction	1. It will lead to process delay 2. It will lead to pressurization of line which results into pump damage and gasket leakage causing health & environment issue. 3. Leakage will cause burn injuries. 4. It may lead to fire due to external source of ignition	6	6	36	HIGH	1. WG provided on reactors 2. LI on storage tank ST-10104 3. NRV provided on pump discharge line 4. Side glass on inlet transfer line 5. Process under supervison 6. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 7. Overload protection for pump tripping 8. SG provided on pump discharge line 9. Suitable MOC of pipelines and valve (SS-316). 10. RCC flooring available 11. PG on Pump discharge line. 12. Suitable MOC of packing (teflon). 13. Spill kit available. 14. PTW system is available 15. Fire fighting system is available 16. FLP fittings provided 17. Earthing and bonding provided on equipment and line	4	6	24	MODERATE	1. Provide flange guards on the lines.	4	4	16	
		5.22	No / Less Quantity of ML transferred from storage tank ST-10104 to reactor R-12107 / R-12112 / R-12118 by pump P-10102 due to suction Line choke up / valve choke up.	1. It will lead to process delay. 2. It may lead to dry running of pump may cause damage to seal	6	4	24	MODERATE	1. WG provided on reactors 2. LI on storage tank ST-10104 3. PG on Pump discharge line. 4. Side glass on inlet transfer line 5. Process under supervison 6. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 7. Underload protection for Pump tripping. 8. SG provided on pump discharge line 9. Suitable MOC of valve SS-316 is selected	4	4	16	LOW					

5.23	No / Less Quantity of ML transferred from storage tank ST-10104 to reactor R-12107 / R-12112 / R-12118 by pump P-10102 due to pump failure	1. It will lead to process delay	6	2	12	LOW	1. Preventive Maintenance as per schedule . 2. Suitable selection of MOC of pump P-10102 (SS-316) 3. Underload and overload tripping protection provided. 4. PG provided on discharge line. 5. Side Glass on pump P-10102 discharge line. 6. LI on storage tank ST-10104 7. WG provided on reactor	4	2	8	EXTREMELY LOW					
5.24	No / Less Quantity of ML transferred from storage tank ST-10104 to reactor R-12107 / R-12112 / R-12118 by pump P-10102 due to no / less quantity in storage tank	1. It will lead to process delay. 2. It may lead to dry running of pump may cause damage to seal	6	4	24	MODERATE	1. Process under supervision 2. Daily Stock log register maintained. 3. Underload tripping protection provided. 4. PG provided on discharge line. 5. Side Glass on pump P-10102 discharge line. 6. LI on storage tank ST-10104 7. WG provided on reactors	4	4	16	LOW					
5.25	No / Less Quantity of ML transferred from storage tank ST-10104 to reactor R-12107 / R-12112 / R-12118 by pump P-10102 due to leakage in system	1. It will lead to material loss. 2. It will lead to leakage causing Health & Environment issue. 3. Leakage will cause burn injuries. 4. It may lead to fire in case of external source of ignition	6	6	36	HIGH	1. WG provided on reactors 2. LI on storage tank ST-10104 3. Emergency push button provided on floor 4. Side glass on inlet transfer line 5. Process under supervison 6. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 7. Suitable MOC of pipelines and valve (SS-316). 8. PG on Pump discharge line. 9. Suitable MOC of packing (teflon). 10. Spill kit available. 11. Side Glass on pump P-10102 discharge line. 12. Fire fighting system is available 13. FLP fittings provided 14. Earthing and bonding provided on equipment and line 15. PTW system is available 16. RCC flooring available	4	6	24	MODERATE	1. Provide flange guards on the lines.	2	4	8	
5.26	No / Less Quantity of ML transferred from storage tank ST-10104 to reactor R-12107 / R-12112 / R-12118 by pump P-10102 due to LI malfunction of storage tank ST-10104.	1.It will lead to process delay 2. It may lead to dry running of pump.	6	4	24	MODERATE	1. WG provided on reactors 2. Visual Inspection of LI on storage tank ST-10104 3. Side glass on inlet transfer line 4. Process under supervision 5. Isolation valve provided on both sides of LI 6. Underload protection provided on pump P-10102 7. PG on Pump discharge line. 8. Side Glass on pump P-10102 discharge line. 9. Drain valve provided on LI.	4	4	16	LOW					
5.27	No / Less Quantity of ML transferred from reactor R-12107 / R-12112 / R-12118 to centrifuge CF-11105 by gravity for recentrifuge process due to human error	1. It may lead to process delay.	6	2	12	LOW	1. Process under supervision. 2. WG provided on reactor R-12107 / R-12112 / R-12118 3.WG provided on centrifuge CF-11105 4. Sight glass provided in ML transfer line.	4	2	8	EXTREMELY LOW					

5.28	No / Less Quantity of ML transferred from reactor R-12107 / R-12112 / R-12118 to centrifuge CF-11105 by gravity for recentrifuge process due to transfer line valve malfuction	1. It may lead to process delay.	6	2	12	LOW	1. Process under supervision. 2. WG provided on reactor R-12107 / R-12112 / R-12118 3.WG provided on centrifuge CF-11105 4. Sight glass provided in ML transfer line. 5. Suitable MOC of valve SS-316 is selected. 6. N2 provision available for transfer remaining material in header. 7. spare valve is available.	4	2	8	EXTREMELY LOW					
5.29	No / Less Quantity of ML transferred from reactor R-12107 / R-12112 / R-12118 to centrifuge CF-11105 by gravity for recentrifuge process due to spillage / leakage	1. It will lead to material loss. 2. It will lead to leakage causing Health & Environment issue. 3. Leakage will cause burn injuries. 4. It may lead to fire in presence of external ignition source.	6	6	36	HIGH	1. Process under supervision. 2. WG provided on reactor R-12107 / R-12112 / R-12118 3.WG provided on centrifuge CF-11105 4. Sight glass provided in ML transfer line. 5. Suitable MOC of line and valve SS-316 is selected. 6. Earthing provided to all equipment. 7. Fire protection system available. 8. spare valve is available. 9. Suitable MOC of packing (teflon). 10.Spill kit available.. 11. RCC flooring in plant area 12. Double valve provided in transfer line. 13. PTW system in place. 14. Flameproof fittings installed.	4	6	24	MODERATE					
5.30	No / Less Quantity of ML transferred from reactor R-12107 / R-12112 / R-12118 to centrifuge CF-11105 by gravity for recentrifuge process due to CF cloth torn	1. It may lead to salt carry forword with ML	6	2	12	LOW	1. Process under supervision. 2. WG provided on reactor R-12107 / R-12112 / R-12118 3.WG provided on centrifuge CF-11105 4. Sight glass provided in ML transfer line. 5. Visual checkin of cloth before. centrifuge filling 6. Suitable MOC of cloth PP is selected 7. Double valve provided on transfer line 8. WG provided on ML square tank.	4	2	8	EXTREMELY LOW					
5.31	No/less ML received in ML storage tank ST-10105 from centrifuge CF-11105 via square tank due to human error	1.It will lead to process delay 2.ML left over with salt may cause yield loss	6	4	24	MODERATE	1.Process under supervision 2.WG provided on ML tank 3.WG provided on Centrifuge 4. LI provided on storage tank 5.Manual visual inspection of salt	4	4	16	LOW					
5.32	No/less ML received in ML storage tank ST-10105 from centrifuge CF-11105 via square tank due to pipe line spillage /leakage	1.It will lead to process delay 2. It may lead to Health and enviornment issue. 3 Fire due to presence of external source of ignition. 4. It may lead to yield loss.	6	6	36	HIGH	1.Process under supervision 2.WG provided on ML tank 3.WG provided on Centrifuge 4. LI provided on storage tank 5.Suitable MOC of transfer line is selected (SS-316 braided hose pipe) 6 RCC flooring available 7 Suitable PPE (hand gloves, safety shoes, safety googles/ face shield, cannister mask/ airline, apron) is used 8 Fire fighting system available 9 PTW system available 10 FLP fittings available 11 Earthing and flange to flange bondng is provided. 12 Double valve provided between ML square tank to storage tank.	4	6	24	MODERATE					

5.33	No/less ML received in ML storage tank ST-10105 from centrifuge CF-11105 via square tank due to square tank transfer line and valve(Discharge / inlet) malfunction	1.It will lead to process delay 2. It may lead to centrifuge unbalance due to over loading and may cause spillage / leakage 3. It may lead to Health and enviornment issue. 4 Fire due to presence of external source of ignition. 5. It may lead to yield loss.	6	6	36	HIGH	1.Process under supervision 2.SG provided on ML transfer line 3.WG provided on Centrifuge 4.WG provided on receiver 5.LI provided on storage tank 6. Overload protection provided 7.Emergency stop button available on floor. 6 RCC flooring available 7 Suitable PPE (hand gloves, safety shoes, safety googles/ face shield, cannister mask/ airline, apron) is used 8 Fire fighting system available 9 PTW system available 10 FLP fittings available 11 Earthing and flange to flange bondng is provided. 12. Suitable MOC of valve SS-316 is selected	4	6	24	MODERATE					
5.34	No/less ML received in ML storage tank ST-10105 from centrifuge CF-11105 via square tank due to cloth choke up	1.It will lead to process delay 2. It may lead to centrifuge unbalance due to over loading and may cause spillage / leakage 3. It may lead to Health and enviornment issue. 4 Fire due to presence of external source of ignition. 5. It may lead to yield loss.	6	6	36	HIGH	1.Process under supervision 2.SG provided on ML transfer line 3.WG provided on Centrifuge 4.WG provided on receiver 5.LI provided on storage tank 6. Overload protection provided 7.Emergency stop button available on floor. 6 RCC flooring available 7 Suitable PPE (hand gloves, safety shoes, safety googles/ face shield, cannister mask/ airline, apron) is used 8 Fire fighting system available 9 PTW system available 10 FLP fittings available 11 Earthing and flange to flange bondng is provided. 12. Suitable MOC of cloth pp is selected 13. Visual check of cloth befor ML transfer in centrifuge.	4	6	24	MODERATE					
5.35	No/less quantity of salt received from centrifuge CF-10105 to bag due to human error	No consequences					1. Process under supervision 2. Secondary containment is provided 3 suitable PPE (hand gloves, safety shoes, safety googles/ face shield, , apron) is used 4.Salt weighing done after CF unloading 5. Visual inspection of filter cloth done after unloading of CF 6. CF filter cloth scrapping done after salt unloading.									
5.36	No/less quantity of salt received from centrifuge CF-10105 to bag due to weigh balance malfunction	No consequences					1. Process under supervision 3. Secondary containment is provided 4 suitable PPE (hand gloves, safety shoes, safety googles/ face shield, apron) is used 5. Calibration of weigh balance is done (internal monthly , External yearly) 6. Spare weigh balance is available									
5.37	No/less quantity of salt received from centrifuge CF-10105 to bag due to material spillage	1. It may lead to health and enviornment issue	6	4	24	MODERATE	1. Process under supervision 2 RCC flooring is avaliable 3. Secondary containment is provided 4 suitable PPE (hand gloves, safety shoes, safety googles/ face shield, apron) is used 5. Salt weighing after unloading 6. Spill kit avaiable	4	4	16	LOW					

		5.38	No/less quantity of salt received from centrifuge CF-10105 to bag due to filter cloth torn	1 It will lead to material carry forword with filter ML may cause yield loss	6	2	12	LOW	1. Process under supervision 2. WG provided on centrifuge 3. Visual inspection of filter cloth before filtering of batch 4. Material recover in next batch during dry material removal 5. Scrap material from centrifuge after dry material unloading 6. Dry material weighing after centrifuge unloading 7.Carry forwarded Material recover from centrifuge & its ML Tank 8. Suitable MOC(PP) and Microns of filter cloth is selected .	4	2	8	EXTREMELY LOW					
		6.1	More Quantity of Remaining mass transferred from reactor R-12107 / R-12112 / R-12118 to centrifuge CF-11102 / CF-11103 / CF-11104 / CF-11105 by gravity due to human error	1.It will lead to process delay 2. It may lead to centrifuge unbalance due to over loading and may cause overflow from the centrifuge. 3. It may lead to Health and enviornment issue. 4 Fire due to presence of external source of ignition. 5. It may lead to yield loss.	6	6	36	HIGH	1, Process under supervision. 2. WG provided on reactor R-12107 / R-12112 / R-12118 3. WG provided on centrifuge CF-11102 / CF-11103 / CF-11104 / CF-11105 4. Sight glass provided in mass transfer line. 5. Overload protection provided 6. RCC flooring available 7. Suitable PPE (hand gloves, safety shoes, safety googles/ face shield, cannister mask/ airline, apron) is used 8. Fire fighting system available 9. PTW system available 10. FLP fittings available 11. Earthing and flange to flange bondng is provided. 12. Emergency stop button available on floor. 13. Double valve protection available.	4	6	24	MODERATE					
		6.2	More Quantity of Remaning mass transferred from reactor R-12107 / R-12112 / R-12118 to centrifuge CF-11102 / CF-11103 / CF-11104 / CF-11105 by gravity due to transfer line valve open / pass	1.It will lead to process delay 2. It may lead to centrifuge unbalance due to over loading and may cause overflow from the centrifuge. 3. It may lead to Health and enviornment issue. 4 Fire due to presence of external source of ignition. 5. It may lead to yield loss.	6	6	36	HIGH	1, Process under supervision. 2. WG provided on reactor R-12107 / R-12112 / R-12118 3. WG provided on centrifuge CF-11102 / CF-11103 / CF-11104 / CF-11105 4. Sight glass provided in mass transfer line. 5. Overload protection provided 6. RCC flooring available 7. Suitable PPE (hand gloves, safety shoes, safety googles/ face shield, cannister mask/ airline, apron) is used 8. Fire fighting system available 9. PTW system available 10. FLP fittings available 11. Earthing and flange to flange bondng is provided. 12. Emergency stop button available on floor. 13. Double valve protection available. 14. spare valve is available. 15. Suitable MOC of valve SS-316 is selected.	4	6	24	MODERATE					
		6.3	More ML received in ML storage tank ST-10104 from centrifuge CF-11102 / CF-11103 / CF-11104 / CF-11105 via square tank due to human error	1. It will lead to process delay 2. It may lead to salt carryforward with ML.	10	2	20	MODERATE	1. Process under supervision 2. WG provided on ML tank 3. WG provided on Centrifuge 4. LI provided on storage tank 5. ML recover in next filtration process.	6	2	12	LOW					
		6.4	More ML received in ML storage tank ST-10104 from centrifuge CF-11102 / CF-11103 / CF-11104 / CF-11105 via square tank due to cloth torn	1. It will lead to process delay 2. It may lead to salt carryforward with ML.	6	2	12	LOW	1. Process under supervision 2. WG provided on ML tank 3. WG provided on Centrifuge 4. LI provided on storage tank 5. ML recover in next filtration process. 6. Suitable MOC of cloth pp is selected 7. Visual check of cloth befor ML transfer in centrifuge.	4	2	8	EXTREMELY LOW					

		6.5	More washing of solvent S from receivers CF-RC-11102B/ CF-RC-11104B/ CF-RC-11105B to centrifuge CF-10102 / CF-10103 / CF-10104 / CF-10105 by gravity due to human error	1. It may lead to solvent loss.	6	2	12	LOW	1. Process under supervision 2.S G provided on solvent transfer line 3. WG provided on Centrifuge 4. WG provided on receiver 5. LI provided on receiver. 6. Solvent will recover in solvent distillation process.	4	2	8	EXTREMELY LOW					
		6.6	More washing of solvent S from receivers CF-RC-11102B/ CF-RC-11104B/ CF-RC-11105B to centrifuge CF-10102 / CF-10103 / CF-10104 / CF-10105 by gravity due to transfer line valve malfunctioning	1. It may lead to solvent loss.	6	2	12	LOW	1. Process under supervision 2. SG provided on solvent transfer line 3. WG provided on Centrifuge 4. WG provided on receiver 5. LI provided on receiver. 6. Solvent will recover in solvent distillation process. 7.Suitable MOC of Valve is selected (SS316) 8. Spare valve is available. 9. Double valve protection is available.	4	2	8	EXTREMELY LOW					
		6.7	More ML received in ML storage tank ST-10104 from centrifuge CF-11102 / CF-11103 / CF-11104 / CF-11105 via square tank due to human error	1. It will lead to process delay 2. It may lead to salt carryforward with ML.	10	2	20	MODERATE	1. Process under supervision 2. WG provided on ML tank 3. WG provided on Centrifuge 4. LI provided on storage tank 5. ML recover in next filtration process.	6	2	12	LOW					
		6.8	More ML received in ML storage tank ST-10104 from centrifuge CF-11102 / CF-11103 / CF-11104 / CF-11105 via square tank due to holes in cloth torn	1. It will lead to process delay 2. It may lead to salt carryforward with ML.	6	2	12	LOW	1. Process under supervision 2. WG provided on ML tank 3. WG provided on Centrifuge 4. LI provided on storage tank 5. ML recover in next filtration process. 6. Suitable MOC of cloth pp is selected 7. Visual check of cloth befor ML transfer in centrifuge.	4	2	8	EXTREMELY LOW					
		6.9	More quantity of salt received from centrifuge CF-10102 / CF-10103 / CF-10104 / CF-10105 / to bag due to human error	1. It may lead to yield loss.	6	4	24	MODERATE	1. Process under supervision 2. Secondary containment is provided 3 suitable PPE (hand gloves, safety shoes, safety googles/ face shield, , apron) is used 4.Salt weighing done after CF unloading 5. Visual inspection of dry salt before unloading.	4	4	16	LOW					
More	Quantity	6.10	More quantity of salt received from centrifuge CF-10102 / CF-10103 / CF-10104 / CF-10105 / to bag due to weigh balance malfunction	1. It may lead to yield loss.	6	4	24	MODERATE	1. Process under supervision 2. Secondary containment is provided 3 suitable PPE (hand gloves, safety shoes, safety googles/ face shield, , apron) is used 4.Salt weighing done after CF unloading 5. Visual inspection of dry salt before unloading. 6. Calibration of weigh balance is done (internal monthly , External yearly) 7. Spare weigh balance is available	4	4	16	LOW					
		6.11	More quantity of salt received from centrifuge CF-10102 / CF-10103 / CF-10104 / CF-10105 / to bag due to holes in cloth choke up	1. It may lead to solvent left over in salt may cause yield loss.	6	4	24	MODERATE	1. Process under supervision 2. Secondary containment is provided 3 suitable PPE (hand gloves, safety shoes, safety googles/ face shield, , apron) is used 4.Salt weighing done after CF unloading 5. Visual inspection of dry salt before unloading. 6. Suitable MOC(PP) and Microns of filter cloth is selected. 7. Visual inspection of clothe before loading centrifuge.	4	4	16	LOW					

6.12	More Quantity of ML transferred from storage tank ST-10104 to reactor R-12107 / R-12112 / R-12118 by pump P-10102 due to human error	1. No concequences due to total ML transfer from storage tank to reactor.					1. Process under supervision 2. WG provided on reactors 3. LI on storage tank ST-10104 4. Side glass on inlet transfer line									
6.13	More Quantity of ML transferred from storage tank ST-10104 to reactor R-12107 / R-12112 / R-12118 by pump P-10102 due to LI malfunction of storage tank ST-10104.	1. No concequences due to total ML transfer from storage tank to reactor.					1. WG provided on reactors 2. Visual Inspection of LI on storage tank ST-10104 3. Side glass on inlet transfer line 4. Process under supervision 5. Isolation valve provided on both sides of LI 6. Underload protection provided on pump P-10102 7. PG on Pump discharge line. 8. Side Glass on pump P-10102 discharge line. 9. Drain valve provided on LI.									
6.14	More Quantity of ML transferred from reactor R-12107 / R-12112 / R-12118 to centrifuge CF-11105 by gravity for recentrifuge process due to human error	1.It will lead to process delay 2. It may lead to centrifuge unbalance due to over loading due to if storage tank ML transfer valve is closed and may cause spillage / leakage 3. It may lead to Health and enviornment issue. 4 Fire due to presence of external source of ignition. 5. It may lead to material loss.	6	6	36	HIGH	1. Process under supervision. 2. WG provided on reactor R-12107 / R-12112 / R-12118 3.WG provided on centrifuge CF-11105 4. Sight glass provided in ML transfer line. 5. Overload protection provided 6. RCC flooring available 7. Suitable PPE\RPE (hand gloves, safety shoes, safety googles, apron) is used 8. Fire fighting system available 9. PTW system available 10. FLP fittings available 11. Earthing and flange to flange bondng is provided. 12. Emergency stop button available on floor.	4	6	24	MODERATE					
6.15	More Quantity of ML transferred from reactor R-12107 / R-12112 / R-12118 to centrifuge CF-11105 by gravity for re-centrifuge process due to transfer line valve malfuction	1. No concequences					1. Process under supervision. 2. WG provided on reactor R-12107 / R-12112 / R-12118 3.WG provided on centrifuge CF-11105 4. Sight glass provided in ML transfer line. 5. Suitable MOC of valve SS-316 is selected. 6. N2 provision available for transfer remaining material in header. 7. spare valve is available.									
6.16	More ML received in ML storage tank ST-10105 from centrifuge CF-11105 via square tank due to human error	1.It will lead to process delay	6	2	12	LOW	1.Process under supervision 2.WG provided on ML tank 3.WG provided on Centrifuge 4. LI provided on storage tank	4	2	8	EXTREMELY LOW					
6.17	More ML received in ML storage tank ST-10105 from centrifuge CF-11105 via square tank due to cloth torn	1.It will lead to process delay	6	2	12	LOW	1.Process under supervision 2.SG provided on ML transfer line 3.WG provided on Centrifuge 4.WG provided on receiver 5.LI provided on storage tank 6. Suitable MOC of cloth pp is selected 7. Visual check of cloth befor ML transfer in centrifuge.	4	2	8	EXTREMELY LOW					

		6.18	More quantity of salt received from centrifuge CF-10105 to bag due to human error	1 It may lead to yiled loss	6	4	24	MODERATE	1. Process under supervision 2. Secondary containment is provided 3.Salt weighing done after CF unloading 5. Visual inspection of salt before unloading from CF 6. CF filter cloth scrapping done after salt unloading.	4	4	16	LOW					
		6.19	More quantity of salt received from centrifuge CF-10105 to bag due to weigh balance malfunction	1 It may lead to yiled loss	6	4	24	MODERATE	1. Process under supervision 3. Secondary containment is provided 4 suitable PPE (hand gloves, safety shoes, safety googles/ face shield, apron) is used 5. Calibration of weigh balance is done (internal monthly , External yearly) 6. Spare weigh balance is available	4	4	16	LOW					
		6.20	More quantity of salt received from centrifuge CF-10105 to bag due to filter cloth choke up	1 It will lead to material carry forword with filter ML may cause yield loss	6	4	24	MODERATE	1. Process under supervision 2. WG provided on centrifuge 3. Visual inspection of filter cloth before filtering of batch 4. Material recover in next batch during dry material removal 5. Scrap material from centrifuge after dry material unloading 6. Dry material weighing after centrifuge unloading 7.Carry forwarded Material recover from centrifuge & its ML Tank 8. Suitable MOC(PP) and Microns of filter cloth is selected .	4	4	16	LOW					
NO/Less	Pressure	7.1	NA															
More	Pressure	8.1	NA															
Less	Temperature	10.1	NA															
More	Temperature	11.1	NA															
NO/Less	Level	12.1	NA															
More	Level	13.1	NA															
Improper	Agitation	14	Agitation failure of reactor R-12107/R-12112/-R-121118	1. It will lead to process delay	6	2	12	LOW	1 PM of reactor is done as per the schedule. 2 Over load / under load tripping to agitator motor 3 Critical spare of reactor is available 4 Suitable MOC of agitator SS316	4	2	8	EXTREMELY LOW					
Changed	Composition	15	NA															
Failure	Utility	16.1	NA															
High	Viscosity	17	NA															
Low	Viscosity	18	NA															
Incorrect Sequence	Raw material Issues	19	NA															
Sample	Sampling Issues	20	NA															
Incompatibility	Raw Material	21	NA															
	DCS	22	NA															
	Power	23.1	Power failure	1. It will lead to process delay	10	1	10	LOW	1. DG set available	6	1	6	EXTREMELY LOW					
	Start up/Shut down	24.1	NA															

	Loss of Containment (Leakage / Rupture)	25.1	No / Less Quantity of Remaning mass transferred from reactor R-12107 / R-12112 / R-12118 to centrifuge CF-11102 / CF-11103 / CF-11104 / CF-11105 by gravity due to leakage in transfer line	1. It will lead to material loss. 2. It will lead to leakage causing Health & Environment issue. 3. Leakage will cause burn injuries. 4. It may lead to fire in presence of external ignition source.	6	6	36	HIGH	1. Process under supervision. 2. WG provided on reactor R-12107 / R-12112 / R-12118 3.WG provided on centrifuge CF-11102 / CF-11103 / CF-11104 / CF-11105 4. Sight glass provided in mass transfer line. 5. Suitable MOC of line and valve SS-316 is selected. 6. Jacketed line provided. 7. Fire protection system available. 8. spare valve is available. 9. Suitable MOC of packing (teflon). 10.Spill kit available.. 11. RCC flooring in plant area 12. Double valve provided in transfer line. 13. PTW system in place. 14. Flameproof fittings installed. 15. Earthing provided to all equipment.	4	6	24	MODERATE					
		25.2	No/less ML received in ML storage tank ST-10104 from centrifuge CF-11102 / CF-11103 / CF-11104 / CF-11105 via square tank due to pipe line spillage /leakage	1.It will lead to process delay 2. It may lead to Health and enviornment issue. 3 Fire due to presence of external source of ignition. 4. It may lead to material loss.	6	6	36	HIGH	1.Process under supervision 2.WG provided on ML tank 3.WG provided on Centrifuge 4. LI provided on storage tank 5.Suitable MOC of transfer line is selected (SS-316 braided hose pipe) 6 RCC flooring available 7 Suitable PPE (hand gloves, safety shoes, safety googles/ face shield, cannister mask/ airline, apron) is used 8 Fire fighting system available 9 PTW system available 10 FLP fittings available 11 Earthing and flange to flange bondng is provided. 12 Double valve provided between ML square tank to storage tank.	4	6	24	MODERATE					
Failure		25.3	No/ less washing of solvent S from receivers CF-RC-11102B/ CF-RC-11104B/ CF-RC-11105B to centrifuge CF-10102 / CF-10103 / CF-10104 / CF-10105 by gravity due to spillage/ leakage	1. It may lead to heath and enviornment issue 2 Fire due to presence of external source of ignition 3. It will lead to yield loss	6	6	36	HIGH	1.Process under supervision 2.SG provided on solvent transfer line 3.WG provided on Centrifuge 4.WG provided on receiver 5.LI provided on receiver. 6. Manual visual inspection of salt 7 RCC flooring available 8 Suitable PPE (hand gloves, safety shoes, safety googles/ face shield, cannister mask/ airline, apron) is used 9 Fire fighting system available 10 PTW system available 11 FLP fittings available 12 Earthing and flange to flange bondng is provided 13 Double valve provided on transfer line 14.Suitable MOC of Valve / line is selected (SS316)	4	6	24	MODERATE					
		25.4	No/less ML received in ML storage tank ST-10104 from centrifuge CF-11102 / CF-11103 / CF-11104 / CF-11105 via square tank due to pipe line spillage /leakage	1.It will lead to process delay 2. It may lead to Health and enviornment issue. 3 Fire due to presence of external source of ignition. 4. It may lead to yield loss.	6	6	36	HIGH	1.Process under supervision 2.WG provided on ML tank 3.WG provided on Centrifuge 4. LI provided on storage tank 5.Suitable MOC of transfer line is selected (SS-316 braided hose pipe) 6 RCC flooring available 7 Suitable PPE (hand gloves, safety shoes, safety googles/ face shield, cannister mask/ airline, apron) is used 8 Fire fighting system available 9 PTW system available 10 FLP fittings available 11 Earthing and flange to flange bondng is provided. 12 Double valve provided between ML square tank to storage tank.	4	6	24	MODERATE					

		25.5	No/less quantity of salt received from centrifuge CF-10102 / CF-10103 / CF-10104 / CF-10105 / to bag due to material spillage	1. It may lead to health and enviornment issue	6	4	24	MODERATE	1. Process under supervision 2 RCC flooring is avaliable 3. Secondary containment is provided 4 suitable PPE (hand gloves, safety shoes, safety googles/ face shield, apron) is used 5. Salt weighing after unloading 6. Spill kit avaiable	4	4	16	LOW					
		25.6	No / Less Quantity of ML transferred from storage tank ST-10104 to reactor R-12107 / R-12112 / R-12118 by pump P-10102 due to leakage in system	1. It will lead to material loss. 2. It will lead to leakage causing Health & Environment issue. 3. Leakage will cause burn injuries. 4. It may lead to fire in case of external source of ignition	6	6	36	HIGH	1. WG provided on reactors 2. LI on storage tank ST-10104 3. Emergency push button provided on floor 4. Side glass on inlet transfer line 5. Process under supervison 6. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 7. Suitable MOC of pipelines and valve (SS-316). 8. PG on Pump discharge line. 9. Suitable MOC of packing (teflon). 10. Spill kit available. 11. Side Glass on pump P-10102 discharge line. 12. Fire fighting system is available 13. FLP fittings provided 14. Earthing and bonding provided on equipment and line 15. PTW system is available 16. RCC flooring available	4	6	24	MODERATE	1. Provide flange guards on the lines.	2	4	8	
		25.7	No / Less Quantity of ML transferred from reactor R-12107 / R-12112 / R-12118 to centrifuge CF-11105 by gravity for recentrifuge process due to spillage / leakage	1. It will lead to material loss. 2. It will lead to leakage causing Health & Environment issue. 3. Leakage will cause burn injuries. 4. It may lead to fire in presence of external ignition source.	6	6	36	HIGH	1. Process under supervision. 2. WG provided on reactor R-12107 / R-12112 / R-12118 3.WG provided on centrifuge CF-11105 4. Sight glass provided in ML transfer line. 5. Suitable MOC of line and valve SS-316 is selected. 6. Earthing provided to all equipment. 7. Fire protection system available. 8. spare valve is available. 9. Suitable MOC of packing (teflon). 10.Spill kit available.. 11. RCC flooring in plant area 12. Double valve provided in transfer line. 13. PTW system in place. 14. Flameproof fittings installed.	4	6	24	MODERATE					
		25.8	No/less ML received in ML storage tank ST-10105 from centrifuge CF-11105 via square tank due to pipe line spillage /leakage	1.It will lead to process delay 2. It may lead to Health and enviornment issue. 3 Fire due to presence of external source of ignition. 4. It may lead to yield loss.	6	6	36	HIGH	1.Process under supervision 2.WG provided on ML tank 3.WG provided on Centrifuge 4. LI provided on storage tank 5.Suitable MOC of transfer line is selected (SS-316 braided hose pipe) 6 RCC flooring available 7 Suitable PPE (hand gloves, safety shoes, safety googles/ face shield, cannister mask/ airline, apron) is used 8 Fire fighting system available 9 PTW system available 10 FLP fittings available 11 Earthing and flange to flange bondng is provided. 12 Double valve provided between ML square tank to storage tank.	4	6	24	MODERATE					
		25.9	No/less quantity of salt received from centrifuge CF-10105 to bag due to material spillage	1. It may lead to health and enviornment issue	6	4	24	MODERATE	1. Process under supervision 2 RCC flooring is avaliable 3. Secondary containment is provided 4 suitable PPE (hand gloves, safety shoes, safety googles/ face shield, apron) is used 5. Salt weighing after unloading 6. Spill kit avaiable	4	4	16	LOW					
MOC	Corrosion / Erosion	26.1	NA															

Improper	Maintenance	27.1	Improper maintenance	Process delay	4	1	4	EXTREMELY LOW	1 PM of equipment is done as per schedule 2 Trained technician and fitters 3 Maintenance work under supervision 4 Critical spare part is available									
	Engineering issues/ Drawing Errors	28.1	Improper P& ID can lead to improper hazop	Improper hazop														

HAZOP WORK SHEET				Hazop Work Sheet Revision No	PHA-001.00
Product Name	2,4-DFNB			Hazop Work Sheet Effective Date	06-05-18
NODE NO :	6				
DESIGN INTENTION	Transfer DFNB Mix or DFNB crude material to Reactor R-13113 from storage tank ST-10107 by pump P-10107 and send sample for QC analysis. Then charge 20 kg K2CO3 at neutral pH, apply vacuum and start heating up to temperature 120 to 1400C in distillation D-13113, collect the distilled material (Up to 90% purity) in receiver RC-13113C. Then collect the material (Purity is more then 90%) in receiver RC-13113A / RC-13113B and send sample for QC analysis. Remaining bottom material of Reactor R-13113 transfer in storage tank ST-10112 by gravity. Then transfer the material in drum from RC-13113C by gravity. And transfer the material in storage tank ST-10101 / ST-10113 from receiver RC-13113A / RC-13113B by gravity.				
EQUIPMENTS COVERED IN THIS NODE	Reactor R-13113, Storage tank ST-10107, Pump P-10107, Receiver RC-13113A / RC-13113B/RC-13113C, Storage tank ST-10112 , HE-14113A, HE-14113B				
DOCUMENT REFERRED	P& ID and PTC	DOCUMENT No.		DOCUMENT Revision No.	
HAZOP Revision No	01				
HAZOP Effective Date	22-03-22				

	Temperature (^{0}C)		Pressure (kg/cm^{2}g)		MOC	Capacity	
Equipment Details	Design	Working	Design	Working		Design	Working
Reactor R-13113	250	150	6	ATM	SS316L	8KL	12 KL
Storage tank ST-10107	250	150	4.5	ATM	SS316L	10KL	14 KL
Pump P-10107	150	AMB	3	3	SS316L	10m3/hr	10m3/hr
Receiver RC-13113A / RC-13113B/RC-13113C	250	150	4.5	3	SS316L	4/4/2 KL	6 / 6 / 3
Storage tank ST-10112	250	150	4.5	ATM	SS316L	10KL	14 KL
Storage tank ST-10101 / ST-10113	250	150	4.5	ATM	SS316L	10KL	14 KL
HE-14113A	-	-	3.5	3	SS316L	28m2	28m2
HE-14113B	-	-	3.5	3	SS316L	5m2	5m2

Guide Word	Parameter	Sr. No.	CAUSES	CONSEQUENCES	Probability	Severity	RPN No	Risk Classification	SAFEGUARDS	Probability	Severity	RPN No	Risk Classification	RECOMMENDATIONS	Probability	Severity	RPN No	Remarks
NO/Less	Flow	1.1	NA															
More	Flow	2.1	NA															
		3.1	Transfer of distilled material (purity up to 90%) in receiver RC-13113A / RC-13113B instead of Receiver RC-13113C from Reactor R-13113 due to human error or vice-versa	1. It may lead to material flow from receiver to reactor column. 2.It may lead to process delay	6	2	12	LOW	1. Process under supervision 2. LT provided on receiver RC-13113A / RC-13113B / RC-13113C 3. Double valve provided on transfer line from diversion to receiver 5. SG on diversion line 6. Identifiation signs displayed near diversion valves	4	2	8	EXTREMELY LOW					
		3.2	Transfer of distilled material (purity up to 90%) in receiver RC-13113A / RC-13113B instead of Receiver RC-13113C from Reactor R-13113 due to transfer line valve malfunction or vice-versa	1. It may lead to material flow from receiver to reactor column. 2.It may lead to process delay	6	2	12	LOW	1. Process under supervision 2. LT provided on receiver RC-13113A / RC-13113B / RC-13113C 3. Double valve provided on transfer line 5. SG on diversion line 6. Identifiation signs displayed near diversion valves 7. Suitable MOC of valve SS-316 is selected 8. Spare valve is available	4	2	8	EXTREMELY LOW					

Other than/ Misdirected	Flow	3.3	Transfer the material (purity > 90%) from receiver RC-13113A / RC-13113B to storage tank ST-10113 instead of storage tank ST-10101 by gravity due to human error or vice versa	1. It may lead to overflow from the storage tank if storage tank is already full 2. It may lead to spillage may cause health and enviornment issue. 3. It may lead to fire in case of external source of ignition	6	6	36	HIGH	1. LT provided on receiver RC-13113A / RC-13113B 2. LI on storage tank ST-10101 & ST-10113 3. Double valve provided on transfer line. 4. FLP fittings provided 5. SG on transfer line 6. PTW is followed. 7. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 8. RCC flooring available. 9. Spill kit available. 10. Identifiation signs displayed near valves 11. Fire fighting system available	4	6	24	MODERATE					
		3.4	Transfer the material (purity > 90%) from receiver RC-13113A / RC-13113B to storage tank ST-10113 instead of storage tank ST-10101 by gravitydue to transfer line valve malfucntion or vice-versa	1. It may lead to overflow from the storage tank if storage tank is already full 2. It may lead to spillage may cause health and enviornment issue. 3. It may lead to fire in case of external source of ignition	6	6	36	HIGH	1. LT provided on receiver RC-13113A / RC-13113B 2. LI on storage tank ST-10101 & ST-10113 3. Double valve provided on transfer line. 4. FLP fittings provided 5. SG on transfer line 6. PTW is followed. 7. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 8. RCC flooring available. 9. Spill kit available. 10. Identifiation signs displayed near valves 11. Fire fighting system available 12.Suitable MOC SS316 of valve is selected	4	6	24	MODERATE					
Reverse	Flow	4.1	NA															
		5.1	No / Less Quantity Transfer DFNB Mix or DFNB crude material to Reactor R-13113 from storage tank ST-10107 by pump P-10107 due to human error	1. It will lead to process delay	6	2	12	LOW	1. LI provided on ST-10107 2. WG provided on Reactor R-13113 3. SG provided on Reactor inlet line 4. SG provided on pump discharge line 5. Process under supervision 6. PG provided on pump discharge line.	2	2	4	EXTREMELY LOW					
		5.2	No / Less Quantity Transfer DFNB Mix or DFNB crude material to Reactor R-13113 from storage tank ST-10107 by pump P-10107 due to discharge valve malfunction	1. It will lead to yield loss. 2. It will lead to pressurization of line which results into gasket leakage / pump damage causing Health & Environment issue. 3. Leakage will cause burn injuries. 4. It may lead to Fire in presence of external ignition source.	6	6	36	HIGH	1. LI provided on ST-10107 2. WG provided on Reactor R-13113 3. SG provided on Reactor inlet line 4. SG provided on pump discharge line 5. Process under supervision 6. PG provided on pump discharge line. 7. Overload protection for Pump tripping 8. Spill kit available. 9. Suitable MOC of valve is selected (SS316). 10. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 11. Suitable MOC of packing (teflon). 12. Flange guard provided on flange joint. 13. PTW system is available. 14. Fire fighting system is available. 15. Erthing is provided on equipment.	4	6	24	MODERATE					
		5.3	No / Less Quantity Transfer DFNB Mix or DFNB crude material to Reactor R-13113 from storage tank ST-10107 by pump P-10107 due to suction Line valve malfunction	1. It will lead to process delay 2. It may lead to dry running of pump.	6	4	24	MODERATE	1. LI provided on ST-10107 2. WG provided on Reactor R-13113 3. SG provided on Reactor inlet line 4. SG provided on pump discharge line 5. Process under supervision 6. PG provided on pump discharge line. 7. Underload protection for Pump tripping 8. Suitable MOC of valve is selected (SS316).	4	4	16	LOW					
		5.4	No / Less Quantity Transfer DFNB Mix or DFNB crude material to Reactor R-13113 from storage tank ST-10107 by pump P-10107 due to pump failure	1. It will lead to process delay.	6	2	12	LOW	1. LI provided on ST-10107 2. WG provided on Reactor R-13113 3. SG provided on Reactor inlet line 4. SG provided on pump discharge line 5. Process under supervision 6. PG provided on pump discharge line. 7. Underload /Overload protection for Pump tripping 8.PM of pump is done 9.Spare pump is avaialble	4	2	8	EXTREMELY LOW					
		5.5	No / Less Quantity Transfer DFNB Mix or DFNB crude material to Reactor R-13113 from storage tank ST-10107 by pump P-10107 due to no / less quantity in storage tank	1. It will lead to process delay 2. It may lead to dry running of pump.	6	4	24	MODERATE	1. LI provided on ST-10107 2. WG provided on Reactor R-13113 3. SG provided on Reactor inlet line 4. SG provided on pump discharge line 5. Process under supervision 6. PG provided on pump discharge line. 7. Underload protection for Pump tripping. 8. Data maintain of storage tank level.	4	4	16	LOW					

5.6	No / Less Quantity Transfer DFNB Mix or DFNB crude material to Reactor R-13113 from storage tank ST-10107 by pump P-10107 due to spillage/leakage in system	1. It will lead to yield loss. 2. It will lead to Health & Environment issue. 3. Leakage will cause burn injuries. 4. It may lead to Fire in presence of external ignition source.	6	6	36	HIGH	1. LI provided on ST-10107 2. Process under supervision 3. PG provided on pump discharge line. 4. Jacketed pipeline used. 5. Spill kit available. 6. Suitable MOC of valve and pipeline ss-316 is selected. 7. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 8. Suitable MOC of packing (teflon). 9. Flange guard provided on flange joint. 10. PTW system is available. 11. Fire fighting system is available. 12. Erthing is provided on equipment.	4	6	24	MODERATE					
5.8	No/less quantity of K2CO3 charged in Reactor R-13113 due to human error.	1. It may lead to remain acidic pH which may cause corrosion of equipment.	6	4	24	MODERATE	1. The material is weighed before charging in the plant. 2. The neutral pH is checked during and after charging. 3. Process under supervision.	4	2	8	EXTREMELY LOW					
5.9	No/less quantity of K2CO3 charged in Reactor R-13113 due to weigh balance malfunction.	1. It may lead to remain acidic pH which may cause corrosion of equipment.	6	4	24	MODERATE	1. The material is weighed before charging in the plant. 2. The neutral pH is checked during and after charging. 3. Process under supervision. 4. Calibration of weigh scale is done asper schedule. 5. Spare weigh scale is available.	4	4	16	LOW					
5.10	No/less quantity of K2CO3 charged in Reactor R-13113 due to spillage	1. It may lead to material loss 2. It may lead to health and enviornment issue	6	4	24	MODERATE	1. Process under supervision. 2. Secondary containment is provided 3. Spill kit is available 4. RCC flooring is available. 5. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron)	4	2	8	EXTREMELY LOW					
5.11	No/less quantity of collect material (up to 90% purity) received in receiver RC-13113C from Reactor R-13113 due to human error	1. It will lead to process delay.	6	2	12	LOW	1. Process under supervision 2. TT provided on Reactor R-13113 3. TI provided on reactor column and receiver RC-13113C 4. TI provided between primary HE and secondary HE 5. SG provided on receiver RC-13113C. 6. LT provided on receiver RC-13113C 7. VG provided on header and vaccum trap 8.QC analysis done during distillation	4	2	8	EXTREMELY LOW	1. VG to be provided on reactor.	4	2	8	
5.12	No/less quantity of collect material (up to 90% purity) received in receiver RC-13113C from Reactor R-13113 due TT malfunction	1. It will lead to process delay.	6	2	12	LOW	1. Process under supervision 2. Calibration of TT is done as per schedule 3. TI provided on reactor column and receiver RC-13113C 4. TI provided between primary HE and secondary HE 5. SG provided on receiver RC-13113C. 6. LT provided on receiver RC-13113C 7. VG provided on header and vaccum trap 8.QC analysis done during distillation	4	2	8	EXTREMELY LOW					
5.13	No/less quantity of collect material (up to 90% purity) received in receiver RC-13113C from Reactor R-13113 due to oil heating system failure in Reactor R-13113	1. It will lead to process delay.	6	2	12	LOW	1. Process under supervision 2. TT provided on Reactor R-13113 3. TI provided on reactor column and receiver RC-13113C 4. TI provided between primary HE and secondary HE 5. SG provided on receiver RC-13113C 6. LT provided on receiver RC-13113C 7. VG provided on header and vaccum trap 8. QC analysis done during distillation 9. PG provided on oil circulation pump discharge line.. 10. PM of heating system is done as per schedule.	4	2	8	EXTREMELY LOW					

		5.14	No/less quantity of collect material (up to 90% purity) received in receiver RC-13113C from Reactor R-13113 due to vaccuum failure	1. It will lead to process delay.	6	2	12	LOW	1. Process under supervision 2. TT provided on Reactor R-13113 3. TT provided on reactor column top segment and receiver RC-13113C 4. TI provided between primary HE and secondary HE 5. SG provided on receiver RC-13113C. 6. LT provided on receiver RC-13113C 7. VG provided on header and vaccum trap 8.QC analysis done during distillation 9.. PM of vaccum pump is done as per schedule	4	2	8	EXTREMELY LOW					
		5.15	No/less quantity of collect material (up to 90% purity) received in receiver RC-13113C from Reactor R-13113 due to cooling failure in primary HE	1. Material vapour escape from vaccuum pump in environment will lead to environment issue. 2. It will lead to material loss.	6	4	24	MODERATE	1. Process under supervision 2. TT provided on Reactor R-13113 3. TI provided on reactor column and receiver RC-13113C 4. TI provided between primary HE and secondary HE 5. SG provided on receiver RC-13113C 6. LT provided on receiver RC-13113C 7. VG provided on header and vaccum trap 8. QC analysis done during distillation 9. Secondary HE with chilling water supply available 10. TI provided on cooling supply and return line. 11. Stand by cooling water supply pump is provided 12.PG provided on cooling supply and return line	4	2	8	EXTREMELY LOW					
		5.16	No/less quantity of collect material (up to 90% purity) received in receiver RC-13113C from Reactor R-13113 due to chilling failure in secondary HE	1. Material vapour escape from vaccuum pump in environment will lead to environment issue. 2. It will lead to material loss.	6	4	24	MODERATE	1. Process under supervision 2. TT provided on Reactor R-13113 3. TI provided on reactor column and receiver RC-13113C3C 4. TI provided between primary HE and secondary HE 5. SG provided on receiver RC-13113C. 6. LT provided on receiver RC-13113C 7. VG provided on header and vaccum trap 8.QC analysis done during distillation 9. Primary HE with cooling water supply available 10. Cooling water supply provided in vaccum trap jacket 11. Stand by chilling water supply pump is provided 12.PG provided on chilling supply and return line 13. TI provided on chilling supply and return line. 14.PM of pump is done regularly	4	2	8	EXTREMELY LOW					
		5.17	No/less quantity of collect material (more than 90% purity) received in receiver RC-13113A / RC-13113B from Reactor R-13113 due to human error	1. It will lead to process delay.	6	2	12	LOW	1. Process under supervision 2. TT provided on Reactor R-13113 3. TI provided on reactor column and receiver RC-13113A / RC-13113B 4. TI provided between primary HE and secondary HE 5. SG provided on receiver RC-13113A / RC-13113B 6. LT provided on receiver RC-13113A / RC-13113B 7. VG provided on header and vaccum trap 8.QC analysis done during distillation	4	2	8	EXTREMELY LOW					
NO/Less	Quantity	5.18	No/less quantity of collect material (more than 90% purity) received in receiver RC-13113A / RC-13113B from Reactor R-13113 due TT malfunction	1. It will lead to process delay.	6	2	12	LOW	1. Process under supervision 2. Calibration of TT is done as per schedule 3. TI provided on reactor column and receiver RC-13113A / RC-13113B 4. TI provided between primary HE and secondary HE 5. SG provided on receiver RC-13113A / RC-13113B. 6. LT provided on receiver RC-13113A / RC-13113B 7. VG provided on header and vaccum trap 8.QC analysis done during distillation	4	2	8	EXTREMELY LOW					

5.19	No/less quantity of collect material (more than 90% purity) received in receiver RC-13113A / RC-13113B from Reactor R-13113 due to oil heating system failure in Reactor R-13113	1. It will lead to process delay.	6	2	12	LOW	1. Process under supervision 2. TT provided on Reactor R-13113 3. TI provided on reactor column and receiver RC-13113A / RC-13113B 4. TI provided between primary HE and secondary HE 5. SG provided on receiver RC-13113A / RC-13113B 6. LT provided on receiver RC-13113A / RC-13113B 7. VG provided on header and vaccum trap 8. QC analysis done during distillation 9. PG provided on oil circulation pump discharge line.. 10. PM of heating system is done as per schedule.	4	2	8	EXTREMELY LOW					
5.20	No/less quantity of collect material (more than 90% purity) received in receiver RC-13113A / RC-13113B from Reactor R-13113 due to vaccuum failure	1. It will lead to process delay.	6	2	12	LOW	1. Process under supervision 2. TT provided on Reactor R-13113 3. TT provided on reactor column top segment and receiver RC-13113A / RC-13113B 4. TI provided between primary HE and secondary HE 5. SG provided on receiver RC-13113A / RC-13113B. 6. LT provided on receiver RC-13113A / RC-13113B 7. VG provided on header and vaccum trap 8.QC analysis done during distillation 9.. PM of vaccum pump is done as per schedule	4	2	8	EXTREMELY LOW					
5.21	No/less quantity of collect material (more than 90% purity) received in receiver RC-13113A / RC-13113B from Reactor R-13113 due to cooling failure in primary HE	1. Material vapour escape from vaccuum pump in environment will lead to environment issue. 2. It will lead to material loss.	6	4	24	MODERATE	1. Process under supervision 2. TT provided on Reactor R-13113 3. TI provided on reactor column and receiver RC-13113A / RC-13113B 4. TI provided between primary HE and secondary HE 5. SG provided on receiver RC-13113A / RC-13113B 6. LT provided on receiver RC-13113A / RC-13113B 7. VG provided on header and vaccum trap 8. QC analysis done during distillation 9. Secondary HE with chilling water supply available 10. TI provided on cooling supply and return line. 11. Stand by cooling water supply pump is provided 12.PG provided on cooling supply and return line	4	2	8	EXTREMELY LOW					
5.22	No/less quantity of collect material (more than 90% purity) received in receiver RC-13113A / RC-13113B from Reactor R-13113 due to chilling failure in secondary HE	1. Material vapour escape from vaccuum pump in environment will lead to environment issue. 2. It will lead to material loss.	6	4	24	MODERATE	1. Process under supervision 2. TT provided on Reactor R-13113 3. TI provided on reactor column and receiver RC-13113A / RC-13113B3C 4. TI provided between primary HE and secondary HE 5. SG provided on receiver RC-13113A / RC-13113B. 6. LT provided on receiver RC-13113A / RC-13113B 7. VG provided on header and vaccum trap 8.QC analysis done during distillation 9. Primary HE with cooling water supply available 10. Cooling water supply provided in vaccum trap jacket 11. Stand by chilling water supply pump is provided 12.PG provided on chilling supply and return line 13. TI provided on chilling supply and return line. 14.PM of pump is done regularly	4	2	8	EXTREMELY LOW					
5.23	No / Less Quantity of remaining bottom material of Reactor R-13113 transfer in storage tank ST-10112 by gravity due to human error	1. It will lead to process delay	6	2	12	LOW	1, Process under supervior 2. WG provided on Reactor R-13113 3.WG provided on storage tank ST-10112 4.SG provided on transfer line 5. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 6. LI provided on storage tank ST-10112 7. Total material transfer from Reactor R-13113 to storage tank ST-10112	4	2	8	EXTREMELY LOW					

5.24	No / Less Quantity of remaining bottom material of Reactor R-13113 transfer in storage tank ST-10112 by gravity due to transfer line valve malfunction	1. It will lead to process delay	6	2	12	LOW	1. LI provided on ST-10112 2. WG provided on Reactor R-13113 3. SG provided on Reactor inlet line 4. Side glass provided on pump discharge line 5. Process under supervision 6. Spare valve is available to avoid process delay. 7. Suitable MOC of valve is selected (SS316).	4	2	8	EXTREMELY LOW					
5.25	No / Less Quantity of remaining bottom material of Reactor R-13113 transfer in storage tank ST-10112 by gravity due to LI malfuction of storage tank ST-10112	1. It may lead to process delay	6	2	12	LOW	1. Glass LI provided on ST-10112 2. WG provided on Reactor R-13113 3. SG provided on Reactor inlet line 4. Side glass provided on pump discharge line 5. Process under supervision	4	2	8	EXTREMELY LOW					
5.26	No / Less Quantity of remaining bottom material of Reactor R-13113 transfer in storage tank ST-10112 by gravity due to leakage / spillage in system	1. It may lead to yield loss. 2. It may lead to leakage causing Health & Environment issue. 3. It may lead to fire in case of external source of ignition	6	6	36	HIGH	1. LI provided on ST-10112 2. WG provided on Reactor R-13113 3. SG provided on Reactor inlet line 4. Side glass provided on pump discharge line 5. Process under supervision 6. Flange guard provided. 7. Suitable MOC of valve and line SS-316 is selected 8. PTW system available 9. Suitable MOC of valve is selected (SS316). 10. Fire fighting system available 11. FLP fittings available 12. Suitable MOC of packing (teflon). 13. Spill kit available. 14. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron)	4	6	24	MODERATE					
5.27	No/less quantity transfer of material from receivers RC-13113C to drums by gravity due to human error	1. It will lead to process delay.	6	2	12	LOW	1. Process under supervision. 2. LT provided on receiver RC-13113C 3. Weighing of drum during drum filling 4. SG provided on transfer material line. 5. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 6. Fill drum quantity and weight check after filling.	4	2	8	EXTREMELY LOW					
5.28	No/less quantity transfer of material from receivers RC-13113C to drums by gravity due to leakage / spillage	1. It may lead to health and enviornment issue 2. It may lead to yield loss. 3. It may lead to fire in case of external source of ignition.	6	6	36	HIGH	1. Process under supervision. 2. LT provided on receiver RC-13113C 3. Weighing of drum during drum filling 4. SG provided on transfer material line. 5. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 6. Fill drum quantity and weight check after filling. 7. RCC flooring provided 8. Spill kit is available. 9. 2 no's valve provided on transfer line. 10. FLP fittings provided. 11. Firefighting system available. 12. PTW system available. 13. Crocodile earthing provided.	4	6	24	MODERATE					
5.29	No/less quantity transfer of material from receivers RC-13113C to drums by gravity due to weigh balance malfunction	1. It may lead to process delay	6	2	12	LOW	1. Process under supervision. 2. LT provided on receiver RC-13113C 3. Calibration of weigh balance done as per schedule. 4. SG provided on transfer material line. 5. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 6. Spare weigh balace available. 7. Total material will be fill in drums.	4	2	8	EXTREMELY LOW					
5.30	No/less quantity transfer the material in storage tank ST-10101 / ST-10113 from receiver RC-13113A / RC-13113B by gravity due to human error	1. It will lead to process delay.	6	2	12	LOW	1. Process under supervision. 2. LT provided on receiver RC-13113A / RC-13113B 3. LI provided on storage tank ST-10101 / ST-10113 4. SG provided on transfer material line.	4	2	8	EXTREMELY LOW					

		5.31	No/less quantity transfer the material in storage tank ST-10101 / ST-10113 from receiver RC-13113A / RC-13113B by gravity due to transfer line leakage / spillage	1. It may lead to health and enviornment issue 2. It may lead to yield loss. 3. It may lead to fire in case of external source of ignition.	6	6	36	HIGH	1. Process under supervision. 2. LT provided on receiver RC-13113A / RC-13113B 3. LI provided on storage tank ST-10101 / ST-10113 4. SG provided on transfer material line. 5. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 6. Suitable MOC of valve and pipeline SS-316 is selected. 7. RCC flooring provided 8. Spill kit is available. 9. 2 no's valve provided on transfer line. 10. FLP fittings provided. 11. Firefighting system available. 12. PTW system available. 13. Suitable MOC of gasket teflon is selected. 14. Flange guard is provided. 15. Double earthing and flange to flange bonding is provided.	4	6	24	MODERATE					
		5.32	No/less quantity transfer the material in storage tank ST-10101 / ST-10113 from receiver RC-13113A / RC-13113B by gravity due to LT malfuction	1. It may lead to process delay.	6	2	12	LOW	1. Process under supervision. 2. Calibration of LT done asper the schedule. 3. LI provided on storage tank ST-10101 / ST-10113 4. SG provided on transfer material line.	4	2	8	EXTREMELY LOW					
		5.33	No/less quantity transfer the material in storage tank ST-10101 / ST-10113 from receiver RC-13113A / RC-13113B by gravity due to transfer line valve malfuction	1. It may lead to process delay.	6	2	12	LOW	1. Process under supervision. 2. LT provided on receiver RC-13113A / RC-13113B 3. LI provided on storage tank ST-10101 / ST-10113 4. SG provided on transfer material line. 5. Suitable MOC of valve SS-316 is selected. 6. Spare valve is available to avoid process delay.									
		6.1	More Quantity Transfer DFNB Mix or DFNB crude material to Reactor R-13113 from storage tank ST-10107 by pump P-10107 due to human error	1. It may lead to material flow from reactor column to receiver. 2.It may lead to process delay	6	2	12	LOW	1. LI provided on ST-10107 2. WG provided on Reactor R-13113 3. SG provided on Reactor inlet line 4. SG provided on pump discharge line 5. Process under supervision 6. PG provided on pump discharge line. 7. Empty rectore checked.	4	2	8	EXTREMELY LOW					
		6.2	More Quantity Transfer DFNB Mix or DFNB crude material to Reactor R-13113 from storage tank ST-10107 by pump P-10107 due to LI malfunction	1. It may lead to material flow from reactor column to receiver. 2.It may lead to process delay	6	4	24	MODERATE	1. LI provided on ST-10107 2. WG provided on Reactor R-13113 3. SG provided on Reactor inlet line 4. SG provided on pump discharge line 5. Process under supervision 6. PG provided on pump discharge line. 7. Underload protection for Pump tripping. 8. Data maintain of storage tank level.	4	4	16	LOW					
		6.3	More quantity of K2CO3 charged in Reactor R-13113 due to human error.	1. It may lead to material loss	6	2	12	LOW	1. The material is received from store as per issue slip. 2. The material is weighed before charging in the plant. 3.Neutral pH check during and after charging. 4. Process under supervision.	4	2	8	EXTREMELY LOW					
		6.4	More quantity of K2CO3 charged in Reactor R-13113 due to weigh balance malfunction.	1. It may lead to material loss	6	2	12	LOW	1. The material is received from store as per issue slip. 2. The material is weighed before charging in the plant. 3. Neutral pH check during and after charging 4. Process under supervision. 5. Calibration of weigh balance is done as per schedule. 6. Spare weigh balance is available.	4	2	8	EXTREMELY LOW					
		6.5	More quantity of collect material (up to 90% purity) received in receiver RC-13113C from Reactor R-13113 due to human error	1. It will lead to process delay.	6	2	12	LOW	1. Process under supervision 2. TT provided on Reactor R-13113 3. TI provided on reactor column and receiver RC-13113C 4. TI provided between primary HE and secondary HE 5. SG provided on receiver RC-13113C. 6. LT provided on receiver RC-13113C 7. VG provided on header and vaccum trap 8.QC analysis done during distillation	4	2	8	EXTREMELY LOW					

		6.6	More quantity of collect material (up to 90% purity) received in receiver RC-13113C from Reactor R-13113 due TT malfunction	1. It may lead to quality issue due to high boiler content carried forward with more than 90% purity material 2. It may lead to process delay	6	2	12	LOW	1. Process under supervision 2. Calibration of TT is done as per schedule 3. TI provided on reactor column and receiver RC-13113C 4. TI provided between primary HE and secondary HE 5. SG provided on receiver RC-13113C. 6. LT provided on receiver RC-13113C 7. VG provided on header and vaccum trap 8.QC analysis done during distillation	4	2	8	EXTREMELY LOW					
		6.7	More quantity of collect material (up to 90% purity) received in receiver RC-13113C from Reactor R-13113 due to oil heating valve malfunction	1. It may lead to quality issue due to high boiler content carried forward with more than 90% purity material 2. It may lead to process delay	6	2	12	LOW	1. Process under supervision 2. TT provided on Reactor R-13113 3. TT provided on reactor column top segment and receiver RC-13113C 4. TI provided between primary HE and secondary HE 5. SG provided on receiver RC-13113C 6. LT provided on receiver RC-13113C 7. VG provided on header and vaccum trap 8. QC analysis to be done during distillation 9. PG provided on oil circulation pump discharge line. 10. Manual valve provided on oil line 11. PM of control valve is done as per schedule	4	2	8	EXTREMELY LOW					
		6.8	More quantity of collect material (more than 90% purity) received in receiver RC-13113A / RC-13113B from Reactor R-13113 due to human error	1. It may lead to quality issue due to unknown content carried forward with mixed material. 2. It may lead to process delay	6	2	12	LOW	1. Process under supervision 2. TT provided on Reactor R-13113 3. TI provided on reactor column and receiver RC-13113A / RC-13113B 4. TI provided between primary HE and secondary HE 5. SG provided on receiver RC-13113A / RC-13113B 6. LT provided on receiver RC-13113A / RC-13113B 7. VG provided on header and vaccum trap 8.QC analysis done during distillation	4	2	8	EXTREMELY LOW					
		6.9	More quantity of collect material (more than 90% purity) received in receiver RC-13113A / RC-13113B from Reactor R-13113 due TT malfunction	1. It may lead to quality issue due to unknown content carried forward with mixed material. 2. It may lead to process delay	6	2	12	LOW	1. Process under supervision 2. Calibration of TT is done as per schedule 3. TI provided on reactor column and receiver RC-13113A / RC-13113B 4. TI provided between primary HE and secondary HE 5. SG provided on receiver RC-13113A / RC-13113B. 6. LT provided on receiver RC-13113A / RC-13113B 7. VG provided on header and vaccum trap 8.QC analysis done during distillation	4	2	8	EXTREMELY LOW					
		6.10	More quantity of collect material (more than 90% purity) received in receiver RC-13113A / RC-13113B from Reactor R-13113 due to oil heating valve malfunction	1. It may lead to quality issue due to unknown content carried forward with mixed material. 2. It may lead to process delay	6	2	12	LOW	1. Process under supervision 2. TT provided on Reactor R-13113 3. TI provided on reactor column and receiver RC-13113A / RC-13113B 4. TI provided between primary HE and secondary HE 5. SG provided on receiver RC-13113A / RC-13113B 6. LT provided on receiver RC-13113A / RC-13113B 7. VG provided on header and vaccum trap 8. QC analysis done during distillation 9. PG provided on oil circulation pump discharge line. 10. Manual valve provided on oil line 11. PM of control valve is done as per schedule	4	2	8	EXTREMELY LOW					
More	Quantity	6.11	More Quantity of remaining bottom material of Reactor R-13113 transfer in storage tank ST-10112 by gravity due to human error	1. It may lead to overflow of storage tank if already full 2.It may lead to spillage from vent line may cause health and enviornmet issue 3.It may lead to fire due to external source of ignition	6	6	36	HIGH	1, Process under supervior 2. WG provided on Reactor R-13113 3.WG provided on storage tank ST-10112 4.SG provided on transfer line 5. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 6. LI provided on storage tank ST-10112 7. PTW system available 8. Fire fighting system available 9. FLP fittings available 10. Spill kit available.	4	6	24	MODERATE					

6.12	More Quantity of remaining bottom material of Reactor R-13113 transfer in storage tank ST-10112 by gravity due to transfer line valve malfunction	1. It may lead to overflow of storage tank if already full 2.It may lead to spillage from vent line may cause health and enviornmet issue 3.It may lead to fire due to external source of ignition	6	6	36	HIGH	1, Process under supervior 2. WG provided on Reactor R-13113 3.WG provided on storage tank ST-10112 4.SG provided on transfer line 5. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 6. LI provided on storage tank ST-10112 7. PTW system available 8. Fire fighting system available 9. FLP fittings available 10. Spill kit available. 11. Spare valve is available to avoid process delay. 12. Suitable MOC of valve is selected (SS316). 13. Double valve provided on transfer line.	4	6	24	MODERATE					
6.13	More Quantity of remaining bottom material of Reactor R-13113 transfer in storage tank ST-10112 by gravity due to LI malfuction of storage tank ST-10112	1. It may lead to overflow of storage tank if already full 2.It may lead to spillage from vent line may cause health and enviornmet issue 3.It may lead to fire due to external source of ignition	6	6	36	HIGH	1. Glass LI provided on ST-10112 2. WG provided on reactor D-13113 3. SG provided on Reactor inlet line 4. Side glass provided on pump discharge line 5. Process under supervision 6. PTW system available 7. Fire fighting system available 8. FLP fittings available 9. Spill kit available. 10 PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 11. Data maintained for storage tank level 12. Double valve provided on transfer line.	4	6	24	MODERATE					
6.14	More quantity transfer of material from receivers RC-13113C to drums by gravity due to human error	1. It will lead to process delay.	6	2	12	LOW	1. Process under supervision. 2. LT provided on receiver RC-13113C 3. Weighing of drum during drum filling 4. SG provided on transfer material line. 5. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 6. Fill drum quantity and weight check after filling.	4	2	8	EXTREMELY LOW					
6.15	More quantity transfer of material from receivers RC-13113C to drums by gravity due to weigh balance malfunction	1. It may lead to process delay	6	2	12	LOW	1. Process under supervision. 2. LT provided on receiver RC-13113C 3. Calibration of weigh balance done as per schedule. 4. SG provided on transfer material line. 5. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 6. Spare weigh balace available. 7. Total material will be fill in drums.	4	2	8	EXTREMELY LOW					
6.16	More quantity transfer of material from receivers RC-13113C to drums by gravity due to transfer line valve malfuction	1. It will lead to yield loss 2. It may lead to drum over flow may cause health and enviornment issue 3. It may lead to fire in case of external source of ignition	6	6	36	HIGH	1. Process under supervision. 2. LT provided on receiver RC-13113C 3. Weighing of drum during drum filling 4. SG provided on transfer material line. 5. PTW system available 6. Fire fighting system available 7. FLP fittings available 8. Spill kit available. 9. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 10. Double valve provided n transfer line 11. Suitable MOC of valve SS-316 is selected.	4	6	24	MODERATE					
6.16	More quantity transfer the material in storage tank ST-10101 / ST-10113 from receiver RC-13113A / RC-13113B by gravity due to human error	1. It may lead to overflow of storage tank if already full 2.It may lead to spillage from vent line may cause health and enviornmet issue 3.It may lead to fire due to external source of ignition	6	6	36	HIGH	1. Process under supervision. 2. LT provided on receiver RC-13113A / RC-13113B 3. LI provided on storage tank ST-10101 / ST-10113 4. SG provided on transfer material line. 5. Process under supervision 6. PTW system available 7. Fire fighting system available 8. FLP fittings available 9. Spill kit available. 10 PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 11. Data maintained for storage tank level 12. Double valve provided on transfer line. 13. Earthing provided on equipment. and flange to glage bonding provided.	4	6	24	MODERATE	1. Secondery containment need to be provided for storage tank.	2	4	8	

		6.17	More quantity transfer the material in storage tank ST-10101 / ST-10113 from receiver RC-13113A / RC-13113B by gravity due to LI malfuction	1. It may lead to overflow of storage tank if already full 2.It may lead to spillage from vent line may cause health and enviornmet issue 3.It may lead to fire due to external source of ignition	6	6	36	HIGH	1. Process under supervision. 2. Glass LI provided. 3. LT provided on receiver RC-13113A / RC-13113B 4. SG provided on transfer material line. 5. Process under supervision 6. PTW system available 7. Fire fighting system available 8. FLP fittings available 9. Spill kit available. 10 PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 11. Data maintained for storage tank level 12. Double valve provided on transfer line. 13. Earthing provided on equipment. and flange to glage bonding provided.	4	2	8	EXTREMELY LOW					
		6.18	More quantity transfer the material in storage tank ST-10101 / ST-10113 from receiver RC-13113A / RC-13113B by gravity due to transfer line valve malfuction	1. It may lead to overflow of storage tank if already full 2.It may lead to spillage from vent line may cause health and enviornmet issue 3.It may lead to fire due to external source of ignition	6	6	36	HIGH	1. Process under supervision. 2. LT provided on receiver RC-13113A / RC-13113B 3. LI provided on storage tank ST-10101 / ST-10113 4. SG provided on transfer material line. 5. Process under supervision 6. PTW system available 7. Fire fighting system available 8. FLP fittings available 9. Spill kit available. 10 PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 11. Data maintained for storage tank level 12. Double valve provided on transfer line. 13. Earthing provided on equipment. and flange to glage bonding provided. 14. Suitable MOC of valve SS-316 is selected.									
NO/Less	Pressure	7.1	NA															
More	Pressure	8.1	NA															
Back	Pressure	9.1	NA															
Less	Temperature	10.1	No/less temperature < 120^{0}C in reactor D-11113 during distillation of 2,4 DFNB material due to human error	1. It will lead to process delay.	6	2	12	LOW	1. Process under supervision 2. TT provided on reactor D-11113 3. TI provided on reactor column and receivers 4. TI provided between primary HE and secondary HE 5. SG provided on receivers 6. LT provided on receivers 7.QC analysis done during distillation 8. PG provided on oil circulation pump discharge line	4	2	8	EXTREMELY LOW					
		10.2	No/less temperature < 120^{0}C in reactor D-11113 during distillation of 2,4 DFNB material due to oil heating failure.	1. It will lead to process delay.	6	2	12	LOW	1. Process under supervision 2. TT provided on reactor D-11113 3. TI provided on reactor column and receivers 4. TI provided between primary HE and secondary HE 5. SG provided on receivers 6. LT provided on receivers 7.QC analysis done during distillation 8. PG provided on oil circulation pump discharge line 10. PM of oil heating system is done as per the schedule.	4	2	8	EXTREMELY LOW					
		10.3	No/less temperature < 120^{0}C in reactor D-11113 during distillation of 2,4 DFNB material due to TT malfunction of reactor D-11113	1. It will lead to process delay.	6	2	12	LOW	1. Process under supervision 2. Calibration of TT is done as per schedule 3. TI provided on reactor column and receivers 4. TI provided between primary HE and secondary HE 5. SG provided on receivers 6. LT provided on receivers 7.QC analysis done during distillation	4	2	8	EXTREMELY LOW					
		10.4	No/less temperature < 120^{0}C in reactor D-11113 during distillation of 2,4 DFNB material due to oil heating control valve malfuction	1. It will lead to process delay.	6	2	12	LOW	1. Process under supervision 2. TT provided on reactor D-11113 3. TI provided on reactor column and receivers 4. TI provided between primary HE and secondary HE 5. SG provided on receivers 6. LT provided on receivers 7.QC analysis done during distillation 8. PM of control valve is done as per schedule.	4	2	8	EXTREMELY LOW					

More	Temperature	11.1	More temperature > 140°C in reactor D-11113 during distillation of 2,4 DFNB material due to human error	1. It may lead to quality issue due to unknown content carried forward with mix material 2. It may lead to process delay	6	2	12	LOW	1. Process under supervision 2. TT provided on reactor D-11113 3. TI provided on reactor column and receivers 4. TI provided between primary HE and secondary HE 5. SG provided on receivers 6. LT provided on receivers 7.QC analysis done during distillation 8. PG provided on oil circulation pump discharge line	4	2	8	EXTREMELY LOW					
		11.2	More temperature > 140°C in reactor D-11113 during distillation of 2,4 DFNB material due to TT malfunction of reactor D-11113	1. It may lead to quality issue due to unknown content carried forward with mix material 2. It may lead to process delay	6	2	12	LOW	1. Process under supervision 2. Calibration of TT is done as per schedule 3. TI provided on reactor column and receivers 4. TI provided between primary HE and secondary HE 5. SG provided on receivers 6. LT provided on receivers 7.QC analysis done during distillation	4	2	8	EXTREMELY LOW					
		11.3	More temperature > 140°C in reactor D-11113 during distillation of 2,4 DFNB material due to oil heating control valve malfuction	1. It may lead to quality issue due to unknown content carried forward with mix material 2. It may lead to process delay	6	2	12	LOW	1. Process under supervision 2. TT provided on reactor D-11113 3. TI provided on reactor column and receivers 4. TI provided between primary HE and secondary HE 5. SG provided on receivers 6. LT provided on receivers 7.QC analysis done during distillation 8. PM of control valve is done as per schedule. 9. Manual valve is provided.	4	2	8	EXTREMELY LOW					
NO/Less	Level	12.1	NA															
More	Level	13.1	NA															
Improper	Agitation	14	Agitation failure	1.It will lead to process delay	6	1	6	EXTREMELY LOW	1 PM of reactor is done as per schedule. 2 Over load / under load tripping to agitator motor. 3 Critical spare of reactor is available. 4 Suitable MOC of agitator SS316	4	1	4	EXTREMELY LOW					
Changed	Composition	15	Improper quality of K2CO3	1.It may lead to acidic pH may cause equipment damage	6	2	12	LOW	1 QC check of all raw material 2 COA received with material issue slip 3 Process under supervision	4	2	8	EXTREMELY LOW					
Failure	Utility	16.1	Oil heating system failure in reactor D-11113	1. It will lead to process delay.	6	2	12	LOW	1. Process under supervision 2. TT provided on Reactor R-13113 3. TI provided on reactor column and receivers 4. TI provided between primary HE and secondary HE 5. SG provided on receivers 6. LT provided on receivers 7. VG provided on header and vaccum trap 8. QC analysis done during distillation 9. PG provided on oil circulation pump discharge line.. 10. PM of heating system is done as per schedule.	4	2	8	EXTREMELY LOW					
		16.2	Vaccuum failure during distillation	1. It will lead to process delay.	6	2	12	LOW	1. Process under supervision 2. TT provided on reactor D-11113 3. TT provided on reactor column top segment and receivers 4. TI provided between primary HE and secondary HE 5. SG provided on receivers 6. LT provided on receivers 7. VG provided on header and vaccum trap 8.QC analysis done during distillation 9.PM of vaccum pump is done as per schedule	4	2	8	EXTREMELY LOW					
		16.3	Cooling failure in primary HE	1. Material vapour may escape from vaccuum pump in the environment may lead to health and environment issue. 2. It will lead to yield loss.	6	4	24	MODERATE	1. Process under supervision 2. TT provided on reactor D-11113 3. TT provided on reactor column top segment and receivers 4. TI provided between primary HE and secondary HE 5. SG provided on receivers 6. LT provided on receivers 7. VG provided on header and vaccum trap 8.QC analysis done during distillation 14. Secondary HE with chilling water supply available 15. TI provided on cooling supply and return line. 16. Stand by cooling water supply pump is provided 17.PG provided on cooling supply and return line	4	2	8	EXTREMELY LOW					

		16.4	Chilling failure in secondary HE	1. Material vapour may escape from vaccuum pump in the environment may lead to health and environment issue. 2. It will lead to yield loss.	6	4	24	MODERATE	1. Process under supervision 2. TT provided on reactor D-11113 3. TT provided on reactor column top segment and receivers 4. TI provided between primary HE and secondary HE 5. SG provided on receivers. 6. LT provided on receivers 7. VG provided on header and vaccum trap 8.QC analysis done during distillation 14. Primary HE with cooling water supply available 15. Cooling water supply provided in vaccum trap jacket 16. Stand by chilling water supply pump is provided 17.PG provided on chilling supply and return line 18. TI provided on chilling supply and return line. 17.PM of pump is done regularly	4	2	8	EXTREMELY LOW					
High	Viscosity	17	Nitrogen failure during vaccum release	1. It will lead to process delay	6	2	12	LOW	1. Process under supervision 2. PG provided on nitrogen main header 3. Stand by nitrogen supply available	4	2	8	EXTREMELY LOW					
Low	Viscosity	18	NA															
Incorrect Sequence	Raw material Issues	19	NA															
	Sampling Issues	20	Incorrect sampling of 2 4 DFNB mix distilled material	1. It will lead to process delay and quality issue	6	2	12	LOW	1. Process under supervision 2 QC analysis done of reaction mass upto desired result during reflux of reaction	4	2	8	EXTREMELY LOW					
Incompatibility	Raw Material	21	NA															
Failure	DCS	22	NA															
	Power	23.1	Power failure	1. It will lead to process delay	10	2	20	MODERATE	DG Set available	6	2	12	LOW					
	Start up/Shut down	24.1	NA															
	Loss of Containment (Leakage / Rupture)	25.1	No / Less Quantity Transfer DFNB Mix or DFNB crude material to Reactor R-13113 from storage tank ST-10107 by pump P-10107 due to spillage/leakage in system	1. It will lead to yield loss. 2. It will lead to Health & Environment issue. 3. Leakage will cause burn injuries. 4. It may lead to Fire in presence of external ignition source.	6	6	36	HIGH	1. LI provided on ST-10107 2. Process under supervision 3. PG provided on pump discharge line. 4. Jacketed pipeline used. 5. Spill kit available. 6. Suitable MOC of valve and pipeline ss-316 is selected. 7. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 8. Suitable MOC of packing (teflon). 9. Flange guard provided on flange joint. 10. PTW system is available. 11. Fire fighting system is available. 12. Erthing is provided on equipment.	4	6	24	MODERATE					
		25.2	No/less quantity of K2CO3 charged in Reactor R-13113 due to spillage	1. It may lead to material loss 2. It may lead to health and enviornment issue	6	4	24	MODERATE	1. Process under supervision. 2. Secondary containment is provided 3. Spill kit is available 4. RCC flooring is available. 5. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron)	4	2	8	EXTREMELY LOW					
		25.3	No / Less Quantity of remaining bottom material of Reactor R-13113 transfer in storage tank ST-10112 by gravity due to leakage / spillage in system	1. It may lead to yield loss. 2. It may lead to leakage causing Health & Environment issue. 3. It may lead to fire in case of external source of ignition	6	6	36	HIGH	1. LI provided on ST-10112 2. WG provided on Reactor R-13113 3. SG provided on Reactor inlet line 4. Side glass provided on pump discharge line 5. Process under supervision 6. Flange guard provided. 7. Suitable MOC of valve and line SS-316 is selected 8. PTW system available 9. Suitable MOC of valve is selected (SS316). 10. Fire fighting system available 11. FLP fittings available 12. Suitable MOC of packing (teflon). 13. Spill kit available. 14. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron)	4	6	24	MODERATE					
		25.4	No/less quantity transfer of material from receivers RC-13113C to drums by gravity due to leakage / spillage	1. It may lead to health and enviornment issue 2. It may lead to yield loss. 3. It may lead to fire in case of external source of ignition.	6	6	36	HIGH	1. Process under supervision. 2. LT provided on receiver RC-13113C 3. Weighing of drum during drum filling 4. SG provided on transfer material line. 5. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 6. Fill drum quantity and weight check after filling. 7. RCC flooring provided 8. Spill kit is available. 9. 2 no's valve provided on transfer line. 10. FLP fittings provided. 11. Firefighting system available. 12. PTW system available. 13. Crocodile earthing provided.	4	6	24	MODERATE					

		25.5	No/less quantity transfer the material in storage tank ST-10101 / ST-10113 from receiver RC-13113A / RC-13113B by gravity due to transfer line leakage / spillage	1. It may lead to health and enviornment issue 2. It may lead to yield loss. 3. It may lead to fire in case of external source of ignition.	6	6	36	HIGH	1. Process under supervision. 2. LT provided on receiver RC-13113A / RC-13113B 3. LI provided on storage tank ST-10101 / ST-10113 4. SG provided on transfer material line. 5. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 6. Suitable MOC of valve and pipeline SS-316 is selected. 7. RCC flooring provided 8. Spill kit is available. 9. 2 no's valve provided on transfer line. 10. FLP fittings provided. 11. Firefighting system available. 12. PTW system available. 13. Suitable MOC of gasket teflon is selected. 14. Flange guard is provided. 15. Double earthing and flange to flange bonding is provided.	4	6	24	MODERATE					
MOC	Corrosion / Erosion	26.1	Corrosion due to less quantity of K2CO3 charged in reactor	1. It may lead to remain acidic pH which may cause corrosion of equipment.	6	4	24	MODERATE	1. Process under supervision. 2. The material is weighed before charging in the plant. 3. The neutral pH is checked during charging.	4	2	8	EXTREMELY LOW					
Improper	Maintenance	27.1	Improper maintenance	Process delay	6	2	12	LOW	1 PMS of equipment is done 2 Trained technician and fitters 3 Maintenance work under supervision 4 Critical spare part is available	4	2	8	EXTREMELY LOW					
	Engineering issues/ Drawing Errors	28.1	Improper P& ID can lead to improper hazop	Improper hazop			0					0						

HAZOP WORK SHEET				Hazop Work Sheet Revision No	PHA-001.00
Product Name	2,4-DFNB			Hazop Work Sheet Effective Date	06-05-18
NODE NO :	7				
DESIGN INTENTION	Transfer DFNB Mix or DFNB crude material from storage tank ST-10101, ST-10113, ST-10111 & ST-10107 to reactor D-11102, D-11103 (10KL) by respective pump no.P-10111, P-10107 & P-10113. Start stirring and charge K2CO3 for neutralize pH. Apply vacuum in respected reactor D-11102, D-11103 (10KL) by respective dry vacuum pump D-VP-12102, D-VP-11103. When received vacuum upto 750 mmHg then start heating @110 - 120^{0}C in bottom. collect the mix-fraction in RC-12102C/RC-12103C. Give sample for QC analysis for running distillation, if the desired result is achieved then collect the pure material in RC-12102A/RC-12102B/RC-12103A/RC-12103B. Then transfer the pure material from receivers RC-12102A/RC-12102B/RC-12103A/RC-12103B to drums by gravity and then transfer the material in storage tank TF-11111 from drum by self primming pump ST-P-10101 Transfer the mix fraction from receivers RC-12102C / RC-12103C to storge tank ST-10101, ST-10113, ST-10111 & ST-10107 by gravity. Check QC analysis of bottom remaining material in reactor D-11102 / D-11103 before transfering to storage tank ST-10112 by pump P-10112				
EQUIPMENTS COVERED IN THIS NODE	Storage tank ST-10101, ST-10113, ST-10111 & ST-10107, Storage tank TF-11111, Storage tank ST-10112, Reactor D-11102, D-11103, Reactor D-11102, D-11103, Pump no.P-10111, P-10107 & P-10113. Vacuum pump D-VP-12102, D-VP-11103, Receiver RC-12102A/RC-12102B/RC-12103A/RC-12103B, Receiver RC-12102C/RC-12103C, Pump ST-P-10101, Pump P-10112.				
DOCUMENT REFERRED	P& ID and PTC	DOCUMENT No.		DOCUMENT Revision No.	
HAZOP Revision No	01				
HAZOP Effective Date	25-03-22				

	Temperature (^{0}C)		Pressure (kg/cm^{2}g)		MOC	Capacity	
Equipment Details	Design	Working	Design	Working		Design	Working
Storage tank ST-10101, ST-10113, ST-10111 & ST-10107	250	150	4.5	ATM	SS316L	10KL	14 KL
Storage tank TF-11111							28 KL
Storage tank ST-10112	250	150	4.5	ATM	SS316L	10KL	12 KL
Reactor D-11102, D-11103	250		6		SS316L	8 KL	15 KL
Pump no.P-10111, P-10107 & P-10113.	150	AMB	3	3	SS316L	10m3/hr	10m3/hr
Vacuum pump D-VP-12102, D-VP-11103	150	65	0.1 torr	10 torr	Ductile Iron	0.1 torr	10 torr
Receiver RC-12102A/RC-12102B/RC-12103A/RC-12103B	250	150	4.5	3	SS316L	5 KL	7.5 KL
Receiver RC-12102C/RC-12103C	250	150	4.5	3	SS316L	2KL	3 KL
Pump ST-P-10101	150	150	3	3	SS316L	10 m3/hr	10 m3/hr
Pump P-10112	150	150	3	3	SS316L	10 m3/hr	10 m3/hr

Guide Word	Parameter	Sr. No.	CAUSES	CONSEQUENCES	Probability	Severity	RPN No	Risk Classification	SAFEGUARDS	Probability	Severity	RPN No	Risk Classification	RECOMMENDATIONS	Probability	Severity	RPN No	Remarks
NO/Less	Flow	1.1	NA															
More	Flow	2.1	NA															
		3.1	Transfer the mix fraction from storage tank ST-10101 / ST-10107 / ST-10113 / ST-10111 to reactor D-11101 / D-11103 by pump no. P-10111, P-10113, P-10107 instead of D-11102 due to human error or vice-versa	1. It may lead to process delay due to over flow of reactors D-11101 / D-11103 which are in running process and excess material getting filled in the column.	6	2	12	LOW	1. Process under supervision 2. LI on storage tank ST-10101 / ST-10107 / ST-10113 / ST-10111 3. Double valve provided on transfer line from diversion to storage tank. 4. WG provided on reactors D-11102 / D-11103 and D-11101. 5. SG provided on inlet transfer line of reactor. 6. Identification flow arrow displayed.	4	2	8	EXTREMELY LOW					

Other than/ Misdirected	Flow	3.2	Transfer the mix fraction from storage tank ST-10101 / ST-10107 / ST-10113 / ST-10111 to reactor D-11101 / D-11103 by pump no. P-10111, P-10113, P-10107 instead of D-11102 due to transfer line valve malfunction or vice-versa	1. It may lead to process delay due to over flow of reactors D-11101 / D-11103 which are in running process and excess material getting filled in the column.	6	2	12	LOW	1. Process under supervision 2. LI on storage tank ST-10101 / ST-10107 / ST-10113 / ST-10111 3. Double valve provided on transfer line from diversion to storage tank. 4. WG provided on reactors D-11102 / D-11103 and D-11101. 5. SG provided on inlet transfer line of reactor. 6. Identification flow arrow displayed. 7. Suitable MOC SS316 of valve is selected 8. Spare valve is available	4	2	8	EXTREMELY LOW					
		3.3	Transfer the mix fraction from receivers RC-12103C / RC-12102C to storage tank ST-10101 / ST-10107 / ST-10113 instead of ST-10111 by gravity due to human error or vice-versa	1. It may lead to overflow of storage tank if the others are full 2.It may lead to spillage from vent line may cause health and enviornmet issue 3.It may lead to fire due to external source of ignition	6	6	36	HIGH	1. LT provided on receiver RC-12103C / RC-12102C 2. LI on storage tank ST-10101 / ST-10107 / ST-10113 / ST-10111 3. Double valve provided on transfer line from diversion to storage tank. 4. FLP fittings provided 5. Side glass on inlet line of storage tank 6. PTW is available 7. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 8. RCC flooring available 9. Spill kit available 10. Process under supervision. 11. Fire fighting system available 12. Data maintained for storage tank level	4	6	24	MODERATE					
		3.4	Transfer the mix fraction from receivers RC-12103C / RC-12102C to storage tank ST-10101 / ST-10107 / ST-10113 instead of ST-10111 by gravity due to transfer line valve malfucntion or vice-versa	1. It may lead to overflow of storage tank if the others are full 2.It may lead to spillage from vent line may cause health and enviornmet issue 3.It may lead to fire due to external source of ignition	6	6	36	HIGH	1. LT provided on receiver RC-12103C / RC-12102C 2. LI on storage tank ST-10101 / ST-10107 / ST-10113 / ST-10111 3. Double valve provided on transfer line from diversion to storage tank. 4. FLP fittings provided 5. Side glass on inlet line of storage tank 6. PTW is available 7. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 8. RCC flooring available 9. Spill kit available 10. Process under supervision. 11. Fire fighting system available 12. Data maintained for storage tank level 13.Suitable MOC SS316 of valve is selected	4	6	24	MODERATE					
Reverse	Flow	4.1	NA															
		5.1	No / Less Quantity Transfer DFNB Mix fraction or DFNB crude material from storage tank ST-10101 / ST-10107 / ST-10113 / ST-10111 to reactor D-11102 / D-11103 (10KL) by respective pump no. P-10111, P-10113, P-10107 due to human error	1. It will lead to process delay	6	2	12	LOW	1. LI provided on ST-10101 / ST-10107 / ST-10113 / ST-10111 2. WG provided on reactor D-11102 / D-11103 3. SG provided on Reactor inlet line 4. Side glass provided on pump discharge line 5. Process under supervision 6. PG providedon pump discharge line	2	2	4	EXTREMELY LOW					
		5.2	No / Less Quantity Transfer DFNB Mix fraction or DFNB crude material from storage tank ST-10101 / ST-10107 / ST-10113 / ST-10111 to reactor D-11102 / D-11103 (10KL) by respective pump no. P-10111, P-10113, P-10107 due to discharge valve malfunction	1. It will lead to material loss. 2. It will lead to pressurization of line which results into gasket leakage causing Health & Environment issue. 3. Leakage will cause burn injuries. 4. It may lead to fire in case of external surce of ignition	6	6	36	HIGH	1. LI provided on ST-10101 / ST-10107 / ST-10113 / ST-10111 2. WG provided on reactor D-11102 / D-11103 3. SG provided on Reactor inlet line 4. Side glass provided on pump discharge line 5. Process under supervision 6. PG providedon pump discharge line 7. Overload protection for Pump tripping 8. PTW system available 9. Suitable MOC of valve is selected (SS316). 10. Fire fighting system available 11. FLP fittings available 12. Suitable MOC of packing (teflon). 13. Spill kit available. 14. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron)	4	6	24	MODERATE					

5.3	No / Less Quantity Transfer DFNB Mix fraction or DFNB crude material from storage tank ST-10101 / ST-10107 / ST-10113 / ST-10111 to reactor D-11102 / D-11103 (10KL) by respective pump no. P-10111, P-10113, P-10107 due to suction Line valve malfunction	1. It may be lead to process delay. 2. It may lead to dry running of pump.	6	4	24	MODERATE	1. LI provided on ST-10101 / ST-10107 / ST-10113 / ST-10111 2. WG provided on reactor D-11102 / D-11103 3. SG provided on Reactor inlet line 4. Side glass provided on pump discharge line 5. Process under supervision 6. PG provided on pump discharge line 7. Underrload protection for Pump tripping 8. Suitable MOC of valve is selected (SS316).	4	4	16	LOW					
5.4	No / Less Quantity Transfer DFNB Mix fraction or DFNB crude material from storage tank ST-10101 / ST-10107 / ST-10113 / ST-10111 to reactor D-11102 / D-11103 (10KL) by respective pump no. P-10111, P-10113, P-10107 due to pump failure	1. It will lead to production delay.	6	2	12	LOW	1. LI provided on ST-10101 / ST-10107 / ST-10113 / ST-10111 2. WG provided on reactor D-11102 / D-11103 3. SG provided on Reactor inlet line 4. Side glass provided on pump discharge line 5. Process under supervision 6. Underload /Overload protection for Pump tripping 7.PM of pump is done 8.Spare pump is avaialble	4	2	8	EXTREMELY LOW					
5.5	No / Less Quantity Transfer DFNB Mix fraction or DFNB crude material from storage tank ST-10101 / ST-10107 / ST-10113 / ST-10111 to reactor D-11102 / D-11103 (10KL) by respective pump no. P-10111, P-10113, P-10107 due to no / less quantity in storage tank	1. It may lead to process delay 2. It may lead to pump dry rum. Mau cause pump damage	6	4	24	MODERATE	1. LI provided on ST-10101 / ST-10107 / ST-10113 / ST-10111 2. WG provided on reactor D-11102 / D-11103 3. SG provided on Reactor inlet line 4. Side glass provided on pump discharge line 5. Process under supervision 6. PG provided on pump discharge line 7. Underload protection for Pump tripping 8. Data maintained for storage tank level	4	4	16	LOW					
5.6	No / Less Quantity Transfer DFNB Mix fraction or DFNB crude material from storage tank ST-10101 / ST-10107 / ST-10113 / ST-10111 to reactor D-11102 / D-11103 (10KL) by respective pump no. P-10111, P-10113, P-10107 due to leakage / spillage in system	1. It may lead to yield loss. 2. It will lead to leakage causing Health & Environment issue. 3. It may lead to fire iin case of external source of ignition	6	6	36	HIGH	1. LI provided on ST-10101 / ST-10107 / ST-10113 / ST-10111 2. WG provided on reactor D-11102 / D-11103 3. SG provided on Reactor inlet line 4. Side glass provided on pump discharge line 5. Process under supervision 6. PG providedon pump discharge line 7. Suitable MOC of valve and line SS-316 is selected 8. PTW system available 9. Suitable MOC of valve is selected (SS316). 10. Fire fighting system available 11. FLP fittings available 12. Suitable MOC of packing (teflon). 13. Spill kit available. 14. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron)	4	6	24	MODERATE					
5.7	No/less quantity of K2CO3 charged due to human error.	1. It may lead to remain acidic pH which may cause corrosion of equipment.	6	4	24	MODERATE	1. The material is received from store as per issue slip. 2. The material is weighed before charging in the plant. 3.Neutral pH check during and after charging. 4. Process under supervision.	4	2	8	EXTREMELY LOW					
5.8	No/less quantity of K2CO3 charged due to weigh balance malfunction.	1. It may lead to remain acidic pH which may cause corrosion of equipment.	6	4	24	MODERATE	1. The material is received from store as per issue slip. 2. The material is weighed before charging in the plant. 3. Neutral pH check during and after charging 4. Process under supervision. 5. Calibration of weigh balance is done as per schedule. 6. Spare weigh balance is available.	4	2	8	EXTREMELY LOW					
5.9	No/less quantity of K2CO3 charged due to spillage	1. It may lead to material loss 2. It may lead to health and enviornment issue	6	4	24	MODERATE	1. Process under supervision. 2. Secondary containment is provided 3. Spill kit is available 4. RCC flooring is available. 5. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron)	4	2	8	EXTREMELY LOW					

5.10	No/less quantity of mix-fraction received in receiver RC-12102C / RC-12103C from reactor D-11102 / D-11103 due to human error	1. It will lead to process delay.	6	2	12	LOW	1. Process under supervision 2. TT provided on reactor D-11102 / D-11103 3. TI provided on reactor column and receiver RC-12102C / RC-12103C 4. TI provided between primary HE and secondary HE 5. SG provided on receiver RC-12102C / RC-12103C . 6. LT provided on receiver RC-12102C / RC-12103C 7. VG provided on header and vaccum trap 8.QC analysis done during distillation	4	2	8	EXTREMELY LOW	1. VT to be provided on reactor.	4	2	8	
5.11	No/less quantity of mix-fraction received in receiver RC-12102C / RC-12103C from reactor D-11102 / D-11103 due TT malfunction	1. It will lead to process delay.	6	2	12	LOW	1. Process under supervision 2. Calibration of TT is done as per schedule 3. TI provided on reactor column and receiver RC-12102C / RC-12103C 4. TI provided between primary HE and secondary HE 5. SG provided on receiver RC-12102C / RC-12103C . 6. LT provided on receiver RC-12102C / RC-12103C 7. VG provided on header and vaccum trap 8.QC analysis done during distillation	4	2	8	EXTREMELY LOW					
5.12	No/less quantity of mix-fraction received in receiver RC-12102C / RC-12103C from reactor D-11102 / D-11103 due to oil heating failure in reactor D-11102 / D-11103	1. It will lead to process delay.	6	2	12	LOW	1. Process under supervision 2. TT provided on reactor D-11102 / D-11103 3. TI provided on reactor column and receiver RC-12102C / RC-12103C 4. TI provided between primary HE and secondary HE 5. SG provided on receiver RC-12102C / RC-12103C . 6. LT provided on receiver RC-12102C / RC-12103C 7. VG provided on header and vaccum trap 8.QC analysis done during distillation 9.. PG provided on reactor jacket 10. PG provided on oill supply line 11. Stand by oil circulation pump is available 12. PM of thermopak is done as per schedule	4	2	8	EXTREMELY LOW					
5.13	No/less quantity of mix-fraction received in receiver RC-12102C / RC-12103C from reactor D-11102 / D-11103 due to vaccuum failure	1. It will lead to process delay.	6	2	12	LOW	1. Process under supervision 2. TT provided on reactor D-11102 / D-11103 3. TI provided on reactor column and receiver RC-12102C / RC-12103C 4. TI provided between primary HE and secondary HE 5. SG provided on receiver RC-12102C / RC-12103C . 6. LT provided on receiver RC-12102C / RC-12103C 7. VG provided on header and vaccum trap 8.QC analysis done during distillation 9.. PM of vaccum pump is done as per schedule	4	2	8	EXTREMELY LOW					
5.14	No/less quantity of mix-fraction received in receiver RC-12102C / RC-12103C from reactor D-11102 / D-11103 due to cooling failure in primary HE	1. Material vapour escape from vaccuum pump in environment will lead to environment issue. 2. It will lead to material loss.	6	4	24	MODERATE	1. Process under supervision 2. TT provided on reactor D-11102 / D-11103 3. TI provided on reactor column and receiver RC-12102C / RC-12103C 4. TI provided between primary HE and secondary HE 5. SG provided on receiver RC-12102C / RC12103C 6. LT provided on receiverRC-12102C / RC12103C 7. VG provided on header and vaccum trap 8. QC analysis done during distillation 9. Secondary HE with chilling water supply available 10. TI provided on cooling supply and return line. 11. Stand by cooling water supply pump is provided 12.PG provided on cooling supply and return line	4	2	8	EXTREMELY LOW					

5.15	No/less quantity of mix-fraction received in receiver RC-12102C / RC-12103C from reactor D-11102 / D-11103 due to chilling failure in secondary HE	1. Material vapour escape from vaccuum pump in environment will lead to environment issue. 2. It will lead to material loss.	6	4	24	MODERATE	1. Process under supervision 2. TT provided on reactor D-11102 / D-11103 3. TI provided on reactor column and receiver RC-12102C / RC-12103C 4. TI provided between primary HE and secondary HE 5. SG provided on receiver RC-12102C / RC-12103C . 6. LT provided on receiver RC-12102C / RC-12103C 7. VG provided on header and vaccum trap 8.QC analysis done during distillation 9. Primary HE with cooling water supply available 10. Cooling water supply provided in vaccum trap jacket 11. Stand by chilling water supply pump is provided 12.PG provided on chilling supply and return line 13. TI provided on chilling supply and return line. 14.PM of pump is done regularly	4	2	8	EXTREMELY LOW					
5.16	No/less quantity of pure material received in receiver RC-12102A / RC-12102B / RC-12103A / RC-12103B from reactor D-11102 / D-11103 due to human error	1. It will lead to process delay.	6	2	12	LOW	1. Process under supervision 2. TT provided on reactor D-11102 / D-11103 3. TI provided on reactor column. and receiver RC-12102A / RC-12102B / RC-12103A / RC-12103B 4. TI provided between primary HE and secondary HE 5. SG provided on receiver RC-12102A / RC-12102B / RC-12103A / RC-12103B 6. LT provided on receiver RC-12102A / RC-12102B / RC-12103A / RC-12103B 7. VG provided on header and vaccum trap	4	2	8	EXTREMELY LOW					
5.17	No/less quantity of pure material received in receiver RC-12102A / RC-12102B / RC-12103A / RC-12103B from reactor D-11102 / D-11103 due TT malfunction	1. It will lead to process delay.	6	2	12	LOW	1. Process under supervision 2. Calibration of TT is done as per schedule 3. TI provided on reactor column. and receiver RC-12102A / RC-12102B / RC-12103A / RC-12103B 4. TI provided between primary HE and secondary HE 5. SG provided on receiver RC-12102A / RC-12102B / RC-12103A / RC-12103B 6. LT provided on receiver RC-12102A / RC-12102B / RC-12103A / RC-12103B 7. VG provided on header and vaccum trap	4	2	8	EXTREMELY LOW					
5.18	No/less quantity of pure material received in receiver RC-12102A / RC-12102B / RC-12103A / RC-12103B from reactor D-11102 / D-11103 due to steam heating failure in reactor D-11102 / D-11103	1. It will lead to process delay.	6	2	12	LOW	1. Process under supervision 2. TT provided on reactor D-11102 / D-11103 3. TI provided on reactor column. and receiver RC-12102A / RC-12102B / RC-12103A / RC-12103B 4. TI provided between primary HE and secondary HE 5. SG provided on receiver RC-12102A / RC-12102B / RC-12103A / RC-12103B. 6. LT provided on receiver RC-12102A / RC-12102B / RC-12103A / RC-12103B 7. VG provided on header and vaccum trap 8.Stand by steam supply provision available 9.. PG provided on reactor jacket 10. PG provided on steam supply header	4	2	8	EXTREMELY LOW					
5.19	No/less quantity of pure material received in receiver RC-12102A / RC-12102B / RC-12103A / RC-12103B from reactor D-11102 / D-11103 due to vaccuum failure	1. It will lead to process delay.	6	2	12	LOW	1. Process under supervision 2. TT provided on reactor D-11102 / D-11103 3. TI provided on reactor column. and receiver RC-12102A / RC-12102B / RC-12103A / RC-12103B 4. TI provided between primary HE and secondary HE 5. SG provided on receiver RC-12102A / RC-12102B / RC-12103A / RC-12103B 6. LT provided on receiver RC-12102A / RC-12102B / RC-12103A / RC-12103B 7. VG provided on header and vaccum trap 8. PM of vaccum pump is done as per schedule	4	2	8	EXTREMELY LOW					

NO/Less	Quantity	5.20	No/less quantity of pure material received in receiver RC-12102A / RC-12102B / RC-12103A / RC-12103B from reactor D-11102 / D-11103 due to cooling failure in primary HE	1. Material vapour escape from vaccuum pump in environment will lead to environment issue. 2. It will lead to material loss.	6	4	24	MODERATE	1. Process under supervision 2. TT provided on reactor D-11102 / D-11103 3. TI provided on reactor column. and receiver RC-12102A / RC-12102B / RC-12103A / RC-12103B 4. TI provided between primary HE and secondary HE 5. SG provided on receiver RC-12102A / RC-12102B / RC-12103A / RC-12103B 6. LT provided on receiver RC-12102A / RC-12102B / RC-12103A / RC-12103B 7. VG provided on header and vaccum trap 8.PG provided on cooling supply and return line 14. Secondary HE with chilling water supply available 15. TI provided on cooling supply and return line. 16. Stand by cooling water supply pump is provided	4	2	8	EXTREMELY LOW					
		5.21	No/less quantity of pure material received in receiver RC-12102A / RC-12102B / RC-12103A / RC-12103B from reactor D-11102 / D-11103 due to chilling failure in secondary HE	1. Material vapour escape from vaccuum pump in environment will lead to environment issue. 2. It will lead to material loss.	6	4	24	MODERATE	1. Process under supervision 2. TT provided on reactor D-11102 / D-11103 3. TI provided on reactor column. and receiver RC-12102A / RC-12102B / RC-12103A / RC-12103B 4. TI provided between primary HE and secondary HE 5. SG provided on receiver RC-12102A / RC-12102B / RC-12103A / RC-12103B 6. LT provided on receiver RC-12102A / RC-12102B / RC-12103A / RC-12103B 7. VG provided on header and vaccum trap 8.PM of pump is done regularly 14. Primary HE with cooling water supply available 15. Cooling water supply provided in vaccum trap jacket 16. Stand by chilling water supply pump is provided 17.PG provided on chilling supply and return line 18. TI provided on chilling supply and return line.	4	2	8	EXTREMELY LOW					
		5.22	No/less quantity transfer of pure material from receivers RC-12102A / RC-12102B / RC-12103A / RC-12103B to drums by gravity due to human error	1. It will lead to process delay.	6	2	12	LOW	1. Process under supervision. 2. LT provided on receiver RC-12102A / RC-12102B / RC-12103A / RC-12103B 3. Weighing of drum during drum filling 4. SG provided on transfer material line. 5. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 6. Fill drum quantity and weight check after filling.	4	2	8	EXTREMELY LOW					
		5.23	No/less quantity transfer of pure material from receivers RC-12102A / RC-12102B / RC-12103A / RC-12103B to drums by gravity due to transfer line leakage / spillage	1. It may lead to health and enviornment issue 2. It may lead to yield loss. 3. It may lead to fire in case of external source of ignition.	6	6	36	HIGH	1. Process under supervision. 2. LT provided on receiver RC-12102A / RC-12102B / RC-12103A / RC-12103B 3. Weighing of drum during drum filling 4. SG provided on transfer material line. 5. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 6. Fill drum quantity and weight check after filling. 7. RCC flooring provided 8. Spill kit is available. 9. 2 no's valve provided on transfer line. 10. FLP fittings provided. 11. Firefighting system available. 12. PTW system available. 13. Crocodile earthing provided.	4	6	24	MODERATE					
		5.24	No/less quantity transfer of pure material from receivers RC-12102A / RC-12102B / RC-12103A / RC-12103B to drums by gravity due to weigh balance malfunction	1. It may lead to process delay	6	2	12	LOW	1. Process under supervision. 2. LT provided on receiver RC-12102A / RC-12102B / RC-12103A / RC-12103B 3. Calibration of weigh balance done as per schedule. 4. SG provided on transfer material line. 5. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 6. Spare weigh balace available. 7. Total material will be fill in drums.	4	2	8	EXTREMELY LOW					

5.25	No / Less Quantity of pure material transfer from drum to storage tank TF-11111 by pump ST-P-10101 due to human error	1. It will lead to process delay	6	2	12	LOW	1. Drum Weighing before material transferring. 2. LI on storage tank TF-11111 3. Empty drum check after transferring. 4. Sight glass on inlet transfer line 5. Process under supervision 6. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 7. OCP displayed for Transferring operation from drum to storage tank in local language. 8. PG provided on pump discharge line	4	2	8	EXTREMELY LOW					
5.26	No / Less Quantity of pure material transfer from drum to storage tank TF-11111 by pump ST-P-10101 due to discharge Line valve malfuction	1. It will lead to material loss. 2. It will lead to pressurization of line which results into gasket leakage / pump damage causing Health & Environment issue. 3. Leakage will cause burn injuries. 4. It may lead to fire in case of external ignition source.	6	6	36	HIGH	1. Drum Weighing before material transferring. 2. LI on storage tank TF-11111 3. Empty drum check after transferring. 4. Sight glass on inlet transfer line 5. Process under supervision 6. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 7. Overload protection for Pump is provided. 8. Self primming pump is used for transferring the material to storage tank from drums 9. Suitable MOC of pipelines and valve (SS316). 10. PG on Pump discharge line. 11. Suitable MOC of packing (teflon). 12. Spill kit available. 13. Sight Glass on pump P-XXXX discharge line. 14. Earthing provided on connected equipment 15. Fire protection system available 16. Flameproof fittings installed	4	6	24	MODERATE					
5.27	No / Less Quantity of pure material transfer from drum to storage tank TF-11111 by pump ST-P-10101 due to suction Line valve malfuction	1. It will lead to process delay. 4. It may lead to dry running of pump.	6	4	24	MODERATE	1. Drum Weighing before and after transferring operation. 2. LI on storage tank ST-10101 or ST-10113 3. Empty drum check after transferring operation. 4. Sight glass on inlet transfer line 5. Process under supervision 6. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 7. Dry run protection for Pump is provided. 8. Self primming pump is used for transferring the material to storage tank from drums 9. Suitable MOC of pipelines and valve (SS316). 10. Jacketed pipeline and valve with insulation for steam heating. 11. PG on Pump discharge line. 12. Suitable MOC of packing (teflon). 13. Spill kit available. 14. Sight Glass on pumpP-10101 or P-10113discharge line. 15. Flameproof fittings installed 16. Fire protection system available	4	4	16	LOW					
5.28	No / Less Quantity of pure material transfer from drum to storage tank TF-11111 by pump ST-P-10101 due to pump failure	1. It will lead to material loss. 2. It will lead to leakage causing Health & Environment issue. 3. Leakage will cause burn injuries. 4. It may lead to dry running of pump. 5. It will lead to overflowing of drum due to back flow of material.	6	4	24	MODERATE	1. Drum Weighing before and after transferring operation. 2. LI on storage tank ST-10101 or ST-10113 3. Empty drum check after transferring operation. 4. Sight glass on inlet transfer line 5. Process under supervision 6. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 7. Overload / dry run protection for Pump is provided. 8. Self primming pump is used for transferring the material to storage tank from drums 9. Suitable MOC of Pump (SS316) is selected 10. PM of pump is done periodically. 11. PG on Pump discharge line. 12. Sight Glass on pumpP-10101 or P-10113 discharge line. 13. Spill kit available. 15. Earthing provided on connected equipment 16. Fire protection system available 17. Flameproof fittings installed 18. RCC flooring available. 19. Three Manual value provided in discharge line and one in suction line	4	4	16	LOW					

5.29	No / Less Quantity of pure material transfer from drum to storage tank TF-11111 by pump ST-P-10101 due to weigh balance malfuntion	1. It will lead to process delay	6	2	12	LOW	1. Calibration of weigh balance is done as per schedule. 2. LI on storage tank TF-11111 3. Empty drum check after transferring operation. 4. Sight glass on inlet transfer line 5. Process under supervision 6. Total drums material transferred to storage tank 7. Spare weigh balance is available	4	2	8	EXTREMELY LOW					
5.30	No / Less Quantity of pure material transfer from drum to storage tank TF-11111 by pump ST-P-10101 due to leakage / Spillage in system	1. It will lead to material loss. 2. It will lead to leakage causing Health & Environment issue. 3. Leakage will cause burn injuries. 4. It may lead to fire in case of external source of ignition	6	6	36	HIGH	1. Drum Weighing before transferring material. 2. LI on storage tank TF-11111 3. Empty drum check after transferring material 4. SG on inlet transfer line 5. Process under supervision 6. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 7. Flange guard provided 9. Suitable MOC of pipelines and valve (SS316). 10. PG on Pump discharge line. 11. Suitable MOC of packing (teflon). 12. Spill kit available. 13. SG on pump P-xxxx discharge line. 14. Earthing provided on connected equipment 15. Fire protection system available 16. Flameproof fittings installed 17. RCC flooring provided	4	6	24	MODERATE					
5.31	No / Less Quantity of pure material transfer from drum to storage tank TF-11111 by pump ST-P-10101 due to LI malfunction of storage tank TF-11111	It will lead to process delay.	6	2	12	LOW	1. Glass LI on storage tank TF-11111 2. Sight glass on inlet transfer line 3. Drum Weighing before transferring operation. 4. Empty drum check after transferring operation. 5. Process under supervision 6. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 7. Logbook for stock in storage tank is maintained. 8. Double valve provided on LI.	4	2	8	EXTREMELY LOW					
5.32	No/less quantity transfer of mix fraction from receivers RC-12102C / RC-12103C to storge tank ST-10101 / ST-10107 / ST-10113 / ST-10111 by gravity due to human error	1. It will lead to process delay.	6	2	12	LOW	1. Process under supervision. 2. LT provided on receiver RC-12102C / RC-12103C 3. LI provided on storage tank ST-10101 / ST-10107 / ST-10113 / ST-10111 4. SG provided on transfer material line.	4	2	8	EXTREMELY LOW					
5.33	No/less quantity transfer of mix fraction from receivers RC-12102C / RC-12103C to storge tank ST-10101 / ST-10107 / ST-10113 / ST-10111 by gravity due to transfer line leakage / spillage	1. It may lead to health and enviornment issue 2. It may lead to yield loss. 3. It may lead to fire in case of external source of ignition.	6	6	36	HIGH	1. Process under supervision. 2. LT provided on receiver RC-12102C / RC-12103C 3. LI provided on storage tank ST-10101 / ST-10107 / ST-10113 / ST-10111 4. SG provided on transfer material line. 5. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 6. Suitable MOC of valve and pipeline SS-316 is selected. 7. RCC flooring provided 8. Spill kit is available. 9. 2 no's valve provided on transfer line. 10. FLP fittings provided. 11. Firefighting system available. 12. PTW system available. 13. Suitable MOC of gasket teflon is selected. 14. Flange guard is provided. 15. Double earthing and flange to flange bonding is provided.	4	6	24	MODERATE					
5.34	No/less quantity transfer of mix fraction from receivers RC-12102C / RC-12103C to storge tank ST-10101 / ST-10107 / ST-10113 / ST-10111 by gravity due to LT malfuction	1. It may lead to process delay.	6	2	12	LOW	1. Process under supervision. 2. Calibration of LT done asper the schedule. 3. LI provided on storage tank ST-10101 / ST-10107 / ST-10113 / ST-10111 4. SG provided on transfer material line.	4	2	8	EXTREMELY LOW					

5.35	No/less quantity transfer of mix fraction from receivers RC-12102C / RC-12103C to storge tank ST-10101 / ST-10107 / ST-10113 / ST-10111 by gravity due to transfer line valve malfuction	1. It may lead to process delay.	6	2	12	LOW	1. Process under supervision. 2. LT provided on receiver RC-12102C / RC-12103C 3. LI provided on storage tank ST-10101 / ST-10107 / ST-10113 / ST-10111 4. SG provided on transfer material line. 5. Suitable MOC of valve SS-316 is selected. 6. Spare valve is available to avoid process delay.	4	2	8	EXTREMELY LOW					
5.36	No / Less Quantity of Remaning bottom material transferred from reactor D-11102 / D-11103 to storage tank ST-10112 by pump-XXXX due to human error	1. It will lead to process delay	6	2	12	LOW	1, Process under supervior 2. WG provided on reactor D-11102 / D-11103 3.WG provided on storage tank ST-10112 4.SG provided on transfer line 5. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 6. LI provided on storage tank ST-10112 7. PG provided on pump discharge line. 8. Total material transfer from reactor D-11102 / D-11103 to storage tank ST-10112	4	2	8	EXTREMELY LOW					
5.37	No / Less Quantity of Remaning bottom material transferred from reactor D-11102 / D-11103 to storage tank ST-10112 by pump-XXXX due to discharge valve malfunction	1. It may lead to yield loss. 2. It may lead to pressurization of line which results into gasket leakage causing Health & Environment issue. 3. Leakage may cause burn injuries. 4. It may lead to fire in case of external surce of ignition	6	6	36	HIGH	1. LI provided on ST-10112 2. WG provided on reactor D-11102 / D-11103 3. SG provided on Reactor inlet line 4. Side glass provided on pump discharge line 5. Process under supervision 6. PG providedon pump discharge line 7. Overload protection for Pump tripping 8. PTW system available 9. Suitable MOC of valve is selected (SS316). 10. Fire fighting system available 11. FLP fittings available 12. Suitable MOC of packing (teflon). 13. Spill kit available. 14. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron)	4	6	24	MODERATE					
5.38	No / Less Quantity of Remaning bottom material transferred from reactor D-11102 / D-11103 to storage tank ST-10112 by pump-XXXX due to suction Line valve malfunction	1. It may lead to dry running of pump. 2. It may lead to process delay.	6	4	24	MODERATE	1. LI provided on ST-10112 2. WG provided on reactor D-11102 / D-11103 3. SG provided on Reactor inlet line 4. Side glass provided on pump discharge line 5. Process under supervision 6. PG provided on pump discharge line 7. Underload protection for Pump tripping 8. Suitable MOC of valve is selected (SS316). 9. Spare valve available to avoid process delay.	4	4	16	LOW					
5.39	No / Less Quantity of Remaning bottom material transferred from reactor D-11102 / D-11103 to storage tank ST-10112 by pump-XXXX due to pump failure	1. It may lead to production delay.	6	2	12	LOW	1. LI provided on ST-10112 2. WG provided on reactor D-11102 / D-11103 3. SG provided on Reactor inlet line 4. Side glass provided on pump discharge line 5. Process under supervision 6. Underload /Overload protection for Pump tripping. 7. PM of pump is done 8. Spare pump and its parts is available to avoid process delay.	4	2	8	EXTREMELY LOW					
5.40	No / Less Quantity of Remaning bottom material transferred from reactor D-11102 / D-11103 to storage tank ST-10112 by pump-XXXX due to LI malfuction of storage tank ST-10112	1. It may lead to process delay	6	2	12	LOW	1. Glass LI provided on ST-10112 2. WG provided on reactor D-11102 / D-11103 3. SG provided on Reactor inlet line 4. Side glass provided on pump discharge line 5. Process under supervision 6. PG provided on pump discharge line.	4	2	8	EXTREMELY LOW					

		5.41	No / Less Quantity of Remaning bottom material transferred from reactor D-11102 / D-11103 to storage tank ST-10112 by pump-XXXX due to leakage / spillage in system	1. It may lead to yield loss. 2. It may lead to leakage causing Health & Environment issue. 3. It may lead to fire iin case of external source of ignition	6	6	36	HIGH	1. LI provided on ST-10112 2. WG provided on reactor D-11102 / D-11103 3. SG provided on Reactor inlet line 4. Side glass provided on pump discharge line 5. Process under supervision 6. PG providedon pump discharge line 7. Suitable MOC of valve and line SS-316 is selected 8. PTW system available 9. Suitable MOC of valve is selected (SS316). 10. Fire fighting system available 11. FLP fittings available 12. Suitable MOC of packing (teflon). 13. Spill kit available. 14. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 15. Flange guard provided.	4	6	24	MODERATE					
		6.1	More Quantity Transfer DFNB Mix fraction or DFNB crude material from storage tank ST-10101 / ST-10107 / ST-10113 / ST-10111 to reactor D-11102 / D-11103 by respective pump no. P-10111, P-10113, P-10107 due to human error	1. It may lead to process delay due to over flow of reactors D-11102 / D-11103 and excess material getting filled in the column.	6	2	12	LOW	1. LI provided on ST-10101 / ST-10107 / ST-10113 / ST-10111 2. WG provided on reactor D-11102 / D-11103 3. SG provided on Reactor inlet line 4. Side glass provided on pump discharge line 5. Process under supervision 6. PG provided on pump discharge line. 7. Empty reactore checked.	4	2	8	EXTREMELY LOW					
		6.2	More Quantity Transfer DFNB Mix fraction or DFNB crude material from storage tank ST-10101 / ST-10107 / ST-10113 / ST-10111 to reactor D-11102 / D-11103 by respective pump no. P-10111, P-10113, P-10107 due to LI malfuction	1. It may lead to process delay due to over flow of reactors D-11102 / D-11103 and excess material getting filled in the column.	6	2	12	LOW	1. LI provided on ST-10101 / ST-10107 / ST-10113 / ST-10111 2. WG provided on reactor D-11102 / D-11103 3. SG provided on Reactor inlet line 4. Side glass provided on pump discharge line 5. Process under supervision 6. PG provided on pump discharge ine	4	2	8	EXTREMELY LOW					
		6.3	More quantity of K2CO3 charged due to human error.	1. It may lead to material loss	6	2	12	LOW	1. The material is received from store as per issue slip. 2. The material is weighed before charging in the plant. 3.Neutral pH check during and after charging. 4. Process under supervision.	4	2	8	EXTREMELY LOW					
		6.4	More quantity of K2CO3 charged due to weigh balance malfunction.	1. It may lead to material loss	6	2	12	LOW	1. The material is received from store as per issue slip. 2. The material is weighed before charging in the plant. 3. Neutral pH check during and after charging 4. Process under supervision. 5. Calibration of weigh balance is done as per schedule. 6. Spare weigh balance is available.	4	2	8	EXTREMELY LOW					
		6.5	More quantity of mix-fraction received in receiver RC-12102C / RC-12103C from reactor D-11102 / D-11103 due to human error	1. It will lead to process delay.	6	2	12	LOW	1. Process under supervision 2. TT provided on reactor D-11102 / D-11103 3. TI provided on reactor column and receiver RC-12102C / RC-12103C 4. TI provided between primary HE and secondary HE 5. SG provided on receiver RC-12102C / RC-12103C. 6. LT provided on receiver RC-12102C / RC-12103C 7.QC analysis done during distillation	4	2	8	EXTREMELY LOW					
		6.6	More quantity of mix-fraction received in receiver RC-12102C / RC-12103C from reactor D-11102 / D-11103 due TT malfunction	1. It will lead to process delay.	6	2	12	LOW	1. Process under supervision 2. Calibration of TT is done as per schedule 3. TI provided on reactor column and receiver RC-12102C / RC-12103C 4. TI provided between primary HE and secondary HE 5. SG provided on receiver RC-12102C / RC-12103C. 6. LT provided on receiver RC-12102C / RC-12103C 7.QC analysis done during distillation	4	2	8	EXTREMELY LOW					

		6.7	More quantity of mix-fraction received in receiver RC-12102C / RC-12103C from reactor D-11102 / D-11103 due to steam heating valve malfuction in reactor D-11102 / D-11103	1. It will lead to process delay and quality issue	6	2	12	LOW	1. Process under supervision 2. TT provided on reactor D-11102 / D-11103 3. TI provided on reactor column and receiver RC-12102C / RC-12103C 4. TI provided between primary HE and secondary HE 5. SG provided on receiver RC-12102C / RC-12103C. 6. LT provided on receiver RC-12102C / RC-12103C 7. VG provided on header and vaccum trap 8. QC analysis done during distillation 9.. PG provided on reactor jacket 10. PG provided on steam supply header 11.Stand by steam supply provision available 12.PM of control valve is done as per schedule 13. Manual valve provided on steam heatng line	4	2	8	EXTREMELY LOW					
		6.8	More quantity of pure material received in receiver RC-12102A / RC-12102B / RC-12103A / RC-12103B from reactor D-11102 / D-11103 due to human error	1. It may lead to quality issue due to high boiler content carried forward with pure material 2. It may lead to process delay	6	2	12	LOW	1. Process under supervision 2. TT provided on reactor D-11102 / D-11103 3. TI provided on reactor column and receiver RC-12102A / RC-12102B / RC-12103A / RC-12103B 4. TI provided between primary HE and secondary HE 5. SG provided on receiver RC-12102A / RC-12102B / RC-12103A / RC-12103B 6. LT provided on receiver RC-12102A / RC-12102B / RC-12103A / RC-12103B 7. VG provided on header and vaccum trap 8. QC analysis to be done during distillation	4	2	8	EXTREMELY LOW					
		6.9	More quantity of pure material received in receiver RC-12102A / RC-12102B / RC-12103A / RC-12103B from reactor D-11102 / D-11103 due TT malfunction	1. It may lead to quality issue due to high boiler content carried forward with pure material 2. It may lead to process delay	6	2	12	LOW	1. Process under supervision 2. Calibration of TT is done as per schedule 3. TI provided on reactor column and receiver RC-12102A / RC-12102B / RC-12103A / RC-12103B 4. TI provided between primary HE and secondary HE 5. SG provided on receiver RC-12102A / RC-12102B / RC-12103A / RC-12103B 6. LT provided on receiver RC-12102A / RC-12102B / RC-12103A / RC-12103B 7. VG provided on header and vaccum trap 8. QC analysis to be done during distillation	4	2	8	EXTREMELY LOW					
		6.10	More quantity of pure material received in receiver RC-12102A / RC-12102B / RC-12103A / RC-12103B from reactor D-11102 / D-11103due to steam heating valve malfuction in reactor D-11102 / D-11103	1. It may lead to quality issue due to high boiler content carried forward with pure material 2. It may lead to process delay	6	2	12	LOW	1. Process under supervision 2. TT provided on reactor D-11102 / D-11103 3. TI provided on reactor column and receiver RC-12102A / RC-12102B / RC-12103A / RC-12103B 4. TI provided between primary HE and secondary HE 5. SG provided on receiver RC-12102A / RC-12102B / RC-12103A / RC-12103B. 6. LT provided on receiver RC-12102A / RC-12102B / RC-12103A / RC-12103B 7. VG provided on header and vaccum trap 8. QC analysis to be done during distillation 9.. PG provided on reactor jacket 10. PG provided on steam supply header 11. Manual valve provided on steam supply line	4	2	8	EXTREMELY LOW					
More	Quantity	6.11	More quantity transfer of pure material from receivers RC-12102A / RC-12102B / RC-12103A / RC-12103B to drums by gravity due to human error	1. It will lead to yield loss 2. It may lead to drum over flow may cause health and enviornment issue 3. It may lead to fire in case of external source of ignition	6	6	36	HIGH	1. Process under supervision. 2. LT provided on receiver RC-12102A / RC-12102B / RC-12103A / RC-12103B 3. Weighing of drum during drum filling 4. SG provided on transfer material line. 5. PTW system available 6. Fire fighting system available 7. FLP fittings available 8. Spill kit available. 9. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 10. Double valve provided n transfer line	4	6	24	MODERATE					

6.12	More quantity transfer of pure material from receivers RC-12102A / RC-12102B / RC-12103A / RC-12103B to drums by gravity due to weigh balance malfunction	1. It will lead to processd delay 2. It may lead to drum over flow may cause health and enviornment issue 3. It may lead to fire in case of external source of ignition	6	6	36	HIGH	1. Process under supervision. 2. LT provided on receiver RC-12102A / RC-12102B / RC-12103A / RC-12103B 3. Calibration of weigh balance done as per schedule. 4. SG provided on transfer material line. 5. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 6. Spare weigh balance available.	4	6	24	MODERATE					
6.13	More quantity transfer of pure material from receivers RC-12102A / RC-12102B / RC-12103A / RC-12103B to drums by gravity due to transfer line valve malfuction	1. It will lead to yield loss 2. It may lead to drum over flow may cause health and enviornment issue 3. It may lead to fire in case of external source of ignition	6	6	36	HIGH	1. Process under supervision. 2. LT provided on receiver RC-12102A / RC-12102B / RC-12103A / RC-12103B 3. Weighing of drum during drum filling 4. SG provided on transfer material line. 5. PTW system available 6. Fire fighting system available 7. FLP fittings available 8. Spill kit available. 9. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 10. Double valve provided n transfer line 11. Suitable MOC of valve SS-316 is selected.	4	6	24	MODERATE					
6.14	More Quantity of pure material transfer from drum to storage tank TF-11111 by pump ST-P-10101 due to human error	No consequences due to total material transferred to storage tank					1. Drum Weighing before material transferring. 2. LI on storage tank TF-11111 3. Empty drum check after transferring. 4. Sight glass on inlet transfer line 5. Process under supervision 6. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 7. OCP displayed for Transferring operation from drum to storage tank in local language. 8. PG provided on pump discharge line									
6.15	More Quantity of pure material transfer from drum to storage tank TF-11111 by pump ST-P-10101 due to weigh balance malfuntion	No consequences due to total material transferred to storage tank					1. Calibration of weigh balance is done as per schedule. 2. LI on storage tank TF-11111 3. Empty drum check after transferring operation. 4. Sight glass on inlet transfer line 5. Process under supervision 6. Total drums material transferred to storage tank 7. Spare weigh balance is available									
6.16	More Quantity of pure material transfer from drum to storage tank TF-11111 by pump ST-P-10101 due to LI malfunction of storage tank TF-11111	No consequences due to total material transferred to storage tank					1. Glass LI on storage tank TF-11111 2. Sight glass on inlet transfer line 3. Drum Weighing before transferring operation. 4. Empty drum check after transferring operation. 5. Process under supervision 6. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 7. Logbook for stock in storage tank is maintained. 8. Double valve provided on LI.									
6.17	More quantity transfer of mix fraction from receivers RC-12102C / RC-12103C to storge tank ST-10101 / ST-10107 / ST-10113 / ST-10111 by gravity due to human error	1. It may lead to overflow of storage tank if already full 2.It may lead to spillage from vent line may cause health and enviornmet issue 3.It may lead to fire due to external source of ignition	6	6	36	HIGH	1. Process under supervision. 2. LT provided on receiver RC-12102C / RC-12103C 3. LI provided on storage tank ST-10101 / ST-10107 / ST-10113 / ST-10111 4. SG provided on transfer material line. 5. PTW system available 6. Fire fighting system available 7. FLP fittings available 8. Spill kit available. 9. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron)	4	6	24	MODERATE	1. Secondery containment nedd to be provided.	2	4	8	

		6.18	More quantity transfer of mix fraction from receivers RC-12102C / RC-12103C to storge tank ST-10101 / ST-10107 / ST-10113 / ST-10111 by gravity due to LI malfuction	1. It may lead to overflow of storage tank if already full 2.It may lead to spillage from vent line may cause health and enviornmet issue 3.It may lead to fire due to external source of ignition	6	6	36	HIGH	1. Process under supervision. 2. Glass Li provided. 3. LT provided on receiver RC-12102C / RC-12103C1 4. SG provided on transfer material line. 5. PTW system available 6. Fire fighting system available 7. FLP fittings available 8. Spill kit available. 9. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron)	4	6	24	MODERATE					
		6.19	More quantity transfer of mix fraction from receivers RC-12102C / RC-12103C to storge tank ST-10101 / ST-10107 / ST-10113 / ST-10111 by gravity due to transfer line valve malfuction	1. It may lead to overflow of storage tank if already full 2.It may lead to spillage from vent line may cause health and enviornmet issue 3.It may lead to fire due to external source of ignition	6	6	36	HIGH	1. Process under supervision. 2. LT provided on receiver RC-12102C / RC-12103C 3. LI provided on storage tank ST-10101 / ST-10107 / ST-10113 / ST-10111 4. SG provided on transfer material line. 5. Suitable MOC of valve SS-316 is selected. 6. Spare valve is available to avoid process delay. 7. PTW system available 8. Fire fighting system available 9. FLP fittings available 10. Spill kit available. 11. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron)	4	6	24	MODERATE					
		6.20	More Quantity of Remaning bottom material transferred from reactor D-11102 / D-11103 to storage tank ST-10112 by pump-XXXX due to human error	1. It may lead to overflow of storage tank if already full 2.It may lead to spillage from vent line may cause health and enviornmet issue 3.It may lead to fire due to external source of ignition	6	6	36	HIGH	1, Process under supervior 2. WG provided on reactor D-11102 / D-11103 3.WG provided on storage tank ST-10112 4.SG provided on transfer line 5. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 6. LI provided on storage tank ST-10112 7. PTW system available 8. Fire fighting system available 9. FLP fittings available 10. Spill kit available.	4	6	24	MODERATE					
		6.21	More Quantity of Remaning bottom material transferred from reactor D-11102 / D-11103 to storage tank ST-10112 by pump-XXXX due to LI malfuction of storage tank ST-10112	1. It may lead to overflow of storage tank if already full 2.It may lead to spillage from vent line may cause health and enviornmet issue 3.It may lead to fire due to external source of ignition	6	6	36	HIGH	1. Glass LI provided on ST-10112 2. WG provided on reactor D-11102 / D-11103 3. SG provided on Reactor inlet line 4. Side glass provided on pump discharge line 5. Process under supervision 6. PTW system available 7. Fire fighting system available 8. FLP fittings available 9. Spill kit available. 10 PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 11. Data maintained for storage tank level.	4	6	24	MODERATE					
NO/Less	Pressure	7.1	NA															
More	Pressure	8.1	NA															
Back	Pressure	9.1	NA															
Less	Temperature	10.1	No/less temperature < 110^{o}C in reactor D-11102 / D-11103 during distillation of 2,4 DFNB material due to human error	1. It will lead to process delay.	6	2	12	LOW	1. Process under supervision 2. TT provided on reactor D-11102 / D-11103 3. TI provided on reactor column and receivers 4. TI provided between primary HE and secondary HE 5. SG provided on receivers 6. LT provided on receivers 7.QC analysis done during distillation 8.. PG provided on reactor jacket 9. PG provided on steam supply header	4	2	8	EXTREMELY LOW					
		10.2	No/less temperature < 110^{o}C in reactor D-11102 / D-11103 during distillation of 2,4 DFNB material due to oil heating failure .	1. It will lead to process delay.	6	2	12	LOW	1. Process under supervision 2. TT provided on reactor D-11102 / D-11103 3. TI provided on reactor column and receivers 4. TI provided between primary HE and secondary HE 5. SG provided on receivers 6. LT provided on receivers 7.QC analysis done during distillation 8.. PG provided on reactor jacket 9. PG provided on oil supply line. 10. Stand by pump available for oil circulation. 11. PM done of thermopack as per schedule.	4	2	8	EXTREMELY LOW					

Less	Temperature	10.3	No/less temperature < 110°C in reactor D-11102 / D-11103 during distillation of 2,4 DFNB material due to oil valve malfunction .	1. It will lead to process delay.	6	4	24	MODERATE	1. Process under supervision 2. TT provided on reactor D-11102 / D-11103 3. TI provided on reactor column and receivers 4. TI provided between primary HE and secondary HE 5. SG provided on receivers 6. LT provided on receivers 7.QC analysis done during distillation 8.. PG provided on reactor jacket 9. PG provided on oil supply line. 10. 2 no's manual valve provided before and after control valve. 11. Suitable MOC of valve CS is selected 12. Manual on/off valve operation facility is available 13. Spare valve is available. 14. PM of control valve done as per schedule.	4	2	8	EXTREMELY LOW					
		10.4	No/less temperature < 110°C in reactor D-11102 / D-11103 during distillation of 2,4 DFNB material due to TT malfunction of reactor D-11102 / D-11103	1. It will lead to process delay.	6	2	12	LOW	1. Process under supervision 2. Calibration of TT is done as per schedule 3. TI provided on reactor column and receivers 4. TI provided between primary HE and secondary HE 5. SG provided on receivers 6. LT provided on receivers 7.QC analysis done during distillation	4	2	8	EXTREMELY LOW					
More	Temperature	11.1	More temperature > 120°C in reactor D-11102 / D-11103 during distillation of 2,4 DFNB material due to human error	1. It may lead to quality issue due to unknown content carried forward with distilled material 2. It may lead to process delay	6	2	12	LOW	1. Process under supervision 2. TT provided on reactor D-11102 / D-11103 3. TI provided on reactor column and receivers 4. TI provided between primary HE and secondary HE 5. SG provided on receivers 6. LT provided on receivers 7.QC analysis done during distillation	4	2	8	EXTREMELY LOW					
		11.2	More temperature > 120°C in reactor D-11102 / D-11103 during distillation of 2,4 DFNB material due to oil heating valve malfunction.	1. It may lead to quality issue due to unknown content carried forward with distilled material 2. It may lead to process delay	6	2	12	LOW	1. Process under supervision 2. TT provided on reactor D-11102 / D-11103 3. TI provided on reactor column and receivers 4. TI provided between primary HE and secondary HE 5. SG provided on receivers 6. LT provided on receivers 7.QC analysis done during distillation 8.. PG provided on reactor jacket 9. PG provided on oil supply line. 10. 2 no's manual valve provided before and after control valve. 11. Suitable MOC of valve CS is selected 12. Manual on/off valve operation facility is available 13. Spare valve is available. 14. PM of control valve done as per schedule.	4	2	8	EXTREMELY LOW					
		11.3	More temperature > 120°C in reactor D-11102 / D-11103 during distillation of 2,4 DFNB material due to TT malfunction of reactor D-11102 / D-11103	1. It may lead to quality issue due to unknown content carried forward with distilled material 2. It may lead to process delay	6	2	12	LOW	1. Process under supervision 2. Calibration of TT is done as per schedule 3. TI provided on reactor column and receivers 4. TI provided between primary HE and secondary HE 5. SG provided on receivers 6. LT provided on receivers 7.QC analysis done during distillation	4	2	8	EXTREMELY LOW					
NO/Less	Level	12.1	NA															
More	Level	13.1	NA															
Improper	Agitation	14.1	Agitation failure of electrical	1. It will lead to process delay and quality issue	6	2	12	LOW	1. Process under supervision 2. PM is done as per schedule 3. WG provided on reactor 4. Critical spare available 5. Overload / Underload protection available.	4	2	8	EXTREMELY LOW					
		14.2	Agitation failure of mechanical	1. It will lead to process delay and quality issue	6	2	12	LOW	1. Process under supervision 2. PM is done as per schedule 3. WG provided on reactor 4. Critical spare available	4	2	8	EXTREMELY LOW					
Changed	Composition	15	Improper quality of K2CO3	1.It may lead to acidic pH may cause equipment damage	6	2	12	LOW	1 QC check of all raw material 2 COA received with material issue slip 3 Process under supervision	4	2	8	EXTREMELY LOW					

Failure	Utility	16.1	Oil heating failure in reactor D-11102 / D-11103	1. It will lead to process delay.	6	2	12	LOW	1. Process under supervision 2. TT provided on reactor D-11102 / D-11103 3. TI provided on reactor column and receivers 4. TI provided between primary HE and secondary HE 5. SG provided on receivers 6. LT provided on receivers 7.QC analysis done during distillation 8.. PG provided on reactor jacket 9. PG provided on oil supply line. 10. Stand by pump available for oil circulation. 11. PM done of thermopack as per schedule.	4	2	8	EXTREMELY LOW					
		16.2	Vaccuum failure during distillation	1. It will lead to process delay.	6	2	12	LOW	1. Process under supervision 2. TT provided on reactor D-11102 / D-11103 3. TI provided on reactor column and receivers. 4. TI provided between primary HE and secondary HE 5. SG provided on receivers 6. LT provided on receivers 7. VG provided on header and vaccum trap 8.QC analysis done during distillation 9.PM of vaccum pump is done as per schedule	4	2	8	EXTREMELY LOW					
		16.3	Cooling failure in primary HE	1. Material vapour may escape from vaccuum pump in the environment may lead to health and environment issue. 2. It will lead to yield loss.	6	4	24	MODERATE	1. Process under supervision 2. TT provided on reactor D-11102 / D-11103 3. TI provided on reactor column and receivers. 4. TI provided between primary HE and secondary HE 5. SG provided on receivers 6. LT provided on receivers 7. VG provided on header and vaccum trap 8.QC analysis done during distillation 14. Secondary HE with chilling water supply available 15. TI provided on cooling supply and return line. 16. Stand by cooling water supply pump is provided 17.PG provided on cooling supply and return line	4	2	8	EXTREMELY LOW					
		16.4	Chilling failure in secondary HE	1. Material vapour may escape from vaccuum pump in the environment may lead to health and environment issue. 2. It will lead to yield loss.	6	4	24	MODERATE	1. Process under supervision 2. TT provided on reactor D-11102 / D-11103 3.TI provided on reactor column and receivers. 4. TI provided between primary HE and secondary HE 5. SG provided on receivers. 6. LT provided on receivers 7. VG provided on header and vaccum trap 8.QC analysis done during distillation 14. Primary HE with cooling water supply available 15. Cooling water supply provided in vaccum trap jacket 16. Stand by chilling water supply pump is provided 17.PG provided on chilling supply and return line 18. TI provided on chilling supply and return line. 17.PM of pump is done regularly	4	2	8	EXTREMELY LOW					
		16.5	Nitrogen failure during vaccum release	1. It wlll lead to process delay	6	2	12	LOW	1. Process under supervision 2. PG provided on nitrogen main header 3. Stand by nitrogen supply available	4	2	8	EXTREMELY LOW					
High	Viscosity	17	NA															
Low	Viscosity	18	NA															
Incorrect Sequence	Raw material Issues	19	NA															
	Sampling Issues	20	Incorrect sampling of 2 4 DFNB mix distilled material	1. It will lead to process delay	6	2	12	LOW	1. Process under supervision 2 QC analysis done of reaction mass upto desired result during reflux of reaction	4	2	8	EXTREMELY LOW					
Incompatibility	Raw Material	21	NA															
	DCS	22	NA															
	Power	23.1	Power failure	1. It will lead to process delay	10	2	20	MODERATE	DG set available	6	2	12	LOW					
	Start up/Shut down	24.1	NA															

Failure	Loss of Containment (Leakage / Rupture)	25.1	No / Less Quantity Transfer DFNB Mix fraction or DFNB crude material from storage tank ST-10101 / ST-10107 / ST-10113 / ST-10111 to reactor D-11102 / D-11103 (10KL) by respective pump no. P-10111, P-10113, P-10107 due to leakage / spillage in system	1. It may lead to yield loss. 2. It will lead to leakage causing Health & Environment issue. 3. It may lead to fire iin case of external source of ignition	6	6	36	HIGH	1. LI provided on ST-10101 / ST-10107 / ST-10113 / ST-10111 2. WG provided on reactor D-11102 / D-11103 3. SG provided on Reactor inlet line 4. Side glass provided on pump discharge line 5. Process under supervision 6. PG providedon pump discharge line 7. Suitable MOC of valve and line SS-316 is selected 8. PTW system available 9. Suitable MOC of valve is selected (SS316). 10. Fire fighting system available 11. FLP fittings available 12. Suitable MOC of packing (teflon). 13. Spill kit available. 14. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron)	4	6	24	MODERATE					
		25.2	No/less quantity of K2CO3 charged due to spillage	1. It may lead to material loss 2. It may lead to health and enviornment issue	6	4	24	MODERATE	1. Process under supervision. 2. Secondary containment is provided 3. Spill kit is available 4. RCC flooring is available. 5. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron)	4	2	8	EXTREMELY LOW					
		25.3	No/less quantity transfer of pure material from receivers RC-12102A / RC-12102B / RC-12103A / RC-12103B to drums by gravity due to transfer line leakage / spillage	1. It may lead to health and enviornment issue 2. It may lead to yield loss. 3. It may lead to fire in case of external source of ignition.	6	6	36	HIGH	1. Process under supervision. 2. LT provided on receiver RC-12102A / RC-12102B / RC-12103A / RC-12103B 3. Weighing of drum during drum filling 4. SG provided on transfer material line. 5. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 6. Fill drum quantity and weight check after filling. 7. RCC flooring provided 8. Spill kit is available. 9. 2 no's valve provided on transfer line. 10. FLP fittings provided. 11. Firefighting system available. 12. PTW system available. 13. Crocodile earthing provided.	4	6	24	MODERATE					
		25.4	No / Less Quantity of pure material transfer from drum to storage tank TF-11111 by pump ST-P-10101 due to leakage / Spillage in system	1. It will lead to material loss. 2. It will lead to leakage causing Health & Environment issue. 3. Leakage will cause burn injuries. 4. It may lead to fire in case of external source of ignition	6	6	36	HIGH	1. Drum Weighing before transferring material. 2. LI on storage tank TF-11111 3. Empty drum check after transferring material 4. SG on inlet transfer line 5. Process under supervision 6. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 7. Flange guard provided 9. Suitable MOC of pipelines and valve (SS316). 10. PG on Pump discharge line. 11. Suitable MOC of packing (teflon). 12. Spill kit available. 13. SG on pump P-xxxx discharge line. 14. Earthing provided on connected equipment 15. Fire protection system available 16. Flameproof fittings installed 17. RCC flooring provided	4	6	24	MODERATE					
		25.5	No/less quantity transfer of mix fraction from receivers RC-12102C / RC-12103C to storge tank ST-10101 / ST-10107 / ST-10113 / ST-10111 by gravity due to transfer line leakage / spillage	1. It may lead to health and enviornment issue 2. It may lead to yield loss. 3. It may lead to fire in case of external source of ignition.	6	6	36	HIGH	1. Process under supervision. 2. LT provided on receiver RC-12102C / RC-12103C 3. LI provided on storage tank ST-10101 / ST-10107 / ST-10113 / ST-10111 4. SG provided on transfer material line. 5. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 6. Suitable MOC of valve and pipeline SS-316 is selected. 7. RCC flooring provided 8. Spill kit is available. 9. 2 no's valve provided on transfer line. 10. FLP fittings provided. 11. Firefighting system available. 12. PTW system available. 13. Suitable MOC of gasket teflon is selected. 14. Flange guard is provided. 15. Double earthing and flange to flange bonding is provided.	4	6	24	MODERATE					

		25.6	No / Less Quantity of Remaning bottom material transferred from reactor D-11102 / D-11103 to storage tank ST-10112 by pump-XXXX due to leakage / spillage in system	1. It may lead to yield loss. 2. It may lead to leakage causing Health & Environment issue. 3. It may lead to fire iin case of external source of ignition	6	6	36	HIGH	1. LI provided on ST-10112 2. WG provided on reactor D-11102 / D-11103 3. SG provided on Reactor inlet line 4. Side glass provided on pump discharge line 5. Process under supervision 6. PG providedon pump discharge line 7. Suitable MOC of valve and line SS-316 is selected 8. PTW system available 9. Suitable MOC of valve is selected (SS316). 10. Fire fighting system available 11. FLP fittings available 12. Suitable MOC of packing (teflon). 13. Spill kit available. 14. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 15. Flange guard provided.	4	6	24	MODERATE					
MOC	Corrosion / Erosion	26.1	Corrosion due to less quantity of K2CO3 charged in reactor	1. It may lead to remain acidic pH which may cause corrosion of equipment.	6	4	24	MODERATE	1. The material is received from store as per issue slip. 2. The material is weighed before charging in the plant. 3. The neutral pH is checked during and after charging. 4. Process under supervision.	4	2	8	EXTREMELY LOW					
Improper	Maintenance	27.1	Improper maintenance	Process delay	6	2	12	LOW	1 PM of equipment is done as per schedule. 2 Trained technician and fitters 3 Maintenance work under supervision 4 Critical spare part is available	4	2	8	EXTREMELY LOW					
	Engineering issues/ Drawing Errors	28.1	Improper P& ID can lead to improper hazop	Improper hazop			0					0						

HAZOP WORK SHEET				Hazop Work Sheet Revision No	PHA-001.00
Product Name	2,4-DFNB			Hazop Work Sheet Effective Date	06-05-18
NODE NO :	8				
DESIGN INTENTION	Transfer DFNB Mix or DFNB crude material from storage tank ST-10101, ST-10113, ST-10111 & ST-10107 to reactor D-11101(10KL) by respective pump no.P-10111, P-10107 & P-10113. Start stirring and charge K2CO3 for neutralize pH. Apply vacuum in respected reactor D-11101(10KL) by respective steam ejector SE-15101. When received vacuum upto 750 mmHg then start heating @110 - 140^{0}C in bottom. collect the mix-fraction in RC-13101C. Give sample for QC analysis for running distillation, if the desired result is achieved then collect the pure material in RC-13101A/RC-13101B. Then transfer the pure material from receivers RC-13101A/RC-13101B to drums by gravity and then transfer the material in storage tank TF-11111 from drum by self primming pump ST-P-10101. Transfer the mix fraction from receivers RC-13101C to storge tank ST-10101, ST-10113, ST-10111 & ST-10107 by gravity. Check QC analysis of bottom remaining material in reactor D-11101 before transfering to storage tank ST-10112 by pump P-10112				
EQUIPMENTS COVERED IN THIS NODE	Reactor D-11101, Storage tank ST-10101, ST-10113, ST-10111 & ST-10107, Pump P-10111, P-10107 & P-10113, Steam ejector SE-15101, Receiver RC-13101C, Receiver RC-13101A/RC-13101B, Storage tank TF-11111, Storage tank TF-11112.				
DOCUMENT REFERRED	P& ID and PTC	DOCUMENT No.		DOCUMENT Revision No.	
HAZOP Revision No	01				
HAZOP Effective Date	30-03-22				

	Temperature (^{0}C)		Pressure (kg/cm^{2}g)		MOC	Capacity	
Equipment Details	Design	Working	Design	Working		Design	Working
Reactor D-11101	320		5		SS316L	10KL	15 KL
Storage tank ST-10101, ST-10113, ST-10111 & ST-10107	250	150	4.5	ATM	SS316L	10KL	14 KL
Pump P-10111, P-10107 & P-10113	150	AMB	3	3	SS316L	10 m3/hr	10 m3/hr
Steam ejector SE-15101	150	130	3.5	3.5	SS316L	1 torr	1 torr
Receiver RC-13101C	150	110	4.5	3.5	SS316L	2KL	3 KL
Receiver RC-13101A/RC-13101B	170	110	3.5		SS316L	2KL	7.5 KL
Storage tank TF-11111	250	150	4.5	ATM	SS316L	10KL	28 KL
Storage tank TF-11112	250	150	4.5	ATM	SS316L	10KL	28 KL

Guide Word	Parameter	Sr. No.	CAUSES	CONSEQUENCES	Probability	Severity	RPN No	Risk Classification	SAFEGUARDS	Probability	Severity	RPN No	Risk Classification	RECOMMENDATIONS	Probability	Severity	RPN No	Remarks
NO/Less	Flow	1.1	NA															
More	Flow	2.1	NA															
		3.1	Transfer the mix fraction from storage tank ST-10101 / ST-10107 / ST-10113 / ST-10111 to reactor D-11102 / D-11103 by pump no. P-10111, P-10113, P-10107 instead of D-11101 due to human error or vice-versa	1. It may lead to process delay due to over flow of reactors D-11102 / D-11103 which are in running process and excess material getting filled in the column.	6	2	12	LOW	1. Process under supervision 2. LI on storage tank ST-10101 / ST-10107 / ST-10113 / ST-10111 3. Double valve provided on transfer line from diversion to storage tank. 4. WG provided on reactors D-11102 / D-11103 and D-11101. 5. SG provided on inlet transfer line of reactor. 6. Identification flow arrow displayed.	4	2	8	EXTREMELY LOW					
		3.2	Transfer the mix fraction from storage tank ST-10101 / ST-10107 / ST-10113 / ST-10111 to reactor D-11102 / D-11103 by pump no. P-10111, P-10113, P-10107 instead of D-11101 due to transfer line valve malfunction or vice-versa	1. It may lead to process delay due to over flow of reactors D-11102 / D-11103 which are in running process and excess material getting filled in the column.	6	2	12	LOW	1. Process under supervision 2. LI on storage tank ST-10101 / ST-10107 / ST-10113 / ST-10111 3. Double valve provided on transfer line from diversion to storage tank. 4. WG provided on reactors D-11102 / D-11103 and D-11101. 5. SG provided on inlet transfer line of reactor. 6. Identification flow arrow displayed. 7. Suitable MOC SS316 of valve is selected 8. Spare valve is available	4	2	8	EXTREMELY LOW					

Other than/ Misdirected	Flow	3.3	Transfer the mix fraction from receivers RC-13101C to storage tank ST-10101 / ST-10107 / ST-10113 instead of ST-10111 by gravity due to human error or vice-versa	1. It may lead to overflow of storage tank if the others are full 2.It may lead to spillage from vent line may cause health and enviornmet issue 3.It may lead to fire due to external source of ignition	6	6	36	HIGH	1. LT provided on receiver RC-13101C 2. LI on storage tank ST-10101 / ST-10107 / ST-10113 / ST-10111 3. Double valve provided on transfer line from diversion to storage tank. 4. FLP fittings provided 5. Side glass on inlet line of storage tank 6. PTW is available 7. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 8. RCC flooring available 9. Spill kit available 10. Process under supervision. 11. Fire fighting system available 12. Data maintained for storage tank level	4	6	24	MODERATE					
		3.4	Transfer the mix fraction from receivers RC-13101C to storage tank ST-10101 / ST-10107 / ST-10113 instead of ST-10111 by gravitydue to transfer line valve malfucntion or vice-versa	1. It may lead to overflow of storage tank if the others are full 2.It may lead to spillage from vent line may cause health and enviornmet issue 3.It may lead to fire due to external source of ignition	6	6	36	HIGH	1. LT provided on receiver RC-13101C. 2. LI on storage tank ST-10101 / ST-10107 / ST-10113 / ST-10111 3. Double valve provided on transfer line from diversion to storage tank. 4. FLP fittings provided 5. Side glass on inlet line of storage tank 6. PTW is available 7. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 8. RCC flooring available 9. Spill kit available 10. Process under supervision. 11. Fire fighting system available 12. Data maintained for storage tank level 13.Suitable MOC SS316 of valve is selected	4	6	24	MODERATE					
Reverse	Flow	4.1	NA															
		5.1	No / Less Quantity Transfer DFNB Mix fraction or DFNB crude material from storage tank ST-10101 / ST-10107 / ST-10113 / ST-10111 to reactor D-11101 (10KL) by respective pump no. P-10111, P-10113, P-10107 due to human error	1. It will lead to process delay	6	2	12	LOW	1. LI provided on ST-10101 / ST-10107 / ST-10113 / ST-10111 2. WG provided on reactor D-11101 3. SG provided on Reactor inlet line 4. Side glass provided on pump discharge line 5. Process under supervision 6. PG providedon pump discharge line	2	2	4	EXTREMELY LOW					
		5.2	No / Less Quantity Transfer DFNB Mix fraction or DFNB crude material from storage tank ST-10101 / ST-10107 / ST-10113 / ST-10111 to reactor D-11101 by respective pump no. P-10111, P-10113, P-10107 due to discharge valve malfunction	1. It will lead to material loss. 2. It will lead to pressurization of line which results into gasket leakage causing Health & Environment issue. 3. Leakage will cause burn injuries. 4. It may lead to fire in case of external source of ignition	6	6	36	HIGH	1. LI provided on ST-10101 / ST-10107 / ST-10113 / ST-10111 2. WG provided on reactor D-11101 3. SG provided on Reactor inlet line 4. Side glass provided on pump discharge line 5. Process under supervision 6. PG providedon pump discharge line 7. Overload protection for Pump tripping 8. PTW system available 9. Suitable MOC of valve is selected (SS316). 10. Fire fighting system available 11. FLP fittings available 12. Suitable MOC of packing (teflon). 13. Spill kit available. 14. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron)	4	6	24	MODERATE					
		5.3	No / Less Quantity Transfer DFNB Mix fraction or DFNB crude material from storage tank ST-10101 / ST-10107 / ST-10113 / ST-10111 to reactor D-11101 (10KL) by respective pump no. P-10111, P-10113, P-10107 due to suction Line valve malfunction	1. It may be lead to process delay. 2. It may lead to dry running of pump.	6	4	24	MODERATE	1. LI provided on ST-10101 / ST-10107 / ST-10113 / ST-10111 2. WG provided on reactor D-11101 3. SG provided on Reactor inlet line 4. Side glass provided on pump discharge line 5. Process under supervision 6. PG provided on pump discharge line 7. Underrload protection for Pump tripping 8. Suitable MOC of valve is selected (SS316).	4	4	16	LOW					

5.4	No / Less Quantity Transfer DFNB Mix fraction or DFNB crude material from storage tank ST-10101 / ST-10107 / ST-10113 / ST-10111 to reactor D-11101 (10KL) by respective pump no. P-10111, P-10113, P-10107 due to pump failure	1. It will lead to production delay.	6	2	12	LOW	1. LI provided on ST-10101 / ST-10107 / ST-10113 / ST-10111 2. WG provided on reactor D-11101 3. SG provided on Reactor inlet line 4. Side glass provided on pump discharge line 5. Process under supervision 6. Underload /Overload protection for Pump tripping 7.PM of pump is done 8.Spare pump is avaialble	4	2	8	EXTREMELY LOW					
5.5	No / Less Quantity Transfer DFNB Mix fraction or DFNB crude material from storage tank ST-10101 / ST-10107 / ST-10113 / ST-10111 to reactor D-11101 (10KL) by respective pump no. P-10111, P-10113, P-10107 due to no / less quantity in storage tank	1. It may lead to process delay 2. It may lead to pump dry rum. Mau cause pump damage	6	4	24	MODERATE	1. LI provided on ST-10101 / ST-10107 / ST-10113 / ST-10111 2. WG provided on reactor D-11101 3. SG provided on Reactor inlet line 4. Side glass provided on pump discharge line 5. Process under supervision 6. PG provided on pump discharge line 7. Underload protection for Pump tripping 8. Data maintained for storage tank level	4	4	16	LOW					
5.6	No / Less Quantity Transfer DFNB Mix fraction or DFNB crude material from storage tank ST-10101 / ST-10107 / ST-10113 / ST-10111 to reactor D-11101 (10KL) by respective pump no. P-10111, P-10113, P-10107 due to leakage / spillage in system	1. It may lead to yield loss. 2. It will lead to leakage causing Health & Environment issue. 3. It may lead to fire iin case of external source of ignition	6	6	36	HIGH	1. LI provided on ST-10101 / ST-10107 / ST-10113 / ST-10111 2. WG provided on reactor D-11101 3. SG provided on Reactor inlet line 4. Side glass provided on pump discharge line 5. Process under supervision 6. PG providedon pump discharge line 7. Suitable MOC of valve and line SS-316 is selected 8. PTW system available 9. Suitable MOC of valve is selected (SS316). 10. Fire fighting system available 11. FLP fittings available 12. Suitable MOC of packing (teflon). 13. Spill kit available. 14. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron)	4	6	24	MODERATE					
5.7	No/less quantity of K2CO3 charged due to human error.	1. It may lead to remain acidic pH which may cause corrosion of equipment.	6	4	24	MODERATE	1. The material is received from store as per issue slip. 2. The material is weighed before charging in the plant. 3.Neutral pH check during and after charging. 4. Process under supervision.	4	2	8	EXTREMELY LOW					
5.8	No/less quantity of K2CO3 charged due to weigh balance malfunction.	1. It may lead to remain acidic pH which may cause corrosion of equipment.	6	4	24	MODERATE	1. The material is received from store as per issue slip. 2. The material is weighed before charging in the plant. 3. Neutral pH check during and after charging 4. Process under supervision. 5. Calibration of weigh balance is done as per schedule. 6. Spare weigh balance is available.	4	2	8	EXTREMELY LOW					
5.9	No/less quantity of K2CO3 charged due to spillage	1. It may lead to material loss 2. It may lead to health and enviornment issue	6	4	24	MODERATE	1. Process under supervision. 2. Secondary containment is provided 3. Spill kit is available 4. RCC flooring is available. 5. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron)	4	2	8	EXTREMELY LOW					
5.10	No/less quantity of mix-fraction received in receiver RC-13101C from reactor D-11101 due to human error	1. It will lead to process delay.	6	2	12	LOW	1. Process under supervision 2. TT provided on reactor D-11101 3. TI provided on reactor column and receiver RC-13101C 4. TI provided between primary HE and secondary HE 5. SG provided on receiver RC-13101C 6. LT provided on receiver RC-13101C 7. VG provided on header and vaccum trap 8.QC analysis done during distillation	4	2	8	EXTREMELY LOW					

5.11	No/less quantity of mix-fraction received in receiver RC-13101C from reactor D-11101 due TT malfunction	1. It will lead to process delay.	6	2	12	LOW	1. Process under supervision 2. Calibration of TT is done as per schedule 3. TI provided on reactor column and receiver RC-13101C 4. TI provided between primary HE and secondary HE 5. SG provided on receiver RC-13101C 6. LT provided on receiver RC-13101C 7. VG provided on header and vaccum trap 8.QC analysis done during distillation	4	2	8	EXTREMELY LOW					
5.12	No/less quantity of mix-fraction received in receiver RC-13101C from reactor D-11101 due to oil heating failure in reactor D-11101	1. It will lead to process delay.	6	2	12	LOW	1. Process under supervision 2. TT provided on reactor D-11101 3. TI provided on reactor column and receiver RC-13101C 4. TI provided between primary HE and secondary HE 5. SG provided on receiver RC-13101C 6. LT provided on receiverRC-13101C 7. VG provided on header and vaccum trap 8.QC analysis done during distillation 9.. PG provided on reactor jacket 10. PG provided on oill supply line 11. Stand by oil circulation pump is available 12. PM of thermopak is done as per schedule	4	2	8	EXTREMELY LOW					
5.13	No/less quantity of mix-fraction received in receiver RC-13101C from reactor D-11101 due to vaccuum failure	1. It will lead to process delay.	6	2	12	LOW	1. Process under supervision 2. TT provided on reactor D-11101 3. TI provided on reactor column and receiver RC-13101C 4. TI provided between primary HE and secondary HE 5. SG provided on receiver RC-13101C 6. LT provided on receiver RC-13101C 7. VG provided on header and vaccum trap 8.QC analysis done during distillation 9.. PM of vaccum pump is done as per schedule	4	2	8	EXTREMELY LOW					
5.14	No/less quantity of mix-fraction received in receiver RC-13101C from reactor D-11101 due to cooling failure in primary HE	1. Material vapour escape from vaccuum pump in environment will lead to environment issue. 2. It will lead to material loss.	6	4	24	MODERATE	1. Process under supervision 2. TT provided on reactor D-11101 3. TI provided on reactor column and receiver RC-13101C 4. TI provided between primary HE and secondary HE 5. SG provided on receiver RC-13101C 6. LT provided on receiver RC-13101C 7. VG provided on header and vaccum trap 8. QC analysis done during distillation 9. Secondary HE with chilling water supply available 10. TI provided on cooling supply and return line. 11. Stand by cooling water supply pump is provided 12.PG provided on cooling supply and return line	4	2	8	EXTREMELY LOW					
5.15	No/less quantity of mix-fraction received in receiver RC-13101C from reactor D-11101 due to chilling failure in secondary HE	1. Material vapour escape from vaccuum pump in environment will lead to environment issue. 2. It will lead to material loss.	6	4	24	MODERATE	1. Process under supervision 2. TT provided on reactor D-11101 3. TI provided on reactor column and receiver RC-13101C 4. TI provided between primary HE and secondary HE 5. SG provided on receiver RC-13101C 6. LT provided on receiver RC-13101C 7. VG provided on header and vaccum trap 8.QC analysis done during distillation 9. Primary HE with cooling water supply available 10. Cooling water supply provided in vaccum trap jacket 11. Stand by chilling water supply pump is provided 12.PG provided on chilling supply and return line 13. TI provided on chilling supply and return line. 14.PM of pump is done regularly	4	2	8	EXTREMELY LOW					
5.16	No/less quantity of pure material received in receiver RC-13101A / RC-13101B from reactor D-11101 due to human error	1. It will lead to process delay.	6	2	12	LOW	1. Process under supervision 2. TT provided on reactor D-11101 3. TI provided on reactor column and receiver RC-13101A / RC-13101B 4. TI provided between primary HE and secondary HE 5. SG provided on receiver RC-13101A / RC-13101B 6. LT provided on receiver RC-13101A / RC-13101B 7. VG provided on header and vaccum trap	4	2	8	EXTREMELY LOW					

		5.17	No/less quantity of pure material received in receiver RC-13101A / RC-13101B from reactor D-11101 due TT malfunction	1. It will lead to process delay.	6	2	12	LOW	1. Process under supervision 2. Calibration of TT is done as per schedule 3. TI provided on reactor column and receiver RC-13101A / RC-13101B 4. TI provided between primary HE and secondary HE 5. SG provided on receiver RC-13101A / RC-13101B 6. LT provided on receiver RC-13101A / RC-13101B 7. VG provided on header and vaccum trap	4	2	8	EXTREMELY LOW					
		5.18	No/less quantity of pure material received in receiver RC-13101A / RC-13101B from reactor D-11101 due to oil heating failure in reactor D-11101	1. It will lead to process delay.	6	2	12	LOW	1. Process under supervision 2. TT provided on reactor D-11101 3. TI provided on reactor column and receiver RC-13101A / RC-13101B 4. TI provided between primary HE and secondary HE 5. SG provided on receiver RC-13101A / RC-13101B 6. LT provided on receiver RC-13101A / RC-13101B 7. VG provided on header and vaccum trap 8.QC analysis done during distillation 9.. PG provided on reactor jacket 10. PG provided on oill supply line 11. Stand by oil circulation pump is available 12. PM of thermopak is done as per schedule	4	2	8	EXTREMELY LOW					
		5.19	No/less quantity of pure material received in receiver RC-13101A / RC-13101B from reactor D-11101 due to vaccuum failure	1. It will lead to process delay.	6	2	12	LOW	1. Process under supervision 2. TT provided on reactor D-11101 3. TI provided on reactor column. and receiver RC-13101A / RC-13101B 4. TI provided between primary HE and secondary HE 5. SG provided on receiver RC-13101A / RC-13101B 6. LT provided on receiver RC-13101A / RC-13101B 7. VG provided on header and vaccum trap 8. PM of vaccum pump is done as per schedule	4	2	8	EXTREMELY LOW	1. VT need to be provide on reactor.	4	2	8	
		5.20	No/less quantity of pure material received in receiver RC-13101A / RC-13101B from reactor D-11101 due to cooling failure in primary HE	1. Material vapour escape from vaccuum pump in environment will lead to environment issue. 2. It will lead to material loss.	6	4	24	MODERATE	1. Process under supervision 2. TT provided on reactor D-11101 3. TI provided on reactor column. and receiver RC-13101A / RC-13101B 4. TI provided between primary HE and secondary HE 5. SG provided on receiver RC-13101A / RC-13101B 6. LT provided on receiver RC-13101A / RC-13101B 7. VG provided on header and vaccum trap 8.PG provided on cooling supply and return line 14. Secondary HE with chilling water supply available 15. TI provided on cooling supply and return line. 16. Stand by cooling water supply pump is provided	4	2	8	EXTREMELY LOW					
NO/Less	Quantity	5.21	No/less quantity of pure material received in receiver RC-13101A / RC-13101B from reactor D-11101 due to chilling failure in secondary HE	1. Material vapour escape from vaccuum pump in environment will lead to environment issue. 2. It will lead to material loss.	6	4	24	MODERATE	1. Process under supervision 2. TT provided on reactor D-11101 3. TI provided on reactor column. and receiver RC-13101A / RC-13101B 4. TI provided between primary HE and secondary HE 5. SG provided on receiver RC-13101A / RC-13101B 6. LT provided on receiver RC-13101A / RC-13101B 7. VG provided on header and vaccum trap 8.PM of pump is done regularly 14. Primary HE with cooling water supply available 15. Cooling water supply provided in vaccum trap jacket 16. Stand by chilling water supply pump is provided 17.PG provided on chilling supply and return line 18. TI provided on chilling supply and return line.	4	2	8	EXTREMELY LOW					

5.22	No/less quantity transfer of pure material from receivers RC-13101A / RC-13101B to drums by gravity due to human error	1. It will lead to process delay.	6	2	12	LOW	1. Process under supervision. 2. LT provided on receiver RC-13101A / RC-13101B 3. Weighing of drum during drum filling 4. SG provided on transfer material line. 5. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 6. Fill drum quantity and weight check after filling.	4	2	8	EXTREMELY LOW					
5.23	No/less quantity transfer of pure material from receivers RC-13101A / RC-13101B to drums by gravity due to transfer line leakage / spillage	1. It may lead to health and enviornment issue 2. It may lead to yield loss. 3. It may lead to fire in case of external source of ignition.	6	6	36	HIGH	1. Process under supervision. 2. LT provided on receiver RC-13101A / RC-13101B 3. Weighing of drum during drum filling 4. SG provided on transfer material line. 5. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 6. Fill drum quantity and weight check after filling. 7. RCC flooring provided 8. Spill kit is available. 9. 2 no's valve provided on transfer line. 10. FLP fittings provided. 11. Firefighting system available. 12. PTW system available. 13. Crocodile earthing provided.	4	6	24	MODERATE					
5.24	No/less quantity transfer of pure material from receivers RC-13101A / RC-13101B to drums by gravity due to weigh balance malfunction	1. It may lead to process delay	6	2	12	LOW	1. Process under supervision. 2. LT provided on receiver RC-13101A / RC-13101B 3. Calibration of weigh balance done as per schedule. 4. SG provided on transfer material line. 5. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 6. Spare weigh balace available. 7. Total material will be fill in drums.	4	2	8	EXTREMELY LOW					
5.25	No / Less Quantity of pure material transfer from drum to storage tank TF-11111 by pump ST-P-10101 due to human error	1. It will lead to process delay	6	2	12	LOW	1. Drum Weighing before material transferring. 2. LI on storage tank TF-11111 3. Empty drum check after transferring. 4. Sight glass on inlet transfer line 5. Process under supervision 6. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 7. OCP displayed for Transferring operation from drum to storage tank in local language. 8. PG provided on pump discharge line	4	2	8	EXTREMELY LOW					
5.26	No / Less Quantity of pure material transfer from drum to storage tank TF-11111 by pump ST-P-10101 due to discharge Line valve malfuction	1. It will lead to material loss. 2. It will lead to pressurization of line which results into gasket leakage / pump damage causing Health & Environment issue. 3. Leakage will cause burn injuries. 4. It may lead to fire in case of external ignition source.	6	6	36	HIGH	1. Drum Weighing before material transferring. 2. LI on storage tank TF-11111 3. Empty drum check after transferring. 4. Sight glass on inlet transfer line 5. Process under supervision 6. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 7. Overload protection for Pump is provided. 8. Self primming pump is used for transferring the material to storage tank from drums 9. Suitable MOC of pipelines and valve (SS316). 10. PG on Pump discharge line. 11. Suitable MOC of packing (teflon). 12. Spill kit available. 13. Sight Glass on pump P-XXXX discharge line. 14. Earthing provided on connected equipment 15. Fire protection system available 16. Flameproof fittings installed	4	6	24	MODERATE					

5.27	No / Less Quantity of pure material transfer from drum to storage tank TF-11111 by pump ST-P-10101 due to suction Line valve malfuction	1. It will lead to process delay. 4. It may lead to dry running of pump.	6	4	24	MODERATE	1. Drum Weighing before and after transferring operation. 2. LI on storage tank ST-10101 or ST-10113 3. Empty drum check after transferring operation. 4. Sight glass on inlet transfer line 5. Process under supervision 6. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 7. Dry run protection for Pump is provided. 8. Self primming pump is used for transferring the material to storage tank from drums 9. Suitable MOC of pipelines and valve (SS316). 10. Jacketed pipeline and valve with insulation for steam heating. 11. PG on Pump discharge line. 12. Suitable MOC of packing (teflon). 13. Spill kit available. 14. Sight Glass on pumpP-10101 or P-10113discharge line. 15. Flameproof fittings installed 16. Fire protection system available	4	4	16	LOW					
5.28	No / Less Quantity of pure material transfer from drum to storage tank TF-11111 by pump ST-P-10101 due to pump failure	1. It will lead to material loss. 2. It will lead to leakage causing Health & Environment issue. 3. Leakage will cause burn injuries. 4. It may lead to dry running of pump. 5. It will lead to overflowing of drum due to back flow of material.	6	4	24	MODERATE	1. Drum Weighing before and after transferring operation. 2. LI on storage tank ST-10101 or ST-10113 3. Empty drum check after transferring operation. 4. Sight glass on inlet transfer line 5. Process under supervision 6. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 7. Overload / dry run protection for Pump is provided. 8. Self primming pump is used for transferring the material to storage tank from drums 9. Suitable MOC of Pump (SS316) is selected 10. PM of pump is done periodically. 11. PG on Pump discharge line. 12. Sight Glass on pumpP-10101 or P-10113 discharge line. 13. Spill kit available. 15. Earthing provided on connected equipment 16. Fire protection system available 17. Flameproof fittings installed 18. RCC flooring available. 19. Three Manual value provided in discharge line	4	4	16	LOW					
5.29	No / Less Quantity of pure material transfer from drum to storage tank TF-11111 by pump ST-P-10101 due to weigh balance malfuntion	1. It will lead to process delay	6	2	12	LOW	1. Calibration of weigh balance is done as per schedule. 2. LI on storage tank TF-11111 3. Empty drum check after transferring operation. 4. Sight glass on inlet transfer line 5. Process under supervision 6. Total drums material transferred to storage tank 7. Spare weigh balance is available	4	2	8	EXTREMELY LOW					
5.30	No / Less Quantity of pure material transfer from drum to storage tank TF-11111 by pump ST-P-10101 due to leakage / Spillage in system	1. It will lead to material loss. 2. It will lead to leakage causing Health & Environment issue. 3. Leakage will cause burn injuries. 4. It may lead to fire in case of external source of ignition	6	6	36	HIGH	1. Drum Weighing before transferring material. 2. LI on storage tank TF-11111 3. Empty drum check after transferring material 4. SG on inlet transfer line 5. Process under supervision 6. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 7. Flange guard provided 9. Suitable MOC of pipelines and valve (SS316). 10. PG on Pump discharge line. 11. Suitable MOC of packing (teflon). 12. Spill kit available. 13. SG on pump P-xxxx discharge line. 14. Earthing provided on connected equipment 15. Fire protection system available 16. Flameproof fittings installed 17. RCC flooring provided	4	6	24	MODERATE					
5.31	No / Less Quantity of pure material transfer from drum to storage tank TF-11111 by pump ST-P-10101 due to LI malfunction of storage tank TF-11111	It will lead to process delay.	6	2	12	LOW	1. Glass LI on storage tank TF-11111 2. Sight glass on inlet transfer line 3. Drum Weighing before transferring operation. 4. Empty drum check after transferring operation. 5. Process under supervision 6. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 7. Logbook for stock in storage tank is maintained. 8. Double valve provided on LI.	4	2	8	EXTREMELY LOW					

5.32	No/less quantity transfer of mix fraction from receivers RC-13101C to storge tank ST-10101 / ST-10107 / ST-10113 / ST-10111 by gravity due to human error	1. It will lead to process delay.	6	2	12	LOW	1. Process under supervision. 2. LT provided on receiver RC-13101C 3. LI provided on storage tank ST-10101 / ST-10107 / ST-10113 / ST-10111 4. SG provided on transfer material line.	4	2	8	EXTREMELY LOW					
5.33	No/less quantity transfer of mix fraction from receivers RC-13101C to storge tank ST-10101 / ST-10107 / ST-10113 / ST-10111 by gravity due to transfer line leakage / spillage	1. It may lead to health and enviornment issue 2. It may lead to yield loss. 3. It may lead to fire in case of external source of ignition.	6	6	36	HIGH	1. Process under supervision. 2. LT provided on receiverRC-13101C 3. LI provided on storage tank ST-10101 / ST-10107 / ST-10113 / ST-10111 4. SG provided on transfer material line. 5. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 6. Suitable MOC of valve and pipeline SS-316 is selected. 7. RCC flooring provided 8. Spill kit is available. 9. 2 no's valve provided on transfer line. 10. FLP fittings provided. 11. Firefighting system available. 12. PTW system available. 13. Suitable MOC of gasket teflon is selected. 14. Flange guard is provided. 15. Double earthing and flange to flange bonding is provided.	4	6	24	MODERATE					
5.34	No/less quantity transfer of mix fraction from receivers RC-13101C to storge tank ST-10101 / ST-10107 / ST-10113 / ST-10111 by gravity due to LT malfuction	1. It may lead to process delay.	6	2	12	LOW	1. Process under supervision. 2. Calibration of LT done asper the schedule. 3. LI provided on storage tank ST-10101 / ST-10107 / ST-10113 / ST-10111 4. SG provided on transfer material line.	4	2	8	EXTREMELY LOW					
5.35	No/less quantity transfer of mix fraction from receivers RC-13101C to storge tank ST-10101 / ST-10107 / ST-10113 / ST-10111 by gravity due to transfer line valve malfuction	1. It may lead to process delay.	6	2	12	LOW	1. Process under supervision. 2. LT provided on receiver RC-13101C 3. LI provided on storage tank ST-10101 / ST-10107 / ST-10113 / ST-10111 4. SG provided on transfer material line. 5. Suitable MOC of valve SS-316 is selected. 6. Spare valve is available to avoid process delay.	4	2	8	EXTREMELY LOW					
5.36	No / Less Quantity of Remaning bottom material transferred from reactor D-11101 to storage tank ST-10112 by pump-XXXX due to human error	1. It will lead to process delay	6	2	12	LOW	1, Process under supervior 2. WG provided on reactor D-11101 3.WG provided on storage tank ST-10112 4.SG provided on transfer line 5. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 6. LI provided on storage tank ST-10112 7. PG provided on pump discharge line. 8. Total material transfer from reactor D-11101 to storage tank ST-10112	4	2	8	EXTREMELY LOW					
5.37	No / Less Quantity of Remaning bottom material transferred from reactor D-11101 to storage tank ST-10112 by pump-XXXX due to discharge valve malfunction	1. It may lead to yield loss. 2. It may lead to pressurization of line which results into gasket leakage causing Health & Environment issue. 3. Leakage may cause burn injuries. 4. It may lead to fire in case of external surce of ignition	6	6	36	HIGH	1. LI provided on ST-10112 2. WG provided on reactor D-11101 3. SG provided on Reactor inlet line 4. Side glass provided on pump discharge line 5. Process under supervision 6. PG providedon pump discharge line 7. Overload protection for Pump tripping 8. PTW system available 9. Suitable MOC of valve is selected (SS316). 10. Fire fighting system available 11. FLP fittings available 12. Suitable MOC of packing (teflon). 13. Spill kit available. 14. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron)	4	6	24	MODERATE					
5.38	No / Less Quantity of Remaning bottom material transferred from reactor D-11101 to storage tank ST-10112 by pump-XXXX due to suction Line valve malfunction	1. It may lead to dry running of pump. 2. It may lead to process delay.	6	4	24	MODERATE	1. LI provided on ST-10112 2. WG provided on reactor D-11101 3. SG provided on Reactor inlet line 4. Side glass provided on pump discharge line 5. Process under supervision 6. PG provided on pump discharge line 7. Underload protection for Pump tripping 8. Suitable MOC of valve is selected (SS316). 9. Spare valve available to avoid process delay.	4	4	16	LOW					

		5.39	No / Less Quantity of Remaning bottom material transferred from reactor D-11101 to storage tank ST-10112 by pump-XXXX due to pump failure	1. It may lead to production delay.	6	2	12	LOW	1. LI provided on ST-10112 2. WG provided on reactor D-11101 3. SG provided on Reactor inlet line 4. Side glass provided on pump discharge line 5. Process under supervision 6. Underload /Overload protection for Pump tripping. 7. PM of pump is done 8. Spare pump and its parts is available to avoid process delay.	4	2	8	EXTREMELY LOW					
		5.40	No / Less Quantity of Remaning bottom material transferred from reactor D-11101 to storage tank ST-10112 by pump-XXXX due to LI malfuction of storage tank ST-10112	1. It may lead to process delay	6	2	12	LOW	1. Glass LI provided on ST-10112 2. WG provided on reactor D-11101 3. SG provided on Reactor inlet line 4. Side glass provided on pump discharge line 5. Process under supervision 6. PG provided on pump discharge line.	4	2	8	EXTREMELY LOW					
		5.41	No / Less Quantity of Remaning bottom material transferred from reactor D-11101to storage tank ST-10112 by pump-XXXX due to leakage / spillage in system	1. It may lead to yield loss. 2. It may lead to leakage causing Health & Environment issue. 3. It may lead to fire iin case of external source of ignition	6	6	36	HIGH	1. LI provided on ST-10112 2. WG provided on reactor D-11101 3. SG provided on Reactor inlet line 4. Side glass provided on pump discharge line 5. Process under supervision 6. PG providedon pump discharge line 7. Suitable MOC of valve and line SS-316 is selected 8. PTW system available 9. Suitable MOC of valve is selected (SS316). 10. Fire fighting system available 11. FLP fittings available 12. Suitable MOC of packing (teflon). 13. Spill kit available. 14. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 15. Flange guard provided.	4	6	24	MODERATE					
		6.1	More Quantity Transfer DFNB Mix fraction or DFNB crude material from storage tank ST-10101 / ST-10107 / ST-10113 / ST-10111 to reactor D-11101 by respective pump no. P-10111, P-10113, P-	1. It may lead to process delay due to over flow of reactors D-11101 and excess material getting filled in the column.	6	2	12	LOW	1. LI provided on ST-10101 / ST-10107 / ST-10113 / ST-10111 2. WG provided on reactor D-11101 3. SG provided on Reactor inlet line 4. Side glass provided on pump discharge line 5. Process under supervision 6. PG provided on pump discharge ine	4	2	8	EXTREMELY LOW					
		6.2	More Quantity Transfer DFNB Mix fraction or DFNB crude material from storage tank ST-10101 / ST-10107 / ST-10113 / ST-10111 to reactor D-11101 by respective pump no. P-10111, P-10113, P-10107 due to LI malfuction	1. It may lead to process delay due to over flow of reactors D-11101 and excess material getting filled in the column.	6	2	12	LOW	1. LI provided on ST-10101 / ST-10107 / ST-10113 / ST-10111 2. WG provided on reactor D-11101 3. SG provided on Reactor inlet line 4. Side glass provided on pump discharge line 5. Process under supervision 6. PG provided on pump discharge ine	4	2	8	EXTREMELY LOW					
		6.3	More quantity of K2CO3 charged due to human error.	1. It may lead to material loss	6	2	12	LOW	1. The material is received from store as per issue slip. 2. The material is weighed before charging in the plant. 3.Neutral pH check during and after charging. 4. Process under supervision.	4	2	8	EXTREMELY LOW					
		6.4	More quantity of K2CO3 charged due to weigh balance malfunction.	1. It may lead to material loss	6	2	12	LOW	1. The material is received from store as per issue slip. 2. The material is weighed before charging in the plant. 3. Neutral pH check during and after charging 4. Process under supervision. 5. Calibration of weigh balance is done as per schedule. 6. Spare weigh balance is available.	4	2	8	EXTREMELY LOW					
		6.5	More quantity of mix-fraction received in receiver RC-13101C from reactor D-11101 due to human error	1. It will lead to process delay.	6	2	12	LOW	1. Process under supervision 2. TT provided on reactor D-11101 3. TI provided on reactor column and receiver RC-13101C 4. TI provided between primary HE and secondary HE 5. SG provided on receiver RC-13101C 6. LT provided on receiver RC-13101C 7.QC analysis done during distillation	4	2	8	EXTREMELY LOW					

		6.6	More quantity of mix-fraction received in receiver RC-13101C from reactor D-11101due TT malfunction	1. It will lead to process delay.	6	2	12	LOW	1. Process under supervision 2. Calibration of TT is done as per schedule 3. TI provided on reactor column and receiver RC-13101C 4. TI provided between primary HE and secondary HE 5. SG provided on receiver RC-13101C 6. LT provided on receiverRC-13101C 7.QC analysis done during distillation	4	2	8	EXTREMELY LOW					
		6.7	More quantity of mix-fraction received in receiver RC-13101C from reactor D-11101 due to oil heating valve malfuction in reactor D-11101	1. It will lead to process delay and quality issue	6	2	12	LOW	1. Process under supervision 2. TT provided on reactor D-11101 3. TI provided on reactor column and receiver RC-13101C 4. TI provided between primary HE and secondary HE 5. SG provided on receiverRC-13101C 6. LT provided on receiverRC-13101C 7. VG provided on header and vaccum trap 8. QC analysis done during distillation 9.. PG provided on reactor jacket 10. PG provided on oil supply line 11.Stand by oil circulation pump is available 12.PM of control valve is done as per schedule 13. Manual valve provided on oil heating line	4	2	8	EXTREMELY LOW					
		6.8	More quantity of pure material received in receiver RC-13101A / RC-13101B from reactor D-11101 due to human error	1. It may lead to quality issue due to high boiler content carried forward with pure material 2. It may lead to process delay	6	2	12	LOW	1. Process under supervision 2. TT provided on reactor D-11101 3. TI provided on reactor column and receiver RC-13101A / RC-13101B 4. TI provided between primary HE and secondary HE 5. SG provided on receiver RC-13101A / RC-13101B 6. LT provided on receiver RC-13101A / RC-13101B 7. VG provided on header and vaccum trap 8. QC analysis to be done during distillation	4	2	8	EXTREMELY LOW					
		6.9	More quantity of pure material received in receiver RC-13101A / RC-13101B from reactor D-11101 due TT malfunction	1. It may lead to quality issue due to high boiler content carried forward with pure material 2. It may lead to process delay	6	2	12	LOW	1. Process under supervision 2. Calibration of TT is done as per schedule 3. TI provided on reactor column and receiver RC-13101A / RC-13101B 4. TI provided between primary HE and secondary HE 5. SG provided on receiver RC-13101A / RC-13101B 6. LT provided on receiver RC-13101A / RC-13101B 7. VG provided on header and vaccum trap 8. QC analysis to be done during distillation	4	2	8	EXTREMELY LOW					
		6.10	More quantity of pure material received in receiver RC-13101A / RC-13101B from reactor D-11101 due to oil heating valve malfuction in reactor D-11101	1. It may lead to quality issue due to high boiler content carried forward with pure material 2. It may lead to process delay	6	2	12	LOW	1. Process under supervision 2. TT provided on reactor D-11101 3. TI provided on reactor column and receiver RC-13101A / RC-13101B 4. TI provided between primary HE and secondary HE 5. SG provided on receiver RC-13101A / RC-13101B 6. LT provided on receiver RC-13101A / RC-13101B 7. VG provided on header and vaccum trap 8. QC analysis to be done during distillation 9.. PG provided on reactor jacket 10. PG provided on oil supply line 11. Manual valve provided on oil supply line	4	2	8	EXTREMELY LOW					
More	Quantity	6.11	More quantity transfer of pure material from receivers RC-13101A / RC-13101B to drums by gravity due to human error	1. It will lead to yield loss 2. It may lead to drum over flow may cause health and enviornment issue 3. It may lead to fire in case of external source of ignition	6	6	36	HIGH	1. Process under supervision. 2. LT provided on receiver RC-13101A / RC-13101B 3. Weighing of drum during drum filling 4. SG provided on transfer material line. 5. PTW system available 6. Fire fighting system available 7. FLP fittings available 8. Spill kit available. 9. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 10. Double valve provided n transfer line	4	6	24	MODERATE					

6.12	More quantity transfer of pure material from receivers RC-13101A / RC-13101B to drums by gravity due to weigh balance malfunction	1. It will lead to processd delay 2. It may lead to drum over flow may cause health and enviornment issue 3. It may lead to fire in case of external source of ignition	6	6	36	HIGH	1. Process under supervision. 2. LT provided on receiver RC-13101A / RC-13101B 3. Calibration of weigh balance done as per schedule. 4. SG provided on transfer material line. 5. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 6. Spare weigh balance available.	4	6	24	MODERATE					
6.13	More quantity transfer of pure material from receivers RC-13101A / RC-13101B to drums by gravity due to transfer line valve malfuction	1. It will lead to yield loss 2. It may lead to drum over flow may cause health and enviornment issue 3. It may lead to fire in case of external source of ignition	6	6	36	HIGH	1. Process under supervision. 2. LT provided on receiver RC-13101A / RC-13101B 3. Weighing of drum during drum filling 4. SG provided on transfer material line. 5. PTW system available 6. Fire fighting system available 7. FLP fittings available 8. Spill kit available. 9. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 10. Double valve provided n transfer line 11. Suitable MOC of valve SS-316 is selected.	4	6	24	MODERATE					
6.14	More Quantity of pure material transfer from drum to storage tank TF-11111 by pump ST-P-10101 due to human error	No consequences due to total material transferred to storage tank					1. Drum Weighing before material transferring. 2. LI on storage tank TF-11111 3. Empty drum check after transferring. 4. Sight glass on inlet transfer line 5. Process under supervision 6. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 7. OCP displayed for Transferring operation from drum to storage tank in local language. 8. PG provided on pump discharge line									
6.15	More Quantity of pure material transfer from drum to storage tank TF-11111 by pump ST-P-10101 due to weigh balance malfuntion	No consequences due to total material transferred to storage tank					1. Calibration of weigh balance is done as per schedule. 2. LI on storage tank TF-11111 3. Empty drum check after transferring operation. 4. Sight glass on inlet transfer line 5. Process under supervision 6. Total drums material transferred to storage tank 7. Spare weigh balance is available									
6.16	More Quantity of pure material transfer from drum to storage tank TF-11111 by pump ST-P-10101 due to LI malfunction of storage tank TF-11111	No consequences due to total material transferred to storage tank					1. Glass LI on storage tank TF-11111 2. Sight glass on inlet transfer line 3. Drum Weighing before transferring operation. 4. Empty drum check after transferring operation. 5. Process under supervision 6. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 7. Logbook for stock in storage tank is maintained. 8. Double valve provided on LI.									
6.17	More quantity transfer of mix fraction from receivers RC-13101C to storge tank ST-10101 / ST-10107 / ST-10113 / ST-10111 by gravity due to human error	1. It may lead to overflow of storage tank if already full 2.It may lead to spillage from vent line may cause health and enviornmet issue 3.It may lead to fire due to external source of ignition	6	6	36	HIGH	1. Process under supervision. 2. LT provided on receiver RC-13101C 3. LI provided on storage tank ST-10101 / ST-10107 / ST-10113 / ST-10111 4. SG provided on transfer material line. 5. PTW system available 6. Fire fighting system available 7. FLP fittings available 8. Spill kit available. 9. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron)	4	6	24	MODERATE					
6.18	More quantity transfer of mix fraction from receivers RC-13101C to storge tank ST-10101 / ST-10107 / ST-10113 / ST-10111 by gravity due to LI malfuction	1. It may lead to overflow of storage tank if already full 2.It may lead to spillage from vent line may cause health and enviornmet issue 3.It may lead to fire due to external source of ignition	6	6	36	HIGH	1. Process under supervision. 2. Glass Li provided. 3. LT provided on receiver RC-13101C 4. SG provided on transfer material line. 5. PTW system available 6. Fire fighting system available 7. FLP fittings available 8. Spill kit available. 9. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron)	4	6	24	MODERATE					

		6.19	More quantity transfer of mix fraction from receivers RC-13101C to storge tank ST-10101 / ST-10107 / ST-10113 / ST-10111 by gravity due to transfer line valve malfuction	1. It may lead to overflow of storage tank if already full 2.It may lead to spillage from vent line may cause health and enviornmet issue 3.It may lead to fire due to external source of ignition	6	6	36	HIGH	1. Process under supervision. 2. LT provided on receiver RC-13101C 3. LI provided on storage tank ST-10101 / ST-10107 / ST-10113 / ST-10111 4. SG provided on transfer material line. 5. Suitable MOC of valve SS-316 is selected. 6. Spare valve is available to avoid process delay. 7. PTW system available 8. Fire fighting system available 9. FLP fittings available 10. Spill kit available. 11. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron)	4	6	24	MODERATE					
		6.20	More Quantity of Remaning bottom material transferred from reactor D-11101 to storage tank ST-10112 by pump-XXXX due to human error	1. It may lead to overflow of storage tank if already full 2.It may lead to spillage from vent line may cause health and enviornmet issue 3.It may lead to fire due to external source of ignition	6	6	36	HIGH	1, Process under supervior 2. WG provided on reactor D-11101 3.WG provided on storage tank ST-10112 4.SG provided on transfer line 5. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 6. LI provided on storage tank ST-10112 7. PTW system available 8. Fire fighting system available 9. FLP fittings available	4	6	24	MODERATE					
		6.21	More Quantity of Remaning bottom material transferred from reactor D-11101 to storage tank ST-10112 by pump-XXXX due to LI malfuction of storage tank ST-10112	1. It may lead to overflow of storage tank if already full 2.It may lead to spillage from vent line may cause health and enviornmet issue 3.It may lead to fire due to external source of ignition	6	6	36	HIGH	1. Glass LI provided on ST-10112 2. WG provided on reactor D-11101 3. SG provided on Reactor inlet line 4. Side glass provided on pump discharge line 5. Process under supervision 6. PTW system available 7. Fire fighting system available 8. FLP fittings available 9. Spill kit available. 10 PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 11. Data maintained for storage tank level.	4	6	24	MODERATE					
NO/Less	Pressure	7.1	NA															
More	Pressure	8.1	NA															
Back	Pressure	9.1	NA															
		10.1	No/less temperature < 110^{0}C in reactor D-11101during distillation of 2,4 DFNB material due to human error	1. It will lead to process delay.	6	2	12	LOW	1. Process under supervision 2. TT provided on reactor D-11101 3. TI provided on reactor column and receivers 4. TI provided between primary HE and secondary HE 5. SG provided on receivers 6. LT provided on receivers 7.QC analysis done during distillation 8.. PG provided on reactor jacket 9. PG provided on oil supply line	4	2	8	EXTREMELY LOW					
		10.2	No/less temperature < 110^{0}C in reactor D-11101 during distillation of 2,4 DFNB material due to oil heating failure .	1. It will lead to process delay.	6	2	12	LOW	1. Process under supervision 2. TT provided on reactor D-11101 3. TI provided on reactor column and receivers 4. TI provided between primary HE and secondary HE 5. SG provided on receivers 6. LT provided on receivers 7.QC analysis done during distillation 8.. PG provided on reactor jacket 9. PG provided on oil supply line. 10. Stand by pump available for oil circulation. 11. PM done of thermopack as per schedule.	4	2	8	EXTREMELY LOW					
Less	Temperature	10.3	No/less temperature < 110^{0}C in reactor D-11101 during distillation of 2,4 DFNB material due to oil valve malfunction .	1. It will lead to process delay.	6	4	24	MODERATE	1. Process under supervision 2. TT provided on reactor D-11101 3. TI provided on reactor column and receivers 4. TI provided between primary HE and secondary HE 5. SG provided on receivers 6. LT provided on receivers 7.QC analysis done during distillation 8.. PG provided on reactor jacket 9. PG provided on oil supply line. 10. 2 no's manual valve provided before and after control valve. 11. Suitable MOC of valve CS is selected 12. Manual on/off valve operation facility is available 13. Spare valve is available. 14. PM of control valve done as per schedule.	4	2	8	EXTREMELY LOW					

		10.4	No/less temperature < 110°C in reactor D-11101 during distillation of 2,4 DFNB material due to TT malfunction of reactor D-11101	1. It will lead to process delay.	6	2	12	LOW	1. Process under supervision 2. Calibration of TT is done as per schedule 3. TI provided on reactor column and receivers 4. TI provided between primary HE and secondary HE 5. SG provided on receivers 6. LT provided on receivers 7.QC analysis done during distillation	4	2	8	EXTREMELY LOW					
More	Temperature	11.1	More temperature > 140°C in reactor D-11101during distillation of 2,4 DFNB material due to human error	1. It may lead to quality issue due to unknown content carried forward with distilled material 2. It may lead to process delay	6	2	12	LOW	1. Process under supervision 2. TT provided on reactor D-11101 3. TI provided on reactor column and receivers 4. TI provided between primary HE and secondary HE 5. SG provided on receivers 6. LT provided on receivers 7.QC analysis done during distillation	4	2	8	EXTREMELY LOW					
		11.2	More temperature > 140°C in reactor D-11101during distillation of 2,4 DFNB material due to oil heating valve malfunction.	1. It may lead to quality issue due to unknown content carried forward with distilled material 2. It may lead to process delay	6	2	12	LOW	1. Process under supervision 2. TT provided on reactor D-11101 3. TI provided on reactor column and receivers 4. TI provided between primary HE and secondary HE 5. SG provided on receivers 6. LT provided on receivers 7.QC analysis done during distillation 8.. PG provided on reactor jacket 9. PG provided on oil supply line. 10. 2 no's manual valve provided before and after control valve. 11. Suitable MOC of valve CS is selected 12. Manual on/off valve operation facility is available 13. Spare valve is available. 14. PM of control valve done as per schedule.	4	2	8	EXTREMELY LOW					
		11.3	More temperature > 140°C in reactor D-11101 during distillation of 2,4 DFNB material due to TT malfunction of reactor D-11101	1. It may lead to quality issue due to unknown content carried forward with distilled material 2. It may lead to process delay	6	2	12	LOW	1. Process under supervision 2. Calibration of TT is done as per schedule 3. TI provided on reactor column and receivers 4. TI provided between primary HE and secondary HE 5. SG provided on receivers 6. LT provided on receivers 7.QC analysis done during distillation	4	2	8	EXTREMELY LOW					
NO/Less	Level	12.1	NA															
More	Level	13.1	NA															
Improper	Agitation	14.1	Agitation failure of electrical	1. It will lead to process delay and quality issue	6	2	12	LOW	1. Process under supervision 2. PM is done as per schedule 3. WG provided on reactor 4. Critical spare available 5. Overload / Underload protection available.	4	2	8	EXTREMELY LOW					
		14.2	Agitation failure of mechanical	1. It will lead to process delay and quality issue	6	2	12	LOW	1. Process under supervision 2. PM is done as per schedule 3. WG provided on reactor 4. Critical spare available	4	2	8	EXTREMELY LOW					
Changed	Composition	15	Improper quality of K2CO3	1.It may lead to acidic pH may cause equipment damage	6	2	12	LOW	1 QC check of all raw material 2 COA received with material issue slip 3 Process under supervision	4	2	8	EXTREMELY LOW					
		16.1	Oil heating failure in reactor D-11101	1. It will lead to process delay.	6	2	12	LOW	1. Process under supervision 2. TT provided on reactor D-11101 3. TI provided on reactor column and receivers 4. TI provided between primary HE and secondary HE 5. SG provided on receivers 6. LT provided on receivers 7.QC analysis done during distillation 8.. PG provided on reactor jacket 9. PG provided on oil supply line. 10. Stand by pump available for oil circulation. 11. PM done of thermopack as per schedule.	4	2	8	EXTREMELY LOW					

Failure	Utility	16.2	Vaccuum failure during distillation	1. It will lead to process delay.	6	2	12	LOW	1. Process under supervision 2. TT provided on reactor D-11101 3. TI provided on reactor column and receivers. 4. TI provided between primary HE and secondary HE 5. SG provided on receivers 6. LT provided on receivers 7. VG provided on header and vaccum trap 8.QC analysis done during distillation 9.PM of vaccum pump is done as per schedule	4	2	8	EXTREMELY LOW					
		16.3	Cooling failure in primary HE	1. Material vapour may escape from vaccuum pump in the environment may lead to health and environment issue. 2. It will lead to yield loss.	6	4	24	MODERATE	1. Process under supervision 2. TT provided on reactor D-11101 3. TI provided on reactor column and receivers. 4. TI provided between primary HE and secondary HE 5. SG provided on receivers 6. LT provided on receivers 7. VG provided on header and vaccum trap 8.QC analysis done during distillation 14. Secondary HE with chilling water supply available 15. TI provided on cooling supply and return line. 16. Stand by cooling water supply pump is provided 17.PG provided on cooling supply and return line	4	2	8	EXTREMELY LOW					
		16.4	Chilling failure in secondary HE	1. Material vapour may escape from vaccuum pump in the environment may lead to health and environment issue. 2. It will lead to yield loss.	6	4	24	MODERATE	1. Process under supervision 2. TT provided on reactor D-11101 3.TI provided on reactor column and receivers. 4. TI provided between primary HE and secondary HE 5. SG provided on receivers. 6. LT provided on receivers 7. VG provided on header and vaccum trap 8.QC analysis done during distillation 14. Primary HE with cooling water supply available 15. Cooling water supply provided in vaccum trap jacket 16. Stand by chilling water supply pump is provided 17.PG provided on chilling supply and return line 18. TI provided on chilling supply and return line. 17.PM of pump is done regularly	4	2	8	EXTREMELY LOW					
		16.5	Nitrogen failure during vaccum release	1. It will lead to process delay	6	2	12	LOW	1. Process under supervision 2. PG provided on nitrogen main header 3. Stand by nitrogen supply available	4	2	8	EXTREMELY LOW					
High	Viscosity	17	NA															
Low	Viscosity	18	NA															
Incorrect Sequence	Raw material Issues	19	NA															
	Sampling Issues	20	Incorrect sampling of 2 4 DFNB mix distilled material	1. It will lead to process delay	6	2	12	LOW	1. Process under supervision 2 QC analysis done of reaction mass upto desired result during reflux of reaction	4	2	8	EXTREMELY LOW					
Incompatibility	Raw Material	21	NA															
	DCS	22	NA															
	Power	23.1	Power failure	1. It will lead to process delay	10	2	20	MODERATE	DG set available	6	2	12	LOW					
	Start up/Shut down	24.1	NA															
		25.1	No / Less Quantity Transfer DFNB Mix fraction or DFNB crude material from storage tank ST-10101 / ST-10107 / ST-10113 / ST-10111 to reactor D-11101 (10KL) by respective pump no. P-10111, P-10113, P-10107 due to leakage / spillage in system	1. It may lead to yield loss. 2. It will lead to leakage causing Health & Environment issue. 3. It may lead to fire iin case of external source of ignition	6	6	36	HIGH	1. LI provided on ST-10101 / ST-10107 / ST-10113 / ST-10111 2. WG provided on reactor D-11101 3. SG provided on Reactor inlet line 4. Side glass provided on pump discharge line 5. Process under supervision 6. PG providedon pump discharge line 7. Suitable MOC of valve and line SS-316 is selected 8. PTW system available 9. Suitable MOC of valve is selected (SS316). 10. Fire fighting system available 11. FLP fittings available 12. Suitable MOC of packing (teflon). 13. Spill kit available. 14. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron)	4	6	24	MODERATE					

Failure	Loss of Containment (Leakage / Rupture)	25.2	No/less quantity of K2CO3 charged due to spillage	1. It may lead to material loss 2. It may lead to health and enviornment issue	6	4	24	MODERATE	1. Process under supervision. 2. Secondary containment is provided 3. Spill kit is available 4. RCC flooring is available. 5. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron)	4	2	8	EXTREMELY LOW					
		25.3	No/less quantity transfer of pure material from receivers RC-13101A / RC-13101B to drums by gravity due to transfer line leakage / spillage	1. It may lead to health and enviornment issue 2. It may lead to yield loss. 3. It may lead to fire in case of external source of ignition.	6	6	36	HIGH	1. Process under supervision. 2. LT provided on receiver RC-13101A / RC-13101B 3. Weighing of drum during drum filling 4. SG provided on transfer material line. 5. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 6. Fill drum quantity and weight check after filling. 7. RCC flooring provided 8. Spill kit is available. 9. 2 no's valve provided on transfer line. 10. FLP fittings provided. 11. Firefighting system available. 12. PTW system available. 13. Crocodile earthing provided.	4	6	24	MODERATE					
		25.4	No / Less Quantity of pure material transfer from drum to storage tank TF-11111 by pump ST-P-10101 due to leakage / Spillage in system	1. It will lead to material loss. 2. It will lead to leakage causing Health & Environment issue. 3. Leakage will cause burn injuries. 4. It may lead to fire in case of external source of ignition	6	6	36	HIGH	1. Drum Weighing before transferring material. 2. LI on storage tank TF-11111 3. Empty drum check after transferring material 4. SG on inlet transfer line 5. Process under supervision 6. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 7. Flange guard provided 9. Suitable MOC of pipelines and valve (SS316). 10. PG on Pump discharge line. 11. Suitable MOC of packing (teflon). 12. Spill kit available. 13. SG on pump P-xxxx discharge line. 14. Earthing provided on connected equipment 15. Fire protection system available 16. Flameproof fittings installed 17. RCC flooring provided	4	6	24	MODERATE					
		25.5	No/less quantity transfer of mix fraction from receivers RC-13101C to storge tank ST-10101 / ST-10107 / ST-10113 / ST-10111 by gravity due to transfer line leakage / spillage	1. It may lead to health and enviornment issue 2. It may lead to yield loss. 3. It may lead to fire in case of external source of ignition.	6	6	36	HIGH	1. Process under supervision. 2. LT provided on receiverRC-13101C 3. LI provided on storage tank ST-10101 / ST-10107 / ST-10113 / ST-10111 4. SG provided on transfer material line. 5. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 6. Suitable MOC of valve and pipeline SS-316 is selected. 7. RCC flooring provided 8. Spill kit is available. 9. 2 no's valve provided on transfer line. 10. FLP fittings provided. 11. Firefighting system available. 12. PTW system available. 13. Suitable MOC of gasket teflon is selected. 14. Flange guard is provided. 15. Double earthing and flange to flange bonding is provided.	4	6	24	MODERATE					
		25.6	No / Less Quantity of Remaning bottom material transferred from reactor D-11101to storage tank ST-10112 by pump-XXXX due to leakage / spillage in system	1. It may lead to yield loss. 2. It may lead to leakage causing Health & Environment issue. 3. It may lead to fire iin case of external source of ignition	6	6	36	HIGH	1. LI provided on ST-10112 2. WG provided on reactor D-11101 3. SG provided on Reactor inlet line 4. Side glass provided on pump discharge line 5. Process under supervision 6. PG providedon pump discharge line 7. Suitable MOC of valve and line SS-316 is selected 8. PTW system available 9. Suitable MOC of valve is selected (SS316). 10. Fire fighting system available 11. FLP fittings available 12. Suitable MOC of packing (teflon). 13. Spill kit available. 14. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 15. Flange guard provided.	4	6	24	MODERATE					

MOC	Corrosion / Erosion	26.1	Corrosion due to less quantity of K2CO3 charged in reactor	1. It may lead to remain acidic pH which may cause corrosion of equipment.	6	4	24	MODERATE	1. The material is received from store as per issue slip. 2. The material is weighed before charging in the plant. 3. The neutral pH is checked during and after charging. 4. Process under supervision.	4	2	8	EXTREMELY LOW					
Improper	Maintenance	27.1	Improper maintenance	Process delay	4	1	4	EXTREMELY LOW	1 PM of equipment is done as per schedule. 2 Trained technician and fitters 3 Maintenance work under supervision 4 Critical spare part is available									
	Engineering issues/ Drawing Errors	28.1	Improper P& ID can lead to improper hazop	Improper hazop			0					0						

HAZOP WORK SHEET				Hazop Work Sheet Revision No	PHA-001.00
Product Name	2,4-DFNB			Hazop Work Sheet Effective Date	06-05-18
NODE NO :	9				
DESIGN INTENTION	Transfer mother liquor from storage tank ST-10105 to reactor R-14114 by pump P-10105. Then apply high vacuum (760 mmhg) by steam ejector SE-15114. And maintain heating temperature up to 130-135^{0}C. Collect recovered solvent S in receiver RC-14114A / RC-14114B and transfer the solvent-S to ST-11118 by gravity.				
EQUIPMENTS COVERED IN THIS NODE	Reactor R-14114, Storage tank ST-10105, Pump P-10105, Steam ejector SE-15114, Receiver RC-14114A / RC-14114B, Storage ST-11118,				
DOCUMENT REFERRED	P& ID and PTC	DOCUMENT No.		DOCUMENT Revision No.	
HAZOP Revision No	01				
HAZOP Effective Date	04-04-22				

	Temperature (^{0}C)		Pressure (kg/cm^{2}g)		MOC	Capacity	
Equipment Details	Design	Working	Design	Working		Design	Working
Reactor R-14114	250	180	6	4	SS316L	8KL	10kl
Storage tank ST-10105	250	150	4.5	ATM	SS316L	10KL	13 KL
Pump P-10105	150	ATM	3	3	SS316L	10 m3/hr	10 m3/hr
Steam ejector SE-15114	150	130	3.5	3.5	SS316L	1torr	54 m3/hr
Receiver RC-14114A / RC-14114B	170	110	4.5	3	SS316L	3KL	4 KL
Storage ST-11118	250	150	4.5	ATM	SS316L	10KL	13 KL

Guide Word	Parameter	Sr. No.	CAUSES	CONSEQUENCES	Probability	Severity	RPN No	Risk Classification	SAFEGUARDS	Probability	Severity	RPN No	Risk Classification	RECOMMENDATIONS	Probability	Severity	RPN No	Remarks
NO/Less	Flow	1.1	NA															
More	Flow	2.1	NA															
Other than/ Misdirected	Flow	3.1	NA															
		3.2	NA															
		3.3	NA															
		3.4	NA															
Reverse	Flow	4.1	NA															
		5.1	No / Less Quantity of transfer mother liquor from storage tank ST-10105 to reactor R-14114 by pump P-10105 due to human error	1. It will lead to process delay	6	2	12	LOW	1. LI provided on ST-10105 2. WG provided on reactor R-14114 3. SG provided on Reactor inlet line 4. Side glass provided on pump discharge line 5. Process under supervision 6. PTC/Batchsheet is available 7. PG on pump discharge line	2	2	4	EXTREMELY LOW					
		5.2	No / Less Quantity of transfer mother liquor from storage tank ST-10105 to reactor R-14114 by pump P-10105 due to discharge valve malfunction	1. It will lead to material loss. 2. It will lead to pressurization of line which results into gasket leakage causing Health & Environment issue. 3. Leakage will cause burn injuries.	6	4	24	MODERATE	1. LI provided on ST-10105 2. WG provided on reactor R-14114 3. SG provided on Reactor inlet line 4. Side glass provided on pump discharge line 5. Process under supervision 6. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 7. Overload protection for Pump tripping 8. PTC/Batchsheet is available 9. Suitable MOC of valve is selected (SS316). 10. Jacketed pipeline and valve with insulation for steam heating. 11. PG on Pump discharge line. 12. Suitable MOC of packing (teflon). 13. Spill kit available.	4	4	16	LOW					
		5.3	No / Less Quantity of transfer mother liquor from storage tank ST-10105 to reactor R-14114 by pump P-10105 due to suction Line valve malfunction	1. It may lead to dry running of pump and process delay	6	4	24	MODERATE	1. LI provided on ST-10105 2. WG provided on reactor R-14114 3. SG provided on Reactor inlet line 4. Side glass provided on pump discharge line 5. Process under supervision 6. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 7. Underload protection for Pump tripping 8. PTC/Batchsheet is available 9. Suitable MOC of valve is selected (SS316). 10. Jacketed pipeline and valve with insulation for steam heating. 11. PG on Pump discharge line. 12. Suitable MOC of packing (teflon). 13.Spare pump is avaialble	4	4	16	LOW					

5.4	No / Less Quantity of transfer mother liquor from storage tank ST-10105 to reactor R-14114 by pump P-10105 due to pump failure	1. It will lead to production delay.	6	2	12	LOW	1. LI provided on ST-10105 2. WG provided on reactor R-14114 3. SG provided on Reactor inlet line 4. Side glass provided on pump discharge line 5. Process under supervision 6. PG on pump discharge line 7. Underload /Overload protection for Pump tripping 8.PM of pump is done 9.Spare pump is avaialble	4	2	8	EXTREMELY LOW					
5.5	No / Less Quantity of transfer mother liquor from storage tank ST-10105 to reactor R-14114 by pump P-10105 due to no / less quantity in storage tank	1. It may lead to process delay and pump dry run	6	4	24	MODERATE	1. LI provided on ST-10105 2. WG provided on reactor R-14114 3. SG provided on Reactor inlet line 4. Side glass provided on pump discharge line 5. Process under supervision 6. PG on pump discharge line 7. Underload protection for Pump tripping	4	4	16	LOW					
5.6	No / Less Quantity of transfer mother liquor from storage tank ST-10105 to reactor R-14114 by pump P-10105 due to spillage / leakage in system	1. It will lead to material loss. 2. It will lead to leakage causing Health & Environment issue. 3. It may be lead to fire in case of externel ignition source.	6	6	36	HIGH	1. LI provided on ST-10105 2. WG provided on reactor R-14114 3. SG provided on Reactor inlet line 4. Side glass provided on pump discharge line 5. Process under supervision 6. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 7. RCC flooring provided 8. Earthing provided on equipment. 9. Suitable MOC of valve & pipeline is selected (SS316). 10. Jacketed pipeline and valve with insulation for steam heating. 11. PG on Pump discharge line. 12. Suitable MOC of packing (teflon). 13. FLP fittings available. 14. RCC flooring available. 15. Spill kit available. 16. Fire fighting system is available. 17. PTW system is available.	4	6	24	MODERATE					
5.7	No/less quantity of collect recovered solvent S in receiver RC-14114A / RC-14114B from reactor R-14114 due to human error	1. It will lead to process delay.	6	2	12	LOW	1. TC provided on reactor R-14114. 2. TI provided on reactor column, HE inlet and HE vent of reactor R-14114 3. SG provided below condenser of reactor. 4. SG provided on reactor reflux line. 5. SG provided on inlet line of receiverRC-14114A / RC-14114B 6. LI provided on receiver RC-14114A / RC-14114B 7. Primery HE with cooling and secondery HE with chilling water provided. 8. TI provided on receiver RC-14114A / RC-14114B 9. WG provided on receiverRC-14114A / RC-14114B 10. VG provided on reactor R-14114 vaccuum header and reactor. 11.QC analysis done during distillation.	4	2	8	EXTREMELY LOW					
5.8	No/less quantity of collect recovered solvent S in receiver RC-14114A / RC-14114B from reactor R-14114 due to less temperature in reactor.	1. It will lead to process delay.	6	2	12	LOW	1. TC provided on reactor R-14114. 2.TI provided on reactor column, HE inlet and HE vent of reactor R-14114. 3.SG provided below condenser of reactor. 4.SG provided on reactor reflux line. 5.SG provided on inlet line of receiver RC-14114A / RC-14114B 6.LI provided on receiver RC-14116A / 14116BRC-14114A / RC-14114B 7. Primery HE with cooling and secondery HE with chilling water provided. 8.TI provided on receiver RC-14114A / RC-14114B 9.WG provided on receiverRC-14114A / RC-14114B 10.VG provided on reactor R-14114 vaccuum header. 11.QC analysis done during distillation	4	2	8	EXTREMELY LOW					

NO/Less	Quantity	5.9	No/less quantity of collect recovered solvent S in receiver RC-14114A / RC-14114B from reactor R-14114 due to steam failure in reactor R-14114	1. It will lead to process delay.	6	2	12	LOW	1. TC provided on reactor R-14114. 2. TI provided on reactor column and HE inlet and HE vent of reactor R-14114. 3. SG provided below condenser of reactor. 4. SG provided on reactor reflux line. 5. SG provided on inlet line of receiverRC-14114A / RC-14114B 6. LI provided on receiver RC-14114A / RC-14114B 7. Primery HE with cooling and secondery HE with chilling water provided. 8. TI provided on receiverRC-14114A / RC-14114B 9. WG provided on receiver RC-14114A / RC-14114B 10. VG provided on reactor R-14114 vaccuum header. 11. QC analysis done during distillation 12. PG provided on reactor jacket 13. PG provided on steam supply header. 14. Stand steam supply available.	4	2	8	EXTREMELY LOW					
		5.10	No/less quantity of collect recovered solvent S in receiver RC-14114A / RC-14114B from reactor R-14114 due to less vaccuum.	1. It will lead to process delay.	6	2	12	LOW	1. TC provided on reactor R-14114. 2.TI provided on reactor column, HE inlet and HE vent of reactor R-14114. 3.SG provided below condenser of reactor. 4.SG provided on reactor reflux line. 5.SG provided on inlet line of receiver RC-14114A / RC-14114B 6.LI provided on receiver RC-14114A / RC-14114B 7. Primery HE with cooling and secondery HE with chilling water provided. 8.TI provided on receiver RC-14114A / RC-14114B 9.WG provided on receiverRC-14114A / RC-14114B 10.VG provided on reactor R-14114 vaccuum header. 11.QC analysis done during distillation 12. PG provided on reactor jacket 13. Alarm provided for vacuum failure.	4	2	8	EXTREMELY LOW	1. On/Off valve to be provided with interlock with steam ejector for avoid water suck in system.	4	2	8	
		5.11	No/less quantity of collect recovered solvent S in receiver RC-14114A / RC-14114B from reactor R-14114 due to cooling failure in primary condenser.	1. Material vapour escape from vaccuum pump in environment will lead to environment issue. 2. It will lead to material loss.	6	4	24	MODERATE	1. TC provided on reactor R-14114 2.TI provided on reactor column, HE inlet and HE vent of reactor R-14114 3.SG provided below condenser of reactor. 4.SG provided on reactor reflux line. 5.SG provided on inlet line of receiver RC-14114A / RC-14114B 6.LI provided on receiver RC-14114A / RC-14114B 7.PG provided on cooling water supply line header of HE 8.TI provided on receiverRC-14114A / RC-14114B 9.WG provided on receiver RC-14114A / RC-14114B 10.VG provided on reactor R-14114 vaccuum header. 11.QC analysis done during distillation 12. SG provided on vapour column 13. PG provided on reactor jacket 14. secondery HE with chilling water supply provided on vaccum trap 15. Cooling water supply provided in vaccum trap jacket 16. Stand by cooling water supply pump is provided 17.PM of pump is done regularly	4	4	16	LOW					
		5.12	No/less quantity of collect recovered solvent S in receiver RC-14114A / RC-14114B from reactor R-14114 due to chilling failure in secondary condenser.	1. Material vapour escape from vaccuum pump in environment will lead to environment issue. 2. It will lead to material loss.	6	4	24	MODERATE	1.TC provided on reactor R-14114 2.TI provided on reactor column, HE inlet and HE vent of reactor R-14114. 3.SG provided below condenser of reactor. 4.SG provided on reactor reflux line. 5.SG provided on inlet line of receiver RC-14114A / RC-14114B 6.LI provided on receiver RC-14114A / RC-14114B 7.PG provided on cooling water supply line header of HE 8.TI provided on receiver RC-14114A / RC-14114B 9.WG provided onreceiver RC-14114A / RC-14114B 10.VG provided on reactor R-14114 vaccuum header. 11.QC analysis done during distillation 12. SG provided on vapour column 13. PG provided on reactor jacket 14. Primery HE with cooling water supply provided. 15. Chilling water supply provided in vaccum trap jacket 16. Stand by chilling water supply pump is provided 17.PM of pump is done regularly	4	4	16	LOW					

		5.13	No / Less quantity of recovered solvent-S transferred from receiver RC-14114A / RC-14114B to storage tank ST-11118 by gravity due to human error	1. It will lead to process delay	6	2	12	LOW	1, Process under supervior 2. WG provided on receiverRC-14114A / RC-14114B 4.SG provided on transfer line 5. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 6. LI provided on storage tank ST-11118 7. LI provided on receiver RC-14114A / RC-14114B	4	2	8	EXTREMELY LOW					
		5.14	No / Less quantity of recovered solvent-S transferred from receiver RC-14114A / RC-14114B to storage tank ST-11118 by gravity due to leakage in transfer line	1. It will lead to material loss. 2. It will lead to leakage causing Health & Environment issue. 3. Leakage will cause burn injuries. 4. It may lead to fire in case of externel ignition source.	6	6	36	HIGH	1, Process under supervior 2. WG provided on receiver RC-14114A / RC-14114B 4.SG provided on transfer line 5. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 6. LI provided on storage tank ST-11118 7. LI provided on receiver RC-14114A / RC-14114B 8. Suitable MOC of packing (teflon). 9.Spill kit available.. 10. RCC florring in plant area 11. Double valve provided in transfer line. 12. PTW system in place. 13. Flameproof fittings installed. 14. Earthing provided to all equipment. 15 Fire fighting system is available 16. Suitable MOC of line, valve and equipment is selected.	4	6	24	MODERATE					
		5.15	No / Less quantity of recovered solvent-S transferred from receiver RC-14114A / RC-14114B to storage tank ST-11118 by gravity due to storage tank ST-11118 bottom drain valve open / pass	1. It will lead to material loss. 2. It will lead to leakage causing Health & Environment issue. 3. Leakage will cause burn injuries. 4. It may lead to fire in case of externel ignition source.	6	6	36	HIGH	1, Process under supervior 1, Process under supervior 2. WG provided on receiver RC-14114A / RC-14114B 4.SG provided on transfer line 5. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 6. LI provided on storage tank ST-11118 7. LI provided on receiverRC-14114A / RC-14114B 8. Suitable MOC of valve. 9.Spill kit available.. 10. RCC florring in plant area 11. Double valve provided in transfer line. 12. PTW system in place. 13. Flameproof fittings installed. 14. Earthing provided to all equipment. 15. Blind provided on bottom drain valve 16. Double valve provided in bottom line. 17. Fire fighting system is available	4	4	16	LOW					
		5.16	No / Less quantity of recovered solvent-S transferred from receiver RC-14114A / RC-14114B to storage tank ST-11118 by gravity due to transfer line valve malfunction	1. It will lead to process delay	6	2	12	LOW	1, Process under supervior 2. WG provided on receiver RC-14114A / RC-14114B 4.SG provided on transfer line 5. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 6. LI provided on storage tank ST-11118 7. LI provided on receiver RC-14114A / RC-14114B 9. Suitable MOC of valve SS-316 is selected 10. Spare valve is availabe	4	2	8	EXTREMELY LOW					
		5.17	No / Less quantity of recovered solvent-S transferred from receiver RC-14114A / RC-14114B to storage tank ST-11118 by gravity due to LI malfunction of storage tank ST-11118	1. It will lead to process delay	6	2	12	LOW	1, Process under supervior 2. WG provided on receiver RC-14114A / RC-14114B 4.SG provided on transfer line 5. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 6.Visul check inspection of LI 7. LI provided on receiverRC-14114A / RC-14114B 9. Suitable MOC of valve SS-316 is selected	4	2	8	EXTREMELY LOW					
		6.1	More Quantity of transfer mother liquor from storage tank ST-10105 to reactor R-14114 by pump P-10105 due to human error	1. It may lead to process delay due to over flow of reactors R-14114 and excess material getting filled in the column.	6	2	12	LOW	1. LI provided on ST-10105 2. WG provided on reactor R-14114 3. SG provided on Reactor inlet line 4. Side glass provided on pump discharge line 5. Process under supervision 6. SG provided on column segment 7. PG on pump discharge line 8. Data maintained of storage tank level	4	2	8	EXTREMELY LOW					
		6.2	More Quantity of transfer mother liquor from storage tank ST-10105 to reactor R-14114 by pump P-10105 due to LI malfunction	1. It may lead to process delay due to over flow of reactors R-14114 and excess material getting filled in the column.	6	2	12	LOW	1. Visual check of glass LI on ST-10105 2. WG provided on reactor R-14114 3. SG provided on Reactor inlet line 4. Side glass provided on pump discharge line 5. Process under supervision 6. PG on pump discharge line 7. Underload protection for Pump tripping 8. Data maintained of storage tank level	4	4	16	LOW					

More	Quantity	6.3	More quantity of collect recovered solvent S in receiver RC-14114A / RC-14114B from reactor R-14114 due to human error	1. No consequences due to total solvent-s recovered in receiver					1. TC provided on reactor R-14114. 2. TI provided on reactor column, HE inlet and HE vent of reactor R-14114 3. SG provided below condenser of reactor. 4. SG provided on reactor reflux line. 5. SG provided on inlet line of receiverRC-14114A / RC-14114B 6. LI provided on receiver RC-14114A / RC-14114B 7. Primery HE with cooling and secondery HE with chilling water provided. 8. TI provided on receiver RC-14114A / RC-14114B 9. WG provided on receiverRC-14114A / RC-14114B 10. VG provided on reactor R-14114 vaccuum header and reactor.									
		6.4	More quantity of collect recovered solvent S in receiver RC-14114A / RC-14114B from reactor R-14114 due to more temperature in reactor.	1. No consequences due to total solvent-s recovered in receiver					1. TC provided on reactor R-14114. 2.TI provided on reactor column, HE inlet and HE vent of reactor R-14114. 3.SG provided below condenser of reactor. 4.SG provided on reactor reflux line. 5.SG provided on inlet line of receiver RC-14114A / RC-14114B 6.LI provided on receiver RC-14116A / 14116BRC-14114A / RC-14114B 7. Primery HE with cooling and secondery HE with chilling water provided. 8.TI provided on receiver RC-14114A / RC-14114B 9.WG provided on receiverRC-14114A / RC-14114B 10.VG provided on reactor R-14114 vaccuum header.									
		6.5	More quantity of recovered solvent-S transferred from receiver RC-14114A / RC-14114B to storage tank ST-11118 by gravity due to human error	1. It may lead to over flow of storage tank if already full 2. It may lead to health and enviornment issue 3. It may lead to fire in case of external source of ignition	6	6	36	HIGH	1, Process under supervior 2. WG provided on receiverRC-14114A / RC-14114B 4.SG provided on transfer line 5. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 6. LI provided on storage tank ST-11118 7. LI provided on receiver RC-14114A / RC-14114B 8. Data maintained for storage tank level 9. Spill kit available. 10. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 11. PTW system is available. 12. Fire fighting system is available. 13. Double earthing / bonding is provided on equipment.	4	6	24	MODERATE					
		6.6	More quantity of recovered solvent-S transferred from receiver RC-14114A / RC-14114B to storage tank ST-11118 by gravity due to transfer line valve malfunction	1. It may lead to over flow of storage tank if already full 2. It may lead to health and enviornment issue 3. It may lead to fire in case of external source of ignition	6	6	36	HIGH	1, Process under supervior 2. WG provided on receiver RC-14114A / RC-14114B 4.SG provided on transfer line 5. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 6. LI provided on storage tank ST-11118 7. LI provided on receiver RC-14114A / RC-14114B 9. Suitable MOC of valve SS-316 is selected 10. Spare valve is availabe 11. Data maintained for storage tank level 12. Spill kit available. 13. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 14. PTW system is available. 15. Fire fighting system is available. 16. Double earthing / bonding is provided on equipment.	4	6	24	MODERATE					
		6.7	More quantity of recovered solvent-S transferred from receiver RC-14114A / RC-14114B to storage tank ST-11118 by gravity due to LI malfunction of storage tank ST-11118	1. It may lead to over flow of storage tank if already full 2. It may lead to health and enviornment issue 3. It may lead to fire in case of external source of ignition	6	6	36	HIGH	1, Process under supervior 2. WG provided on receiver RC-14114A / RC-14114B 4.SG provided on transfer line 5. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 6.Visul check inspection of LI 7. LI provided on receiverRC-14114A / RC-14114B 9. Suitable MOC of valve SS-316 is selected 10. Data maintained for storage tank level 11. Spill kit available. 12. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 13. PTW system is available. 14. Fire fighting system is available. 15. Double earthing / bonding is provided on equipment.	4	6	24	MODERATE					
NO/Less	Pressure	7.1	NA																
More	Pressure	8.1	NA																
Back	Pressure	9.1	NA																

Less	Temperature	10.1	No/less temperature < 130°C in reactor R-14114 during solvent-s recover in receiver RC-14114A,14114B from reactor due to human error	1. It will lead to process delay.	6	2	12	LOW	1. TC provided on reactor R-14114 and connected with on/off valve 2. TI provided on reactor column, 3. SG provided below condenser of reactor. 4. SG provided on reactor reflux line. 5. SG provided on inlet line of receiver RC-14114A,14114B 6. LI provided on receiverRC-14114A,14114B 7. Primary HE provided with cooling water and secondary HE provided with chilling water 8. TI provided onreceiverRC-14114A,14114B 9. WG provided on receiverRC-14114A,14114B 10. VG provided on reactor R-14116 vaccuum header. 11. SG provided on vapour column	4	2	8	EXTREMELY LOW					
		10.2	No/less temperature < 130°C in reactor R-14114 during solvent-s recover in receiver RC-14114A,14114B from reactor due to steam valve malfunction .	1. It will lead to process delay.	6	2	12	LOW	1.TC provided on reactor R-14114 and connected with steam on/off valve 2.TI provided on reactor column, 3.SG provided below condenser of reactor. 4.SG provided on reactor reflux line. 5.SG provided on inlet line of receiver RC-14114A,14114B 6.LI provided on receiver RC-14114A,14114B 7.Primary HE provided with cooling water and secondary HE provided with chilling water 8.TI provided on receiver RC-14114A,14114B 9.WG provided on receiverRC-14114A,14114B 10.VG provided on reactor R-14114 vaccuum header. 11.PM of valve is done as per schedule 12. SG provided on vapour column 13. 2 no's manual valve provided before and after on/off valve 14. Suitable MOC of valve CS is selected 15. Manual on/off valve operation facility is available 16. Spare valve is available	4	2	8	EXTREMELY LOW					
		10.3	No/less temperature < 130°C in reactor R-14114 during solvent-s recover in receiver RC-14114A,14114B from reactor due to steam heating failure.	1. It will lead to process delay.	6	2	12	LOW	1.TC provided on reactor R-14114 and connected with steam on/off valve 2.TI provided on reactor column, 3.SG provided below condenser of reactor. 4.SG provided on reactor reflux line. 5.SG provided on inlet line of receiverRC-14114A,14114B 6.LI provided on receiver RC-14114A,14114B 7.Primary HE provided with cooling water and secondary HE provided with chilling water 8.TI provided on receiverRC-14114A,14114B 9.WG provided on receiver RC-14114A,14114B 10.VG provided on reactor R-14114 vaccuum header. 11.Alarm with steam supply failure 12. SG provided on vapour column 13. PG provided on reactor jacket 14. PG provided on steam supply header 15. Stand by steam supply is available.	4	2	8	EXTREMELY LOW					
		10.4	No/less temperature < 130°C in reactor R-14114 during solvent-s recover in receiver RC-14114A,14114B from reactor due to TC malfunction of reactor R-14116	1. It will lead to process delay.	6	2	12	LOW	1.Calibration of TC is done as per schedule 2. TI provided on reactor column, 3. SG provided below condenser of reactor. 4. SG provided on reactor reflux line. 5. SG provided on inlet line of receiver RC-14114A,14114B 6. LI provided on receiver RC-14114A,14114B 7. Primary HE provided with cooling water and secondary HE provided with chilling water 8. TI provided on receiverRC-14114A,14114B 9. WG provided on receiverRC-14114A,14114B 10. VG provided on reactor R-14114 vaccuum header. 11.Suitable MOC selected of TC 12. SG provided on vapour column	4	2	8	EXTREMELY LOW					
		11.1	More temperature >135°C in reactor R-14114 during solvent-s recover in receiver RC-14114A,14114B from reactor due to human error.	1. No consequences due to maximum reached temperature upto 135°C														

More	Temperature	11.2	More temperature > 135°C in reactor R-14114 during solvent-s recover in receiver RC-14114A,14114B from reactor due to steam line malfunction .	1. No consequences due to maximum reached temperature upto 135°C														
		11.3	More temperature > 135°C in reactor R-14114 during solvent-s recover in receiver RC-14114A,14114B from reactordue to TC malfunction of reactor R-14114	1. No consequences due to maximum reached temperature upto 135°C														
NO/Less	Level	12.1	NA															
More	Level	13.1	NA															
Improper	Agitation	14	Agitation failure of electrical	1. It will lead to process delay and quality issue	6	2	12	LOW	1. Process under supervision 2. PM is done as per schedule 3. WG provided on reactor 4. Critical spare available 5. Overload / Underload protection available.	4	2	8	EXTREMELY LOW					
		14.1	Agitation failure of mechanical	1. It will lead to process delay and quality issue	6	2	12	LOW	1. Process under supervision 2. PM is done as per schedule 3. WG provided on reactor 4. Critical spare available	4	2	8	EXTREMELY LOW					
Changed	Composition	15	NA															
Failure	Utility	16.1	Steam supply failure.	1. It will lead to process delay.	6	2	12	LOW	1.TC provided on reactor R-14114 and connected with steam on/off valve 2.TI provided on reactor column, 3.SG provided below condenser of reactor. 4.SG provided on reactor reflux line. 5.SG provided on inlet line of receiver RC-14114A,14114B 6.LI provided on receiver RC-14114A,14114B 7.Primary HE provided with cooling water and secondary HE provided with chilling water 8.TI provided on receiver RC-14114A,14114B 9.WG provided on receiverRC-14114A,14114B 10.VG provided on reactor R-14114 vaccuum header. 11. SG provided on vapour column 12. PG provided on reactor jacket 13. PG provided on steam supply header 14. Stand by steam supply is available. 15. Alarm with steam supply failure	4	2	8	EXTREMELY LOW					
		16.2	Cooling failure in primary HE	1. Material vapour escape from vaccuum pump in environment will lead to environment issue. 2. It will lead to material loss.	6	4	24	MODERATE	1. TC provided on reactor R-14114 2.TI provided on reactor column, HE inlet and HE vent of reactor R-14114 3.SG provided below condenser of reactor. 4.SG provided on reactor reflux line. 5.SG provided on inlet line of receiverRC-14114A,14114B 6.LI provided on receiver RC-14114A,14114B 7.PG provided on cooling water supply line header of HE 8.TI provided on receiver RC-14114A,14114B 9.WG provided on RC-14114A,14114B 10.VG provided on reactor R-14114 vaccuum header. 11.PM of pump is done regularly 12. SG provided on vapour column 13. PG provided on reactor jacket 14. secondery HE with chilling water supply provided on vaccum trap 15. Cooling water supply provided in vaccum trap jacket 16. Stand by cooling water supply pump is provided	4	4	16	LOW					

		16.3	Vaccuum failure in reactor R-14114	1. It will lead to process delay.	6	2	12	LOW	1. TC provided on reactor R-14114. 2.TI provided on reactor column, HE inlet and HE vent of reactor R-14114. 3.SG provided below condenser of reactor. 4.SG provided on reactor reflux line. 5.SG provided on inlet line of receiver RC-14114A,14114B 6.LI provided on receiver RC-14114A,14114B 7. Primery HE with cooling and secondery HE with chilling water provided. 8.TI provided on receiver RC-14114A,14114B 9.WG provided on receiver RC-14114A,14114B 10.VG provided on reactor R-14114 vaccuum header. 11.Alarm provided for vacuum failure. 12. PG provided on reactor jacket	4	2	8	EXTREMELY LOW					
		16.4	Chilling failure in secondary HE	1. Material vapour escape from vaccuum pump in environment will lead to environment issue. 2. It will lead to material loss.	6	4	24	MODERATE	1.TC provided on reactor R-14114 2.TI provided on reactor column, HE inlet and HE vent of reactor R-14114. 3.SG provided below condenser of reactor. 4.SG provided on reactor reflux line. 5.SG provided on inlet line of receiver RC-14114A,14114B 6.LI provided on receiver RC-14114A,14114B 7.PG provided on chilling water supply line header of HE 8.TI provided on receiverRC-14114A,14114B 9.WG provided onreceiverRC-14114A,14114B 10.VG provided on reactor R-14114 vaccuum header. 11.PM of pump is done regularly 12. SG provided on vapour column 13. PG provided on reactor jacket 14. Primery HE with cooling water supply provided. 15. Chilling water supply provided in vaccum trap jacket 16. Stand by chilling water supply pump is provided	4	4	16	LOW					
		16.5	Nitrogen failure during vaccum release	1. It wlll lead to process delay	6	2	12	LOW	1. Process under supervision 2. PG provided on nitrogen main header 3. Stand by nitrogen supply available	4	2	8	EXTREMELY LOW					
High	Viscosity	17	NA															
Low	Viscosity	18	NA															
Incorrect Sequence	Raw material Issues	19	NA															
	Sampling Issues	20	NA															
Incompatibility	Raw Material	21	NA															
Failure	DCS	22	NA															
	Power	23.1	Power failure	1. It will lead to process delay	10	2	20	MODERATE	DG set available	6	2	12	LOW					
	Start up/Shut down	24.1	NA															
	Loss of Containment (Leakage / Rupture)	25.1	No / Less Quantity of transfer mother liquor from storage tank ST-10105 to reactor R-14114 by pump P-10105 due to spillage / leakage in system	1. It will lead to material loss. 2. It will lead to leakage causing Health & Environment issue. 3. It may be lead to fire in case of externel ignition source.	6	6	36	HIGH	1. LI provided on ST-10105 2. WG provided on reactor R-14114 3. SG provided on Reactor inlet line 4. Side glass provided on pump discharge line 5. Process under supervision 6. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 7. RCC flooring provided 8. Earthing provided on equipment. 9. Suitable MOC of valve & pipeline is selected (SS316). 10. Jacketed pipeline and valve with insulation for steam heating. 11. PG on Pump discharge line. 12. Suitable MOC of packing (teflon). 13. FLP fittings available. 14. RCC flooring available. 15. Spill kit available. 16. Fire fighting system is available. 17. PTW system is available.	4	6	24	MODERATE					

		25.2	No / Less quantity of recovered solvent-S transferred from receiver RC-14114A / RC-14114B to storage tank ST-11118 by gravity due to leakage in transfer line	1. It will lead to material loss. 2. It will lead to leakage causing Health & Environment issue. 3. Leakage will cause burn injuries. 4. It may lead to fire in case of externel ignition source.	6	6	36	HIGH	1, Process under supervior 2. WG provided on receiver RC-14114A / RC-14114B 4.SG provided on transfer line 5. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 6. LI provided on storage tank ST-11118 7. LI provided on receiver RC-14114A / RC-14114B 8. Suitable MOC of packing (teflon). 9.Spill kit available.. 10. RCC florring in plant area 11. Double valve provided in transfer line. 12. PTW system in place. 13. Flameproof fittings installed. 14. Earthing provided to all equipment. 15 Fire fighting system is available 16. Suitable MOC of line, valve and equipment is selected.	4	6	24	MODERATE					
MOC	Corrosion / Erosion	26.1	NA															
Improper	Maintenance	27.1	Improper maintenance	Process delay	4	1	4	EXTREMELY LOW	1 PM of equipment is done as per schedule. 2 Trained technician and fitters 3 Maintenance work under supervision 4 Critical spare part is available									
	Engineering issues/ Drawing Errors	28.1	Improper P& ID can lead to improper hazop	Improper hazop			0					0						

HAZOP WORK SHEET				Hazop Work Sheet Revision No	PHA-001.00
Product Name	2,4-DFNB			Hazop Work Sheet Effective Date	06-05-18
NODE NO :	10				
DESIGN INTENTION	Material of reactor R-14114 transfer to ATFE feed tank ATFE-FT-13102D by pump CP-13114 Then apply high vacuum by vacuum pump D-VP-ATFE-12102 and material feeding in ATFE-12102 by dosing pump P-13102A / P-13102B via pre-heater from feed tank ATFE-FT-13102D at temperature 110 ^{0}C- 120^{o}C and maintain bottom temperature of ATFE-12102 up to 180-185^{0}C. Collect recovered solvent S in receiver ATFE- RC-11102A / ATFE- RC-11102B / ATFE- RC-11102C and transfer the solvent-S to ST-11118 by pump P-11118. Collect mixture in ATFE bottom tank Transfer mixture in ATFE feed tank ATFE-FT-13102 D & redistilled of mixture & collect Solvent-S in ATFE- RC-11102A / ATFE- RC-11102B / ATFE- RC-11102C . Transfer Solvent -S in storage tank ST-11118 by pump P-11118. Collect residue in residue tank ATFE-RT-10102E & unload in drum by gravity. Send residue to co-processing in cement industries.				
EQUIPMENTS COVERED IN THIS NODE	Reactor R-14114, ATFE feed tank ATFE-FT-13102D, ATFE-12102, Pump CP-13114, Pump P-11118, Vacuum pump D-VP-ATFE-12102, Dosing pump P-13102A / P-13102B, Receiver ATFE- RC-11102A / ATFE- RC-11102B / ATFE- RC-11102C, Storage tank ST-11118 , Residue tank ATFE-RT-10102E.				
DOCUMENT REFERRED	P& ID and PTC	DOCUMENT No.		DOCUMENT Revision No.	
HAZOP Revision No	01				
HAZOP Effective Date	07-04-22				

	Temperature (^{0}C)		Pressure (kg/cm^{2}g)		MOC	Capacity	
Equipment Details	Design	Working	Design	Working		Design	Working
Reactor R-14114	250	180	6	4	SS316L	8KL	10 KL
ATFE feed tank ATFE-FT-13102D	250	150	6	4	SS316L	5KL	7 KL
ATFE-12102	300	230	-1.03 to 5	-1.03to 2	ss316	7.5 m2	400 kg/hr
Pump CP-13114	150	ATM	4	3	ss316	10m3/h	10m3/h
Pump P-11118	150	ATM	4	3	ss316	10m3/h	10m3/h
Vacuum pump D-VP-ATFE-12102	150	120	0.1torr	0.1torr	ductil iron	0.1torr	0.1torr
Dosing pump P-13102A / P-13102B	80	80	2.7	2.7	ss316	10m3/h	10m3/h
Receiver ATFE- RC-11102A / ATFE- RC-11102B / ATFE- RC-11102C	170	150	4.5	3	ss316	5/5/2KL	7 KL
Storage tank ST-11118	250	150	4.5	ATM	SS316L	10KL	13 KL
Residue tank ATFE-RT-10102E	250	150	4.5	ATM	SS316L	2kl	3 KL

Guide Word	Parameter	Sr. No.	CAUSES	CONSEQUENCES	Probability	Severity	RPN No	Risk Classification	SAFEGUARDS	Probability	Severity	RPN No	Risk Classification	RECOMMENDATIONS	Probability	Severity	RPN No	Remarks
NO/Less	Flow	1.1	NA															
More	Flow	2.1	NA															
Other than/ Misdirected	Flow	3.1	NA															
Reverse	Flow	4.1	NA															
NO/Less	Quantity	5.1	No / Less quantity of material of reactor R-14114 transfer to ATFE feed tank ATFE-FT-13102D by pump CP-13114 due to human error	1. It will lead to process delay	6	2	12	LOW	1. LI provided on ATFE feed tank ATFE-FT-13102D 2. WG provided on reactor R-14114 3. SG provided on transfer line 4. SG provided on pump discharge line 5. Process under supervision 6. PG on pump discharge line	2	2	4	EXTREMELY LOW				

5.2	No / Less quantity of material of reactor R-14114 transfer to ATFE feed tank ATFE-FT-13102D by pump CP-13114 due to discharge valve malfunction of pump	1. It will lead to material loss. 2. It will lead to pressurization of line which results into gasket leakage causing Health & Environment issue. 3. Leakage will cause burn injuries. 4. It may lead to fire in case of external source of ignition	6	6	36	HIGH	1. LI provided on ATFE feed tank ATFE-FT-13102D 2. WG provided on reactor R-14114 3. SG provided on transfer line 4. SG provided on pump discharge line 5. Process under supervision 6. Overload protection for Pump tripping 7. Suitable MOC of valve is selected (SS-316). 8. Jacketed pipeline and valve with insulation for steam heating. 9. PG on Pump discharge line. 10. Suitable MOC of packing (teflon). 11. Fire fighting system available 12. FLP fittings available 13. PTW system available 14. Spill kit available	2	6	12	LOW					
5.3	No / Less quantity of material of reactor R-14114 transfer to ATFE feed tank ATFE-FT-13102D by pump CP-13114 due to suction Line valve malfunction of pump	1. It may lead to dry running of pump and process delay	6	4	24	MODERATE	1. LI provided on ATFE feed tank ATFE-FT-13102D 2. WG provided on reactor R-14114 3. SG provided on transfer line 4. SG provided on pump discharge line 5. Process under supervision 6. Under load protection for Pump tripping 7. Suitable MOC of valve is selected (SS-316). 8. Jacketed pipeline and valve with insulation for steam heating. 9. PG on Pump discharge line. 10. Spare valve is available	4	4	16	LOW					
5.4	No / Less quantity of material of reactor R-14114 transfer to ATFE feed tank ATFE-FT-13102D by pump CP-13114 due to pump failure	1. It will lead to production delay.	6	2	12	LOW	1. LI provided on ATFE feed tank ATFE-FT-13102D 2. WG provided on reactor R-14114 3. SG provided on transfer line 4. SG provided on pump discharge line 5. Process under supervision 6. PG on pump discharge line 7. Underload /Overload protection for Pump tripping 8.PM of pump is done as per schedule 9.Spare pump is avaialble 10. Suitable MOC of pump SS-316 is selected	4	2	8	EXTREMELY LOW					
5.5	No / Less quantity of material of reactor R-14114 transfer to ATFE feed tank ATFE-FT-13102D by pump CP-13114 due to LI malfunction of feeding tank	1. It may lead to process delay	6	2	12	LOW	1.Visual inspection of glass LI of ATFE feed tank ATFE-FT-13102D 2. WG provided on reactor R-14114 3. SG provided on transfer line 4. SG provided on pump discharge line 5. Process under supervision 6. PG on pump discharge line 7. WG provided on feed tank ATFE-FT-13102D	4	2	8	EXTREMELY LOW					

5.6	No / Less quantity of material of reactor R-14114 transfer to ATFE feed tank ATFE-FT-13102D by pump P-10105 due to spillage / leakage in system	1. It will lead to material loss. 2. It will lead to leakage causing Health & Environment issue. 3. It may be lead to fire in case of externel ignition source.	6	6	36	HIGH	1. LI provided on ATFE feed tank ATFE-FT-13102D 2. WG provided on reactor R-14114 3. SG provided on transfer line 4. SG provided on pump discharge line 5. Process under supervision 6. Overload protection for Pump tripping 7. Suitable MOC of valve and lines is selected (SS-316). 8. Jacketed pipeline and valve with insulation for steam heating. 9. PG on Pump discharge line. 10. Suitable MOC of packing (teflon). 11. Fire fighting system available 12. FLP fittings available 13. PTW system available 14. Spill kit available	2	6	12	LOW					
5.7	No / Less quantity of material feeding in ATFE-12102 by dosing pump P-13102A / P-13102B via pre-heater from feed tank ATFE-FT-13102D due to human error	1. It will lead to process delay	6	2	12	LOW	1. LI provided on ATFE feed tank ATFE-FT-13102D. 2. SG provide on ATFE- 12102 system. 3. SG provided on material transfer line. 4. SG provided on pump discharge line. 5. Process under supervision. 6. PG on pump discharge line. 7. TI provided on ATFE column and at pre-heater.	2	2	4	EXTREMELY LOW					
5.8	No / Less quantity of material feeding in ATFE-12102 by dosing pump P-13102A / P-13102B via pre-heater from feed tank ATFE-FT-13102D due to discharge valve malfunction	1. It will lead to material loss. 2. It will lead to pressurization of line which results into gasket leakage causing Health & Environment issue. 3. Leakage will cause burn injuries. 4. It may lead to fire in case of external source of ignition	6	6	36	HIGH	1. LI provided on ATFE feed tank ATFE-FT-13102D. 2. SG provide on ATFE- 12102 system. 3. SG provided on material transfer line. 4. SG provided on pump discharge line. 5. Process under supervision. 6. Overload protection for Pump tripping. 7. Suitable MOC of valve is selected (SS-316). 8. Jacketed pipeline and valve with insulation for steam heating. 9. PG on Pump discharge line. 10. Suitable MOC of packing (teflon). 11. Fire fighting system available. 12. FLP fittings available. 13. PTW system available	2	6	12	LOW					
5.9	No / Less quantity of material feeding in ATFE-12102 by dosing pump P-13102A / P-13102B via pre-heater from feed tank ATFE-FT-13102D due to suction Line valve malfunction	1. It may lead to dry running of pump and process delay	6	4	24	MODERATE	1. LI provided on ATFE feed tank ATFE-FT-13102D. 2. SG provide on ATFE- 12102 system. 3. SG provided on material transfer line. 4. SG provided on pump discharge line. 5. Process under supervision. 6. Under load protection for Pump tripping 7. Suitable MOC of valve is selected (SS-316). 8. Jacketed pipeline and valve with insulation for steam heating. 9. PG on Pump discharge line. 10. Spare valve is available	4	4	16	LOW					

5.10	No / Less quantity of material feeding in ATFE-12102 by dosing pump P-13102A / P-13102B via pre-heater from feed tank ATFE-FT-13102D due to pump failure	1. It will lead to production delay.	6	2	12	LOW	1. LI provided on ATFE feed tank ATFE-FT-13102D. 2. SG provide on ATFE- 12102 system. 3. SG provided on material transfer line. 4. SG provided on pump discharge line. 5. Process under supervision. 6. PG on pump discharge line. 7. Underload /Overload protection for Pump tripping 8.PM of pump is done as per schedule 9.Standby pump is avaialble 10. Suitable MOC of pump SS-316 is selected	4	2	8	EXTREMELY LOW					
5.11	No / Less quantity of material feeding in ATFE-12102 by dosing pump P-13102A / P-13102B via pre-heater from feed tank ATFE-FT-13102D due to LI malfunction of feeding tank	1. It may lead to process delay	6	2	12	LOW	1. Visual inspection of glass LI of ATFE feed tank ATFE-FT-13102D 2. LI provided on ATFE feed tank ATFE-FT-13102D. 3. SG provide on ATFE- 12102 system. 4. SG provided on material transfer line. 5. SG provided on pump discharge line. 6. Process under supervision. 7. PG on pump discharge line 8.WG provided on feed tank ATFE-FT-13102D.	4	2	8	EXTREMELY LOW					
5.12	No / Less quantity of material feeding in ATFE-12102 by dosing pump P-13102A / P-13102B via pre-heater from feed tank ATFE-FT-13102D due to spillage / leakage in system	1. It will lead to material loss. 2. It will lead to leakage causing Health (burn injury)& Environment issue. 3. It may be lead to fire in case of externel ignition source.	6	6	36	HIGH	1. LI provided on ATFE feed tank ATFE-FT-13102D. 2. SG provide on ATFE- 12102 system. 3. SG provided on material transfer line. 4. SG provided on pump discharge line. 5. Process under supervision. 6. PG on pump discharge line. 7. Suitable MOC of valve and lines is selected (SS-316). 8. Jacketed pipeline and valve with insulation for steam heating. 9. Suitable MOC of packing (teflon). 10. Fire fighting system available 11. FLP fittings available 12. PTW system available 13. Spill kit available. 14. PPE usage (handgloves,	2	6	12	LOW					
5.13	No / Less quantity of material feeding in ATFE-12102 by dosing pump P-13102A / P-13102B via pre-heater from feed tank ATFE-FT-13102D due to steam heating failure in pre-heater	1. It may lead to process delay due to pre-heater choke-up. 2.It may lead to pre-heater to dosing pump system pressurised may cause spillage and leakage . 4. It will lead to leakage causing Health (burn injury)& Environment issue. 5. It may be lead to fire in case of externel ignition source.	6	6	36	HIGH	1. LI provided on ATFE feed tank ATFE-FT-13102D. 2. SG provide on ATFE- 12102 system. 3. SG provided on material transfer line. 4. SG provided on pump discharge line. 5. Process under supervision. 6. PG on pump discharge line. 7. TI provided on ATFE column and at pre-heater. 8. PG provided on steam supply header. 9. Stand by steam supply provision is available. 10. PT provided on main steam supply line and interlock with Alarm available for low pressure steam 11. Jacketed pipeline and valve	2	6	12	LOW					

5.14	No/less quantity of solvent S collect recovered in receiver ATFE- RC-11102A / ATFE-RC-11102B / ATFE-RC-11102C from ATFE-12102 due to human error	1. It will lead to process delay.	6	2	12	LOW	1. Process under supervision 2. TT provided on ATFE-12102 and interlock with controal valve in oil supply line 3. TI provided on ATFE column and at pre-heater. 4. TI provided between primary HE with cooling water supply with cooling water supply 5. SG provided on receiver ATFE-RC-11102A / ATFE- RC-11102B / ATFE- RC-11102C 6. LT provided on receiver ATFE-RC-11102A / ATFE- RC-11102B 6. LI provided on receiver ATFE-RC-11102C 7. VG provided on header and vaccum trap 8.QC analysis done after distillation	4	2	8	EXTREMELY LOW					
5.15	No/less quantity of solvent S collect recovered in receiver ATFE- RC-11102A / ATFE-RC-11102B / ATFE-RC-11102C from ATFE-12102 due TT malfunction	1. It will lead to process delay.	6	2	12	LOW	1. Process under supervision 2. Calibration of TT is done as per schedule 3. TI provided on ATFE column and at pre-heater. 4. TI provided between primary HE with cooling water supply with cooling water supply 5. SG provided on receiver ATFE-RC-11102A / ATFE- RC-11102B / ATFE- RC-11102C 6. LT provided on receiver ATFE-RC-11102A / ATFE- RC-11102B 6. LI provided on receiver ATFE-RC-11102C 7. VG provided on header and vaccum trap 8.QC analysis done after distillation	4	2	8	EXTREMELY LOW					
5.16	No/less quantity of solvent S collect recovered in receiver ATFE- RC-11102A / ATFE-RC-11102B / ATFE-RC-11102C from ATFE-12102 due to oil heating failure in ATFE-12102	1. It will lead to process delay.	6	2	12	LOW	1. Process under supervision 2. TT provided on ATFE-12102 and interlock with controal valve in oil supply line 3. TI provided on ATFE column and at pre-heater. 4. TI provided between primary HE with cooling water supply with cooling water supply 5. SG provided on receiver ATFE-RC-11102A / ATFE- RC-11102B / ATFE- RC-11102C 6. LT provided on receiver ATFE-RC-11102A / ATFE- RC-11102B 6. LI provided on receiver ATFE-RC-11102C 8. VG provided on header and vaccum trap 9.QC analysis done after distillation 10.PM of thermopak is done as	4	2	8	EXTREMELY LOW					

5.17	No/less quantity of solvent S collect recovered in receiver ATFE- RC-11102A / ATFE-RC-11102B / ATFE-RC-11102C from ATFE-12102 due to vaccuum failure	1. It will lead to temperature rise.	6	6	36	HIGH	1. Process under supervision 2. TT provided on ATFE-12102 and interlock with controal valve in oil supply line 3. TI provided on ATFE column and at pre-heater. 4. TI provided between primary HE with cooling water supply with cooling water supply 5. SG provided on receiver ATFE-RC-11102A / ATFE- RC-11102B / ATFE- RC-11102C 6. LT provided on receiver ATFE-RC-11102A / ATFE- RC-11102B 6. LI provided on receiver ATFE-RC-11102C 8. VG provided on header and vaccum trap 9.QC analysis done after distillation 10. PM of vaccum pump is done	4	6	24	MODERATE					
5.18	No/less quantity of solvent S collect recovered in receiver ATFE- RC-11102A / ATFE-RC-11102B / ATFE-RC-11102C from ATFE-12102 due to cooling failure in primary HE	1. Material vapour escape from vaccuum pump in environment will lead to environment issue. 2. It will lead to material loss.	6	4	24	MODERATE	1. Process under supervision 2. TT provided on ATFE-12102 and interlock with controal valve in oil supply line 3. TI provided on ATFE column and at pre-heater. 4. TI provided between primary HE with cooling water supply with cooling water supply 5. SG provided on receiver ATFE-RC-11102A / ATFE- RC-11102B / ATFE- RC-11102C 6. LT provided on receiver ATFE-RC-11102A / ATFE- RC-11102B 6. LI provided on receiver ATFE-RC-11102C 8. VG provided on header and vaccum trap 9.QC analysis done after distillation 10. PM done of cooling circulation	4	2	8	EXTREMELY LOW					
5.19	No / Less quantity transfer of solvent-S to storage tank ST-11118 by pump P-11118 from receiver ATFE- RC-11102A / ATFE-RC-11102B / ATFE-RC-11102C due to human error	1. It will lead to process delay	6	2	12	LOW	1. LI provided on storage tank ST-11118 2. Process under supervision 3. SG provided on receiver ATFE-RC-11102A / ATFE- RC-11102B / ATFE- RC-11102C 4. LT provided on receiver ATFE-RC-11102A / ATFE- RC-11102B 5. LI provided on receiver ATFE-RC-11102C 6. PG on pump discharge line 7. SG provided on transfer line	2	2	4	EXTREMELY LOW					
5.20	No / Less quantity transfer of solvent-S to storage tank ST-11118 by pump P-11118 from receiver ATFE- RC-11102A / ATFE-RC-11102B / ATFE-RC-11102C due to discharge valve malfunction	1. It will lead to material loss. 2. It will lead to pressurization of line which results into gasket leakage causing Health & Environment issue. 3. Leakage will cause burn injuries. 4. It may lead to fire in case of external source of ignition	6	6	36	HIGH	1. LI provided on storage tank ST-11118 2. Process under supervision 3. SG provided on receiver ATFE-RC-11102A / ATFE- RC-11102B / ATFE- RC-11102C 4. LT provided on receiver ATFE-RC-11102A / ATFE- RC-11102B 5. LI provided on receiver ATFE-RC-11102C 6. PG on pump discharge line 7. SG provided on transfer line 6. Overload protection for Pump tripping 8. Suitable MOC of valve is selected (SS-316). 9. Jacketed pipeline and valve with insulation for steam heating. 10. Spare valve is available 11. Suitable MOC of packing (teflon)	4	6	24	MODERATE					

5.21	No / Less quantity transfer of solvent-S to storage tank ST-11118 by pump P-11118 from receiver ATFE- RC-11102A / ATFE-RC-11102B / ATFE-RC-11102C due to suction Line valve malfunction	1. It may lead to dry running of pump and process delay	6	4	24	MODERATE	1. LI provided on storage tank ST-11118 2. Process under supervision 3. SG provided on receiver ATFE-RC-11102A / ATFE- RC-11102B / ATFE- RC-11102C 4. LT provided on receiver ATFE-RC-11102A / ATFE- RC-11102B 5. LI provided on receiver ATFE-RC-11102C 6. PG on pump discharge line 7. SG provided on transfer line 8. Suitable MOC of valve is selected (SS-316). 9. Jacketed pipeline and valve with insulation for steam heating. 10. Spare valve is available 11. Under load protection is provided	4	4	16	LOW					
5.22	No / Less quantity transfer of solvent-S to storage tank ST-11118 by pump P-11118 from receiver ATFE- RC-11102A / ATFE-RC-11102B / ATFE-RC-11102C due to pump failure	1. It will lead to production delay.	6	2	12	LOW	1. LI provided on storage tank ST-11118 2. Process under supervision 3. SG provided on receiver ATFE-RC-11102A / ATFE- RC-11102B / ATFE- RC-11102C 4. LT provided on receiver ATFE-RC-11102A / ATFE- RC-11102B 5. LI provided on receiver ATFE-RC-11102C 6. PG on pump discharge line 7. SG provided on transfer line 8. Underload /Overload protection for Pump tripping 9.PM of pump is done as per schedule 10.Spare pump is avaialble 11. Suitable MOC of pump SS-316 is selected	4	2	8	EXTREMELY LOW					
5.23	No / Less quantity transfer of solvent-S to storage tank ST-11118 by pump P-11118 from receiver ATFE- RC-11102A / ATFE-RC-11102B / ATFE-RC-11102C due to LI malfunction of storage tank	1. It may lead to process delay	6	2	12	LOW	1.Visual inspection of glass LI of storage tank ST-11118 2. Process under supervision 3. SG provided on receiver ATFE-RC-11102A / ATFE- RC-11102B / ATFE- RC-11102C 4. LT provided on receiver ATFE-RC-11102A / ATFE- RC-11102B 5. LI provided on receiver ATFE-RC-11102C 6. PG on pump discharge line 7. SG provided on transfer line 8. Data maintained for storage tank level	4	2	8	EXTREMELY LOW					
5.24	No / Less quantity transfer of solvent-S to storage tank ST-11118 by pump P-11118 from receiver ATFE- RC-11102A / ATFE-RC-11102B / ATFE-RC-11102C due to spillage / leakage in system	1. It will lead to material loss. 2. It will lead to leakage causing Health & Environment issue. 3. It may be lead to fire in case of externel ignition source.	6	6	36	HIGH	1. LI provided on storage tank ST-11118 2. Process under supervision 3. SG provided on receiver ATFE-RC-11102A / ATFE- RC-11102B / ATFE- RC-11102C 4. LT provided on receiver ATFE-RC-11102A / ATFE- RC-11102B 5. LI provided on receiver ATFE-RC-11102C 6. PG on pump discharge line 7. SG provided on transfer line 8. Jacketed pipeline and valve with insulation for steam heating. 9. Suitable MOC of valve and lines is selected (SS-316). 10. Suitable MOC of packing (teflon). 11. Fire fighting system available 12. FLP fittings available 13. PTW system available	2	6	12	LOW					

		5.25	No/less quantity transfer residue material from ATFE-102 bottom tank to drums by gravity due to human error	1. It will lead to process delay.	6	2	12	LOW	1. Process under supervision. 2. WG provided on bottom tank 3. Weighing of drum during drum filling 4. SG provided on transfer material line. 5. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron)	4	2	8	EXTREMELY LOW					
		5.26	No/less quantity transfer residue material from ATFE-102 bottom tank to drums by gravity due to transfer line leakage / spillage	1. It may lead to health and enviornment issue 2. It may lead to fire in case of external source of ignition.	6	6	36	HIGH	1. Process under supervision. 2. WG provided on bottom tank 3. Weighing of drum during drum filling 4. SG provided on transfer material line. 5. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 6. RCC flooring provided 7. Spill kit is available. 8. Crocodile earthing provided. 9. FLP fittings provided. 10. Firefighting system available. 11. PTW system available.	4	6	24	MODERATE					
		5.27	No/less quantity transfer residue material from ATFE-102 bottom tank to drums by gravity due to weigh balance malfunction	1. It may lead to process delay	6	2	12	LOW	1. Process under supervision. 2. WG provided on bottom tank 3. Calibration of weigh balance is done as per schedule 4. SG provided on transfer material line. 5. Spare weigh balance is available	4	2	8	EXTREMELY LOW					
		5.28	No/less quantity transfer residue material from ATFE-102 bottom tank to drums by gravity due to transfer line valve malfunction	1. It may lead to process delay	6	2	12	LOW	1. Process under supervision. 2. WG provided on bottom tank 3. Weighing of drum during drum filling 4. SG provided on transfer material line. 5. Suitable MOC of valve SS-316 is selected. 6. Spare valve is available	4	2	8	EXTREMELY LOW					
More	Quantity	6.1	More quantity of material of reactor R-14114 transfer to ATFE feed tank ATFE-FT-13102D by pump CP-13114 due to human error	1. It will lead to process delay and material loss 2. It may lead to over flow from vent line may cause health and enviornment issue 3. It may lead to fire in case of external source of ignition	6	6	36	HIGH	1. Glass LI provided on ATFE feed tank ATFE-FT-13102D 2. WG provided on reactor R-14114 and ATFE feed tank ATFE-FT-13102D 3. SG provided on transfer line 4. SG provided on pump discharge line 5. Process under supervision 6. PG on pump discharge line 7. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 8. RCC flooring provided 9. Spill kit is available. 10. Earthing provided on equipment 11. FLP fittings provided. 12. Firefighting system available. 13. PTW system available.	4	6	24	MODERATE					

6.2	More quantity of material of reactor R-14114 transfer to ATFE feed tank ATFE-FT-13102D by pump CP-13114 due to LI malfunction of feeding tank	1. It will lead to process delay and material loss 2. It may lead to over flow from vent line may cause health and enviornment issue 3. It may lead to fire in case of external source of ignition	6	6	36	HIGH	1.Visual inspection of glass LI of ATFE feed tank ATFE-FT-13102D 2. WG provided on reactor R-14114 and ATFE feed tank ATFE-FT-13102D 3. SG provided on transfer line 4. SG provided on pump discharge line 5. Process under supervision 6. PG on pump discharge line 7. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 8. RCC flooring provided 9. Spill kit is available. 10. Earthing provided on equipment 11. FLP fittings provided. 12. Firefighting system available. 13. PTW system available.	4	6	24	MODERATE					
6.3	More quantity of material feeding in ATFE-12102 by dosing pump P-13102A / P-13102B via pre-heater from feed tank ATFE-FT-13102D due to human error	1. It may lead to process delay due to more material received in bottom tank with residue	6	2	12	LOW	1. LI provided on ATFE feed tank ATFE-FT-13102D. 2. SG provide on ATFE- 12102 system. 3. SG provided on material transfer line. 4. SG provided on pump discharge line. 5. Process under supervision. 6. PG on pump discharge line. 7. TI provided on ATFE column and at pre-heater. 8. Over load protection for ATFE-12102 is provided 9. WG provided on ATFE feed tank ATFE-FT-13102D.	4	2	8	EXTREMELY LOW					
6.4	More quantity of material feeding in ATFE-12102 by dosing pump P-13102A / P-13102B via pre-heater from feed tank ATFE-FT-13102D due to LI malfunction of feeding tank	1. It may lead to process delay due to more material received in bottom tank with residue	6	2	12	LOW	1. Visual inspection of glass LI of ATFE feed tank ATFE-FT-13102D 2. SG provide on ATFE- 12102 system. 3. SG provided on material transfer line. 4. SG provided on pump discharge line. 5. Process under supervision. 6. PG on pump discharge line 7. WG provided on ATFE feed tank ATFE-FT-13102D. 8. TI provided on ATFE column and at pre-heater.	4	2	8	EXTREMELY LOW					
6.5	More quantity of solvent S collect recovered in receiver ATFE- RC-11102A / ATFE-RC-11102B / ATFE-RC-11102C from ATFE-12102 due to human error	1. It may lead to less qunatity of residue collect	6	2	12	LOW	1. Process under supervision 2. TT provided on ATFE-12102 and interlock with control valve of oil supply line 3. TI provided on ATFE column and at pre-heater. 4. TI provided between primary HE with cooling water supply 5. SG provided on receiver ATFE-RC-11102A / ATFE- RC-11102B / ATFE- RC-11102C 6. LT provided on receiver ATFE-RC-11102A / ATFE- RC-11102B 6. LI provided on receiver ATFE-RC-11102C 7. VG provided on header and vaccum trap 8.QC analysis done after distillation 9. Cold trap provided with cooling and chilling system	4	2	8	EXTREMELY LOW					

6.6	More quantity of solvent S collect recovered in receiver ATFE- RC-11102A / ATFE-RC-11102B / ATFE-RC-11102C from ATFE-12102 due TT malfunction	1. It may lead to less qunatity of residue collect	6	2	12	LOW	1. Process under supervision 2. Calibration of TT is done as per schedule 3. TI provided on ATFE column and at pre-heater. 4. TI provided between primary HE with cooling water supply 5. SG provided on receiver ATFE-RC-11102A / ATFE- RC-11102B / ATFE- RC-11102C 6. LT provided on receiver ATFE-RC-11102A / ATFE- RC-11102B 6. LI provided on receiver ATFE-RC-11102C 7. VG provided on header and vaccum trap 8.QC analysis done after distillation 9. Cold trap provided with cooling and chilling system. 10. TT provided on thermopack	4	2	8	EXTREMELY LOW					
6.7	More quantity of solvent S collect recovered in receiver ATFE- RC-11102A / ATFE-RC-11102B / ATFE-RC-11102C from ATFE-12102 due to oil heating valve malfunction in ATFE-12102	1. It may lead to less qunatity of residue collect	6	2	12	LOW	1. Process under supervision 2. TT provided on ATFE-12102 and interlock with control valve of oil supply line 3. TI provided on ATFE column and at pre-heater. 4. TI provided between primary HE with cooling water supply 5. SG provided on receiver ATFE-RC-11102A / ATFE- RC-11102B / ATFE- RC-11102C 6. LT provided on receiver ATFE-RC-11102A / ATFE- RC-11102B 7. LI provided on receiver ATFE-RC-11102C 8. VG provided on header and vacuum trap 9.QC analysis done after distillation 10.PM of control valve is done as per schedule	4	2	8	EXTREMELY LOW					
6.8	More quantity transfer of solvent-S to storage tank ST-11118 by pump P-11118 from receiver ATFE- RC-11102A / ATFE-RC-11102B / ATFE-RC-11102C due to human error	1. It will lead to over flow of storage tank if already full 2. It may cause health and environment issue. 3. It may lead to fire in case of external source of ignition	6	6	36	HIGH	1. LI provided on storage tank ST-11118 2. Process under supervision 3. SG provided on receiver ATFE-RC-11102A / ATFE- RC-11102B / ATFE- RC-11102C 4. LT provided on receiver ATFE-RC-11102A / ATFE- RC-11102B 5. LI provided on receiver ATFE-RC-11102C 6. PG on pump discharge line 7. SG provided on transfer line 8. RCC flooring provided 9. Spill kit is available. 10. Earthing provided on equipment 11. FLP fittings provided. 12. Firefighting system available. 13. PTW system available. 14. PPE usage (handgloves, masks / face shields, safety	4	6	24	MODERATE					

6.9	More quantity transfer of solvent-S to storage tank ST-11118 by pump P-11118 from receiver ATFE- RC-11102A / ATFE-RC-11102B / ATFE-RC-11102C due to LI malfunction of storage tank	1. It will lead to over flow of storage tank if already full 2. It may cause health and enviornment issue. 3. It may lead to fire in case of external source of ignition	6	6	36	HIGH	1.Visual inspection of glass LI of storage tank ST-11118 2. Process under supervision 3. SG provided on receiver ATFE-RC-11102A / ATFE- RC-11102B / ATFE- RC-11102C 4. LT provided on receiver ATFE-RC-11102A / ATFE- RC-11102B 5. LI provided on receiver ATFE-RC-11102C 6. PG on pump discharge line 7. SG provided on transfer line 8. RCC flooring provided 9. Spill kit is available. 10. Earthing provided on equipment 11. FLP fittings provided. 12. Firefighting system available. 13. PTW system available. 14. PPE usage (handgloves, masks / face shields, safety	4	6	24	MODERATE					
6.10	More quantity transfer residue material from ATFE-102 bottom tank to drums by gravity due to human error	1. It will lead to over flow of drum may cause health (burn injury)and eniornment issue 2. It may lead to fire in case of external source of ignition .	6	6	36	HIGH	1. Process under supervision. 2. WG provided on bottom tank 3. Weighing of drum after drum filling 4. SG provided on transfer material line. 5. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 6. Dip stick used during drum filling 7. Spill kit is available. 8. Earthing provided on equipment 9. FLP fittings provided. 10. Firefighting system available. 11. PTW system available. 12. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron)	4	6	24	MODERATE		4	6	24	
6.11	More quantity transfer residue material from ATFE-102 bottom tank to drums by gravity due to weigh balance malfunction	1. It will lead to over flow of drum may cause health (burn injury)and eniornment issue 2. It may lead to fire in case of external source of ignition .	6	6	36	HIGH	1. Process under supervision. 2. WG provided on bottom tank 3. Calibration of weigh balance is done as per schedule 4. SG provided on transfer material line. 5. Spare weigh balance is available 6. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 7. Dip stick used during drum filling 8. Spill kit is available. 9. Earthing provided on equipment 10. FLP fittings provided. 11. Firefighting system available. 12. PTW system available. 13. PPE usage (handgloves, masks / face shields, safety	4	6	24	MODERATE					

		6.12	More quantity transfer residue material from ATFE-102 bottom tank to drums by gravity due to transfer line valve malfunction	1. It will lead to over flow of drum may cause health (burn injury)and environment issue 2. It may lead to fire in case of external source of ignition .	6	6	36	HIGH	1. Process under supervision. 2. WG provided on bottom tank 3. Weighing of drum after drum filling 4. SG provided on transfer material line. 5. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 6. Dip stick used during drum filling 7. Spill kit is available. 8. Earthing provided on equipment 9. FLP fittings provided. 10. Firefighting system available. 11. PTW system available. 12. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 13. Suitable MOC of valve SS-316	4	6	24	MODERATE		4	6	24	
	Vacuum	7.1	No/less vacuum of solvent S collect recovered in receiver ATFE- RC-11102A / ATFE-RC-11102B / ATFE-RC-11102C from ATFE-12102 due to vaccuum failure	1. It will lead to temperature rise approx 185 deg C however no consequences.	6	6	36	HIGH	1. Process under supervision 2. TT provided on ATFE-12102 and interlock with controal valve in oil supply line 3. TI provided on ATFE column and at pre-heater. 4. TI provided between primary HE with cooling water supply with cooling water supply 5. SG provided on receiver ATFE-RC-11102A / ATFE- RC-11102B / ATFE- RC-11102C 6. LT provided on receiver ATFE-RC-11102A / ATFE- RC-11102B 6. LI provided on receiver ATFE-RC-11102C 8. VG provided on header and vaccum trap 9.QC analysis done after distillation 10. PM of vaccum pump is done	2	6	12	LOW					
NO/Less		7.2	No/less vacuum of solvent S collect recovered in receiver ATFE- RC-11102A / ATFE-RC-11102B / ATFE-RC-11102C from ATFE-12102 due to Human error	1. It will lead to temperature rise approx 185 deg C however no consequences.	6	6	36	HIGH	1. Process under supervision 2. TT provided on ATFE-12102 and interlock with controal valve in oil supply line 3. TI provided on ATFE column and at pre-heater. 4. TI provided between primary HE with cooling water supply with cooling water supply 5. SG provided on receiver ATFE-RC-11102A / ATFE- RC-11102B / ATFE- RC-11102C 6. LT provided on receiver ATFE-RC-11102A / ATFE- RC-11102B 6. LI provided on receiver ATFE-RC-11102C 8. VG provided on header and vaccum trap 9.QC analysis done after distillation 10. cold trap provided with cooling	4	6	24	MODERATE					
More	Vacuum	8.1	NA														
Back	Pressure	9.1	NA														
Less	Temperature	10.1	No/less temperature < 110^{o}C in ATFE feed tank ATFE-FT-13102D due to human error	1. It will lead to process delay due to material jam	6	2	12	LOW	1. Process under supervision 2. WG provided on ATFE feed tank ATFE-FT-13102D 3. TI provided on ATFE feed tank ATFE-FT-13102D 4. SG provided on transfer line 5. LT provided on receivers 6. Over load protection of dosing pump is provided 7.. PG provided on pump discharge line 8. PG provided on steam supply header	4	2	8	EXTREMELY LOW					

10.2	No/less temperature < 110°C in ATFE feed tank ATFE-FT-13102D due to steam heating failure .	1. It will lead to process delay due to material jam	6	2	12	LOW	1. Process under supervision 2. WG provided on ATFE feed tank ATFE-FT-13102D 3. TI provided on ATFE feed tank ATFE-FT-13102D 4. SG provided on transfer line 5. LT provided on receivers 6. Over load protection of dosing pump is provided 7.. PG provided on pump discharge line 8. PG provided on steam supply header 9. Stand by steam supply provision available . 10. PT provided on steam supply line and conect with low pressure Alarm	4	2	8	EXTREMELY LOW					
10.3	No/less temperature < 110°C in ATFE feed tank ATFE-FT-13102D due to steam heating valve malfunction .	1. It will lead to process delay due to material jam	6	4	24	MODERATE	1. Process under supervision 2. WG provided on ATFE feed tank ATFE-FT-13102D 3. TI provided on ATFE feed tank ATFE-FT-13102D 4. SG provided on transfer line 5. LT provided on receivers 6. Over load protection of dosing pump is provided 7.. PG provided on pump discharge line 8. PG provided on steam supply header 9. Suitable MOC of valve CS is selected 10. Spare valve is available. 11 double valve provided on steam supply line	4	4	16	LOW					
10.4	No/less temperature < 110°C in ATFE feed tank ATFE-FT-13102D due to TI malfunction of ATFE feed tank ATFE-FT-13102D	1. It will lead to process delay due to material jam	6	4	24	MODERATE	1. Process under supervision 2. WG provided on ATFE feed tank ATFE-FT-13102D 3. Calibration of TI is done as per schedule 4. SG provided on transfer line 5. LT provided on receivers 6. Over load protection of dosing pump is provided 8. PG provided on steam supply header	4	4	16	LOW					
10.5	No/less temperature < 110°C in ATFE feed tank ATFE-FT-13102D due to PG malfunction of steam line	1. It will lead to process delay due to material jam	6	4	24	MODERATE	1. Process under supervision 2. WG provided on ATFE feed tank ATFE-FT-13102D 3. Calibration of PG is done as per schedule 4. SG provided on transfer line 5. LT provided on receivers 6. Over load protection of dosing pump is provided 8. PG provided on steam supply header	4	4	16	LOW					
10.6	No/less temperature < 110°C in pre-heater due to human error	1. It will lead to process delay due to material jam	6	4	24	MODERATE	1. Process under supervision 2. WG provided on ATFE feed tank ATFE-FT-13102D 3. TI provided on ATFE feed tank ATFE-FT-13102D 4. SG provided on transfer line 5. LT provided on receivers 6. Over load protection of dosing pump is provided 7. PG provided on steam supply header 8. SG provided on ATFE-12102 9. TI provided on material transfer lne from pre-heater to ATFE-12102	4	4	16	LOW					

10.7	No/less temperature < 110°C in pre-heater due to steam heating failure .	1. It will lead to process delay due to material jam	6	4	24	MODERATE	1. Process under supervision 2. WG provided on ATFE feed tank ATFE-FT-13102D 3. TI provided on ATFE feed tank ATFE-FT-13102D 4. SG provided on transfer line 5. LT provided on receivers 6. Over load protection of dosing pump is provided 7. PG provided on steam supply header 8. Stand by steam supply provision available . 9. PT provided on steam supply line and conect with low pressure Alarm 10. SG provided on ATFE-12102 11. TI provided on material transfer lne from pre-heater to ATFE-12102	4	4	16	LOW					
10.8	No/less temperature < 110°C in ATFE feed tank ATFE-FT-13102D due to steam heating valve malfunction .	1. It will lead to process delay due to material jam	6	4	24	MODERATE	1. Process under supervision 2. WG provided on ATFE feed tank ATFE-FT-13102D 3. TI provided on ATFE feed tank ATFE-FT-13102D 4. SG provided on transfer line 5. LT provided on receivers 6. Over load protection of dosing pump is provided 7. PG provided on steam supply header 8. Suitable MOC of valve CS is selected 9. Spare valve is available. 10. SG provided on ATFE-12102 11. TI provided on material transfer lne from pre-heater to ATFE-12102	4	4	16	LOW					
10.9	No/less temperature < 110°C in pre-heater due to TI malfunction of ATFE feed tank ATFE-FT-13102D	1. It will lead to process delay due to material jam	6	4	24	MODERATE	1. Process under supervision 2. WG provided on ATFE feed tank ATFE-FT-13102D 3. Calibration of TI is done as per schedule 4. SG provided on transfer line 5. LT provided on receivers 6. Over load protection of dosing pump is provided 7.. PG provided on pump discharge line 8. PG provided on steam supply header 9. SG provided on ATFE-12102 10. TI provided on material transfer lne from pre-heater to ATFE-12102	4	4	16	LOW					
10.10	No/less temperature < 110°C in pre-heater due to PG malfunction of steam line	1. It will lead to process delay due to material jam	6	4	24	MODERATE	1. Process under supervision 2. WG provided on ATFE feed tank ATFE-FT-13102D 3. Calibration of PG is done as per schedule 4. SG provided on transfer line 5. LT provided on receivers 6. Over load protection of dosing pump is provided 7.. PG provided on pump discharge line 8. TI provided on steam supply header 9. SG provided on ATFE-12102 10. TI provided on material transfer lne from pre-heater to ATFE-12102	4	4	16	LOW					

		10.11	No/less temperature < 180°C during solvent recovery in receiver ATFE- RC-11102A / ATFE-RC-11102B / ATFE-RC-11102C due to human error	1. It may lead to process delay	6	2	12	LOW	1. Process under supervision 2. TT provided on ATFE-12102 3. TI provided on ATFE column and at pre-heater. 4. TI provided between primary HE with cooling water supply 5. SG provided on receiver ATFE-RC-11102A / ATFE- RC-11102B / ATFE- RC-11102C 6. LT provided on receiver ATFE-RC-11102A / ATFE- RC-11102B 6. LI provided on receiver ATFE-RC-11102C 7. VG provided on header and vaccum trap 8.QC analysis done after distillation	4	2	8	EXTREMELY LOW					
		10.12	No/less temperature < 180°C during solvent recovery in receiver ATFE- RC-11102A / ATFE-RC-11102B / ATFE-RC-11102C due to oil heating failure .	1. It may lead to process delay	6	2	12	LOW	1. Process under supervision 2. TT provided on ATFE-12102 3. TI provided on ATFE column and at pre-heater. 4. TI provided between primary HE with cooling water supply 5. SG provided on receiver ATFE-RC-11102A / ATFE- RC-11102B / ATFE- RC-11102C 6. LT provided on receiver ATFE-RC-11102A / ATFE- RC-11102B 6. LI provided on receiver ATFE-RC-11102C 7.QC analysis done after distillation 8. PM of thermopack is done as per schedule 9. PM of oil circulaton pump is done as per schedule 10. Stand by oil circulation pump is available	4	2	8	EXTREMELY LOW					
		10.13	No/less temperature < 180°C during solvent recovery in receiver ATFE- RC-11102A / ATFE-RC-11102B / ATFE-RC-11102C due to oil heating valve malfunction .	1. It may lead to process delay	6	2	12	LOW	1. Process under supervision 2. TT provided on ATFE-12102 3. TI provided on ATFE column and at pre-heater. 4. TI provided between primary HE with cooling water supply 5. SG provided on receiver ATFE-RC-11102A / ATFE- RC-11102B / ATFE- RC-11102C 6. LT provided on receiver ATFE-RC-11102A / ATFE- RC-11102B 6. LI provided on receiver ATFE-RC-11102C 7.QC analysis done after distillation 8. Suitable MOC of valve SS-316 is selected	4	2	8	EXTREMELY LOW					
		10.14	No/less temperature < 180°C during solvent recovery in receiver ATFE- RC-11102A / ATFE-RC-11102B / ATFE-RC-11102C due to TT malfunction of ATFE-12102	1. It may lead to process delay	6	2	12	LOW	1. Process under supervision 2. Calibration of TT is done as per schedule 3. TI provided on ATFE column and at pre-heater. 4. TI provided between primary HE with cooling water supply 5. SG provided on receiver ATFE-RC-11102A / ATFE- RC-11102B / ATFE- RC-11102C 6. LT provided on receiver ATFE-RC-11102A / ATFE- RC-11102B 6. LI provided on receiver ATFE-RC-11102C 7.QC analysis done after distillation	4	2	8	EXTREMELY LOW					

More	Temperature	11.1	More temperature > 120°C in ATFE feed tank ATFE-FT-13102D due to human error [steam heating]	1.It may lead to temperature rise upto 140 deg C.	6	4	24	MODERATE	1. Process under supervision 2. WG provided on ATFE feed tank ATFE-FT-13102D 3. TI provided on ATFE feed tank ATFE-FT-13102D 4. SG provided on transfer line 5. LT provided on receivers 6. PG provided on steam supply header 7. Maximum temperature of low pressure steam is 140°C	4	4	16	LOW					
		11.2	More temperature > 120°C in ATFE feed tank ATFE-FT-13102D due to steam heating valve malfunction .	1.It may lead to temperature rise.	6	4	24	MODERATE	1. Process under supervision 2. WG provided on ATFE feed tank ATFE-FT-13102D 3. TI provided on ATFE feed tank ATFE-FT-13102D 4. SG provided on transfer line 5. LT provided on receivers 6. PG provided on steam supply header 7. Suitable MOC of valve CS is selected 8. Spare valve is available. 9. Maximum temperature of low pressure steam is 140°C	4	4	16	LOW					
		11.3	More temperature > 120°C in ATFE feed tank ATFE-FT-13102D due to TI malfunction of ATFE feed tank ATFE-FT-13102D	1.It may lead to temperature rise.	6	4	24	MODERATE	1. Process under supervision 2. WG provided on ATFE feed tank ATFE-FT-13102D 3. Calibration of TI is done as per schedule 4. SG provided on transfer line 5. LT provided on receivers 6 PG provided on steam supply header 7. TI provided on feeding line 8. Maximum temperature of low pressure steam is 140°C	4	4	16	LOW					
		11.4	More temperature >120°C in pre-heater due to human error	1.It may lead to temperature rise.	6	4	24	MODERATE	1. Process under supervision 2. WG provided on ATFE feed tank ATFE-FT-13102D 3. TI provided on ATFE feed tank ATFE-FT-13102D 4. SG provided on transfer line 5. LT provided on receivers 6. PG provided on steam supply header 7. SG provided on ATFE-12102 8. TI provided on material transfer lne from pre-heater to ATFE-12102 9. Maximum temperature of low pressure steam is 140°C	4	4	16	LOW					
		11.5	More temperature > 120°C in ATFE feed tank ATFE-FT-13102D due to steam heating valve malfunction .	1.It may lead to temperature rise.	6	4	24	MODERATE	1. Process under supervision 2. WG provided on ATFE feed tank ATFE-FT-13102D 3. TI provided on ATFE feed tank ATFE-FT-13102D 4. SG provided on transfer line 5. LT provided on receivers 6. PG provided on steam supply header 7. Suitable MOC of valve CS is selected 8.Spare valve is available. 9. SG provided on ATFE-12102 10. TI provided on material transfer lne from pre-heater to ATFE-12102 11. Maximum temperature of low pressure steam is 140oC	4	4	16	LOW					

		11.6	More temperature > 185°C during solvent recovery in receiver ATFE- RC-11102A / ATFE- RC-11102B / ATFE- RC-11102C due to human error	1. It may lead to decomposition of material if temperature > 240°C . 2. It may lead to fire & explosion.	6	10	60	EXTREMELY HIGH	1. Process under supervision 2. TT provided on ATFE-12102 and interlock with controal valve in oil supply line 3. TI provided on ATFE column and at pre-heater. 4. TI provided between primary HE with cooling water supply. 5. SG provided on receiver ATFE-RC-11102A / ATFE- RC-11102B / ATFE- RC-11102C 6. LT provided on receiver ATFE-RC-11102A / ATFE- RC-11102B 6. LI provided on receiver ATFE-ATFE- RC-11102C 7. VG provided on header and vaccum trap 8. RCC flooring provided 9. Spill kit is available. 10. Earthing provided on equipment	4	10	40	HIGH	Ensure that tempreture is not more than >200o C to avoide rich tempreture od decmposion				
		11.7	More temperature >185°C during solvent recovery in receiver ATFE- RC-11102A / ATFE- RC-11102B / ATFE- RC-11102C due to oil heating valve malfunction .	1. It may lead to decomposition of material if temperature > 240°C . 2. It may lead to fire & explosion.	6	10	60	EXTREMELY HIGH	1. Process under supervision 2. TT provided on ATFE-12102 and interlock with controal valve in oil supply line 3. TI provided on ATFE column and at pre-heater. 4. TI provided between primary HE with cooling water supply and secondary HE 5. SG provided on receiver ATFE-RC-11102A / ATFE- RC-11102B / ATFE- RC-11102C 6. LT provided on receiver ATFE-RC-11102A / ATFE- RC-11102B 6. LI provided on receiver ATFE-ATFE- RC-11102C 8. Suitable MOC of valve SS-316 is selected 9. Control valve is utilised as on / off valve 8. RCC flooring provided	4	10	40	HIGH	Ensure that tempreture is not more than >200o C to avoide rich tempreture od decmposion				
		11.8	More temperature >185°C during solvent recovery in receiver ATFE- RC-11102A / ATFE- RC-11102B / ATFE- RC-11102C due to TT malfunction of ATFE-12102	1. It may lead to decomposition of material if temperature > 240°C . 2. It may lead to fire & explosion.	6	10	60	EXTREMELY HIGH	1. Process under supervision 2. Calibration of TT is done as per schedule 3. TI provided on ATFE column and at pre-heater. 4. TI provided between primary HE with cooling water supply and secondary HE 5. SG provided on receiver ATFE-RC-11102A / ATFE- RC-11102B / ATFE- RC-11102C 6. LT provided on receiver ATFE-RC-11102A / ATFE- RC-11102B 6. LI provided on receiver ATFE-ATFE- RC-11102C 8. RCC flooring provided 9. Spill kit is available. 10. Earthing provided on equipment 11. FLP fittings provided. 12. Firefighting system available	4	10	40	HIGH	Ensure that tempreture is not more than >200o C to avoide rich tempreture od decmposion				

		11.9	More temperature > 130°C before and during residue unload in drum from residue tank ATFE-RT-10102E due to human error	1. It may lead to decomposition of material if temperature > 240°C . 2. It may lead to fire & explosion.	6	10	60	EXTREMELY HIGH	1. Process under supervision 2. TI provided on residue tank ATFE-RT-10102E 3. . VG provided on header and vaccum trap 4. RCC flooring provided 5. Spill kit is available. 6. Earthing provided on equipment 7. FLP fittings provided. 8. Firefighting system available. 9. PTW system available. 10. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 11 As per DSC data if tempreture rise upto more than 240 oC than material is decompos 12. TT provided on thermopack and interlocked with thermopack firing flame . Max temp of	4	10	40	HIGH	Ensure that tempreture is not more than >200o C to avoide rich tempreture od decmposion				
		11.10	More temperature > 130oC before and during residue unload in drum from residue tank ATFE-RT-10102E due to oil heating valve malfunction .	1. It may lead to decomposition of material if temperature > 240°C . 2. It may lead to fire & explosion.	6	10	60	EXTREMELY HIGH	1. Process under supervision 2. TI provided on residue tank ATFE-RT-10102E 3. . VG provided on header and vaccum trap 4. RCC flooring provided 5. Spill kit is available. 6. Earthing provided on equipment 7. FLP fittings provided. 8. Firefighting system available. 9. PTW system available. 10. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 11 As per DSC data if tempreture rise upto more than 240 oC than material is decompos 12. TT provided on thermopack and interlocked with thermopack firing flame . Max temp of	4	10	40	HIGH	Ensure that tempreture is not more than >200o C to avoide rich tempreture od decmposion				
		11.11	More temperature > 130oC before and during residue unload in drum from residue tank ATFE-RT-10102E due to TI malfunction of residue tank ATFE-RT-10102E	1. It may lead to decomposition of material if temperature > 240°C . 2. It may lead to fire & explosion.	6	10	60	EXTREMELY HIGH	1. Process under supervision 2. Calibration of TI is done as per schedule 3. . VG provided on header and vaccum trap 4. RCC flooring provided 5. Spill kit is available. 6. Earthing provided on equipment 7. FLP fittings provided. 8. Firefighting system available. 9. PTW system available. 10. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 11 As per DSC data if tempreture rise upto more than 240 oC than material is decompos 12. TT provided on thermopack and interlocked with thermopack firing flame . Max temp of	4	10	40	HIGH	Ensure that tempreture is not more than >200o C to avoide rich tempreture od decmposion				
NO/Less	Level	12.1	NA															
More	Level	13.1	NA															
Improper	Agitation	14.1	Agitation failure of electrical	1. It will lead to process delay	6	2	12	LOW	1. Process under supervision 2. PM is done as per schedule 3. Critical spare available 4. Overload protection available.	4	2	8	EXTREMELY LOW					
		14.2	Agitation failure of mechanical	1. It will lead to process delay	6	2	12	LOW	1. Process under supervision 2. PM is done as per schedule 3. Critical spare available	4	2	8	EXTREMELY LOW					
Changed	Composition	15	NA															

Failure	Utility	16.1	Steam heating failure in feeding tank ATFE-FT-13102D and pre-heater	1. It will lead to process delay due to material jam	6	2	12	LOW	1. Process under supervision 2. WG provided on ATFE feed tank ATFE-FT-13102D 3. TI provided on ATFE feed tank ATFE-FT-13102D 4. SG provided on transfer line 5. LT provided on receivers 6. Over load protection of dosing pump is provided 7.. PG provided on pump discharge line 8. PG provided on steam supply header 9. Stand by steam supply provision available . 10.PT provided on steam supply line with low pressure 11. SG provided on ATFE-12102 12. TI provided on material transfer lne from pre-heater to ATFE-12102	4	2	8	EXTREMELY LOW					
		16.2	Oil heating failure in ATFE-12102	1. It may lead to process delay	6	2	12	LOW	1. Process under supervision 2. 2. TT provided on ATFE-12102 and interlock with controal valve in oil supply line 3. TI provided on ATFE column and at pre-heater. 4. TI provided between primary HE with cooling water supply 5. SG provided on receiver ATFE-RC-11102A / ATFE- RC-11102B / ATFE- RC-11102C 6. LT provided on receiver ATFE-RC-11102A / ATFE- RC-11102B 6. LI provided on receiver ATFE-RC-11102C 7.QC analysis done after distillation 8. PM of thermopack is done as per schedule 9. PM of oil circulaton pump is done as per schedule	4	2	8	EXTREMELY LOW					
		16.3	Cooling failure in primary HE of ATFE-12102	1. Material vapour escape from vaccuum pump in environment will lead to environment issue. 2. It will lead to material loss.	6	4	24	MODERATE	1. Process under supervision 2. TT provided on ATFE-12102 3. TI provided on ATFE column 4. TI provided between primary HE with cooling water supply 5. SG provided on receiver ATFE-RC-11102A / ATFE- RC-11102B / ATFE- RC-11102C 6. LT provided on receiver ATFE-RC-11102A / ATFE- RC-11102B 7. LI provided on receiver ATFE-RC-11102C 8. VG provided on header and vaccum trap 9.QC analysis done after distillation 10. TI provided on cooling supply and return line. 11. Stand by cooling water supply pump is provided 12.PG provided on cooling supply	4	2	8	EXTREMELY LOW					

		16.4	Chilling failure in cold trap of primary HE	1. Material vapour escape from vaccuum pump in environment will lead to environment issue. 2. It will lead to material loss.	6	4	24	MODERATE	1. Process under supervision 2. TT provided on ATFE-12102 3. SG provided on receiver ATFE-RC-11102A / ATFE- RC-11102B / ATFE- RC-11102C 4. LT provided on receiver ATFE-RC-11102A / ATFE- RC-11102B 5. LI provided on receiver ATFE-RC-11102C 6. VG provided on header and vaccum trap 10. Cold trap with cooling water supply available 7. TI provided on chilling supply and return line. 8. Stand by chilling water supply pump is provided 9.PG provided on chilling supply and return line 10. PM done of chilling circulation pump and chiller plant as per	4	2	8	EXTREMELY LOW					
High	Viscosity	17	NA															
Low	Viscosity	18	NA															
Incorrect Sequence	Raw material Issues	19	NA															
	Sampling Issues	20	Incorrect sampling of recovered solvent S	1. It will lead to process delay	6	2	12	LOW	1. Process under supervision 2 QC analysis done of reaction mass upto desired result during reflux of reaction	4	2	8	EXTREMELY LOW					
Incompatibility	Raw Material	21	NA															
	DCS	22	NA															
	Power	23.1	Power failure	1. It will lead to process delay	10	2	20	MODERATE	DG set available	6	2	12	LOW					
	Start up/Shut down	24.1	NA															
	Loss of Containment (Leakage / Rupture)	25.1	No / Less quantity of material of reactor R-14114 transfer to ATFE feed tank ATFE-FT-13102D by pump P-10105 due to spillage / leakage in system	1. It will lead to material loss. 2. It will lead to leakage causing Health & Environment issue. 3. It may be lead to fire in case of externel ignition source.	6	6	36	HIGH	1. LI provided on ATFE feed tank ATFE-FT-13102D 2. WG provided on reactor R-14114 3. SG provided on transfer line 4. SG provided on pump discharge line 5. Process under supervision 6. Overload protection for Pump tripping 7. Suitable MOC of valve and lines is selected (SS-316). 8. Jacketed pipeline and valve with insulation for steam heating. 9. PG on Pump discharge line. 10. Suitable MOC of packing (teflon). 11. Fire fighting system available 12. FLP fittings available 13. PTW system available 14. Spill kit available	4	6	24	MODERATE					
Failure		25.2	No / Less quantity of material feeding in ATFE-12102 by dosing pump P-13102A / P-13102B via pre-heater from feed tank ATFE-FT-13102D due to spillage / leakage in system	1. It will lead to material loss. 2. It will lead to leakage causing Health & Environment issue. 3. It may be lead to fire in case of externel ignition source.	6	6	36	HIGH	1. LI provided on ATFE feed tank ATFE-FT-13102D. 2. SG provide on ATFE- 12102 system. 3. SG provided on material transfer line. 4. SG provided on pump discharge line. 5. Process under supervision. 6. PG on pump discharge line. 7. Suitable MOC of valve and lines is selected (SS-316). 8. Jacketed pipeline and valve with insulation for steam heating. 9. Suitable MOC of packing (teflon). 10. Fire fighting system available 11. FLP fittings available 12. PTW system available 13. Spill kit available. 14. PPE usage (handgloves	4	6	24	MODERATE					

		25.3	No / Less quantity transfer of solvent-S to storage tank ST-11118 by pump P-11118 from receiver ATFE- RC-11102A / ATFE-RC-11102B / ATFE-RC-11102C due to spillage / leakage in system	1. It will lead to material loss. 2. It will lead to leakage causing Health & Environment issue. 3. It may be lead to fire in case of externel ignition source.	6	6	36	HIGH	1. LI provided on storage tank ST-11118 2. Process under supervision 3. SG provided on receiver ATFE-RC-11102A / ATFE- RC-11102B / ATFE- RC-11102C 4. LT provided on receiver ATFE-RC-11102A / ATFE- RC-11102B 5. LI provided on receiver ATFE-RC-11102C 6. PG on pump discharge line 7. SG provided on transfer line 8. Jacketed pipeline and valve with insulation for steam heating. 9. Suitable MOC of valve and lines is selected (SS-316). 10. Suitable MOC of packing (teflon). 11. Fire fighting system available 12. FLP fittings available 13. PTW system available	4	6	24	MODERATE					
		25.4	No/less quantity transfer residue material from ATFE-102 bottom tank to drums by gravity due to transfer line leakage / spillage	1. It may lead to health (burn injury) and enviornment issue 2. It may lead to fire in case of external source of ignition.	6	6	36	HIGH	1. Process under supervision. 2. WG provided on bottom tank 3. Weighing of drum during drum filling 4. SG provided on transfer material line. 5. PPE usage (handgloves, masks / face shields, safety shoes, pvc apron) 6. RCC flooring provided 7. Spill kit is available. 8. Crocodile earthing provided. 9. FLP fittings provided. 10. Firefighting system available. 11. PTW system available.	4	6	24	MODERATE					
MOC	Corrosion / Erosion	26.1	NA															
Improper	Maintenance	27.1	Improper maintenance	Process delay	6	2	12	LOW	1 PM of equipment is done as per schedule. 2 Trained technician and fitters 3 Maintenance work under supervision 4 Critical spare part is available	4	2	8	EXTREMELY LOW					
	Engineering issues/ Drawing Errors	28.1	Improper P& ID can lead to improper hazop	Improper hazop			0					0						

ANNEXURE - R-16

Anupam Rasayan India Ltd.
No.8110, Sachin G.I.D.C. Estate, Sachin,
Surat, Gujarat 394230

PAYMENT ADVICE

Beneficiary details:
Gujarat pollution Control Board
Gandhinagar 382010
Paryavaran Bhavan, Sector 10-A
gandhinagar382010
INDIA

Payment Doc No: 15000052742022
Value date: 18.09.2022
Bank Ref No: 609231004357

Dear Sir/Madam,

We have credited a payment to your A/c 10325062238 NUMBER with for Rs 10000000.00 against the below mentioned payment details

DATE	INV ref	DOC NO	GROSS AMT	TAX	AMOUNT (INR)
17.09.2022		1500005274	10,000,000.00	0.00	10,000,000.00
Amount INR ONE CRORE Rupees					
Remarks : Advance Paid					

This is system generated advice thus require no signature

ANNEXURE - R-17

MACSON
PRODUCTS
(MANU. & EXPORTER OF DYES AND DYES INTERMEDIATES)
(GOVT. RECOGNIZED EXPORT HOUSE)
(ISO 9001 : 2008, 14001 : 2004, 22000 : 2005
OHSAS 18001 : 2007 CERTIFIED COMPANY)

ADD : PLOT NO. 2424 - 2426, ROAD NO. 2,
B/H SUDHA DYING, G.I.D.C. SACHIN,
SURAT-394230, GUJARAT, (INDIA).
TEL : 075730 25125 to 28, 9974092472
EMAIL : mnp@macsonproducts.com
sales@macsonproducts.com
WEB : www.macsonproducts.com

TO WHOMSOEVER IT MAY CONCERN

This is to certify that **56** employees are employed in the Company and are working in **B** shifts. We further certify that on 10th September 2022 at 22.05 pm., when the accident took place at Anupam Rasayan India Limited, there were **10** employees working in the factory. We also certify that on account of the said incident, there were no casualties in our Factory and that all the employees were safe.

Sachin, Surat

Date: 20-09-2022

For, MACSON PRODUCTS

MACSON PRODUCTS SACHIN

Authorized Signatory

Mobile : 98241 21551
97141 07788
Email : nutandye@yahoo.co.in
nutandye92@gmail.com
Website : www.nutandyechem.in

NUTAN
DYE CHEM
MFR. & EXPORTER OF DYES & DYE INTERMEDIATES

FACT. : PLOT NO. 2428, G.I.D.C., SACHIN, SURAT - 394 230.

TO WHOMSOEVER IT MAY CONCERN

This is to certify that **34** employees are employed in the Company and are working in **3** shifts. We further certify that on 10th September 2022 at 22.05 pm., when the accident took place at Anupam Rasayan India Limited, there were **9** employees working in the factory. We also certify that on account of the said incident, there were no casualties in our Factory and that all the employees were safe.

Sachin, Surat

Date:: 20th September-2022

For Nutan Dye Chem

Partner

Sudha
Dyeing & Printing Mills Pvt. Ltd.

Regd. Office & Factory : Plot No. 2420 & 2422, Road No. 2,
G.I.D.C. Sachin, Surat. Gujarat. (India)
PH. : +91-261-2398915-6-7
E-mail : sudhagroup@gmail.com
CIN-No. U17110GJ1991PTC016335

Date:- 20/09/2022

TO WHOMSOEVER IT MAY CONCERN

This is to certify that **540** employees are employed in the Company and are working in **three** shifts. We further certify that on 10th September 2022 at 22.05 pm., when the accident took place at Anupam Rasayan India Limited, there were **170** employees working in the factory. We also certify that on account of the said incident, there were no casualties in our Factory and that all the employees were safe.

Sachin, Surat

Date::

For Sudha Dyeing & Printing Mills Pvt. Ltd.

Authorised/Director

Authorized Signatory

देवी
Processors Pvt. Ltd.
Plot No. 804/1, Road No.2, G.I.D.C. Sachin, Surat. Mob.: +91 8758977766

Ref. No.: Date :

TO WHOMSOEVER IT MAY CONCERN

This is to certify that 250 employees are employed in the Company and are working in all shifts. We further certify that on 10th September 2022 at 22.05 pm., when the accident took place at Anupam Rasayan India Limited, there were 100 employees working in the factory. We also certify that on account of the said incident, there were no casualties in our Factory and that all the employees were safe.

Sachin, Surat

Date::

DEVI PROCESSORS (P) LTD. Sachin Surat.

For Devi Processor Pvt Ltd

For Devi Processors (P) Ltd.

Auth.Sign./Director

Authorized Signatory

RUBI ENTERPRISE

(Textile Processing Unit)

Plot No. – 806/2, Road No. 8, GIDC SACHIN, SURAT, GUJARAT – 394230

06356006490 0261 2398890 rubienterprise@yahoo.com

TO WHOMSOEVER IT MAY CONCERN

This is to certify that 280 employees are employed in the Company and are working in all shifts. We further certify that on 10th September 2022 at 22.05 pm., when the accident took place at Anupam Rasayan India Limited, there were 125 employees working in the factory. We also certify that on account of the said incident, there were no casualties in our Factory and that all the employees were safe.

Sachin, Surat

Date: 20/09/2022

RUBI ENTERPRISE (Textile Processing Unit)

For RUBI ENTERPRISE

FOR RUBI ENTERPRISE

Partner/Auth.Signatory

MAHAVIR ECO PROJECTS
PRIVATE LIMITED

Plot No.: 2430. G.I.D.C., Sachin - 394230
Surat, Gujarat, INDIA.
Ph.: +91 90330 144 33/55/66/77

CIN Number: U74999GJ2012PTC072826
Email: naik.vatsal@gmail.com
mahavirecoprojects@gmail.com

TO WHOMSOEVER IT MAY CONCERN

This is to certify that **29** employees are employed in the Company and are working in **3** shifts. We further certify that on 10th September 2022 at 22.05 pm., when the accident took place at Anupam Rasayan India Limited, there were **4** employees working in the factory. We also certify that on account of the said incident, there were no casualties in our Factory and that all the employees were safe.

Sachin, Surat

Date: 20/09/2022

For Mahavir Eco Project Pvt Ltd

MANOJ S PATIL
HR MANAGER.

MAHAVIR ECO PROJECTS PVT. LTD.
Plot No. 2430, GIDC Sachin, SURAT-394230.

Authorized Signatory

MAHAVIR SYNTHESIS
PRIVATE LIMITED
ISO 9001:2015, ISO 14001:2015, OHSAS 18001:2007 certified company

Block No.: 304B & 305, Sachin Magadalla Road,
G.I.D.C., Sachin-394230, Surat, Gujarat, INDIA.
Ph.: +91 90330 144 33/55/66/77

CIN Number: U24110GJ2006PTC047950
Email: naik.vatsal@gmail.com
Website: www.mspl.co

TO WHOMSOEVER IT MAY CONCERN

This is to certify that **139** employees are employed in the Company and are working in **3** shifts. We further certify that on 10th September 2022 at 22.05 pm., when the accident took place at Anupam Rasayan India Limited, there were **24** employees working in the factory. We also certify that on account of the said incident, there were no casualties in our Factory and that all the employees were safe.

Sachin, Surat

Date: 20/09/2022

For Mahavir Synthesis Pvt Ltd

MANOJ S PATIL
HR MANAGER.

MAHAVIR SYNTHESIS PVT. LTD. Block No. 304B & 305, GIDC, Sachin, Surat.

Authorized Signatory

BEFORE THE HON'BLE NATIONAL GREEN TRIBUNAL,

PRINCIPAL BENCH, NEW DELHI

AT NEW DELHI

Original Application No.671/2022

"4 Killed, 20 injured and several missing after Surat Factory Dire"

AFFIDAVIT IN SUPPORT OF REPLY

MAY IT PLEASE THE HON'BLE TRIBUNAL

I, Satish Patel, aged about 58 years, EHS Head of Anupam Rasayan India Limited, having office at 8110, GIDC, Sachin, Surat - 394230, do hereby state on solemn affirmation as under: -

1. I say that I am the EHS Head of the Anupam Rasayan India Limited and am authorized to file the present Affidavit. I say that I am aware of the facts and circumstances of the present case and hence am able to depose the same on oath.

2. I say that the Anupam Rasayan India Limited herein has filed the reply to the Original Application. I say that the contents of the said Reply and the present affidavit are true and correct to the best of my knowledge, information, belief and the legal advice which I believe to be correct.

A.N. SINGH
Supreme Court of India
Regn. No. 16959
Exp. Date : 31.01.2025
GOVT. OF INDIA

DEPONENT

21 SEP 2022

WHATEVER stated herein above is true and correct to the best of my knowledge and belief and for the same I have signed hereunder at _____ on this 21 SEP 2022 day of September, 2022.

I Identify the deponent who has Signed/Put T.I. in my presence

DEPONENT

Affiant

GOVT. OF INDIA
A.N. SINGH
Supreme Court of India
Regn. No. 16950
Exp. Date : 31.01.2026
NOTARY

ATTESTED

A.N. Singh, Adv.
Notary Public
Govt. of India, Delhi
Mob.: 9718139591, 7982539115

21 SEP 2022

BEFORE THE HON'BLE NATIONAL GREEN TRIBUNAL,

PRINCIPAL BENCH, NEW DELHI

AT NEW DELHI

Original Application No.671/2022

"4 Killed, 20 injured and several missing after Surat Factory Dire"

VAKALATNAMA

KNOW ALL to whom these present shall come that we, the above named do hereby appoint:

Saurabh Kulkarni,
Advocate
Ashutosh Kumar, Advocate
Chamber No.129, Old Chambers Block, Supreme Court of India, Tilak Marg, New Delhi – 110 001
Ph: (M) 9561098499
(Email) sdkadvocate@gmail.com

Hereinafter called the Advocates to be Advocates of **Managing Director, Anupam Rasayan India Limited** in the above noted case & authorize them;

To, act appear and plead in the above noted case in this court or in any other court in which the same may tried or heard.

To sign file, verify and present pleadings, appeals, cross-objections or petitions fee executions review, revision, withdraw compromise or other petitions or affidavits or other documents as may be deemed necessary or proper for the execution of the said case in all its stages subject to payment for fees for each stage.

To file and take back document, to admit &/or deny the document of opposite party

To take execution proceedings.

And I the undersigned do hereby agree to ratify and confirm all acts done by the Advocates or their substitute in the matter as my/our own acts, as if done by me/us intents and purposes.

AND I/We undertake that I/We or My/Our duly authorized agent would appear in court on all hearing &will inform the Advocate for appearance when the case in called

IN WITNESS WHEREOF we do hereunto set our hand to their presents the contents of which have been understood by us on this day of September 2022

ADVOCATES

Signature

DEPONENT

I am not a member of Advocates Welfare Fund and therefore stamp of Rs.2 is not affixed herewith.

ATTESTED

A.N. Singh, Adv.
Notary Public
Govt. of India, Delhi
Mob.: 9718139591, 7982539115

21 SEP 2022

GOVT. OF INDIA
A.N. SINGH
Supreme Court of India
Regn. No. 16959
Exp. Date: 31.01.2025
NOTARY

21 SEP 2022