

**BEFORE THE NATIONAL GREEN TRIBUNAL
SOUTHERN ZONE, CHENNAI**

Original Application No 279 of 2024 (SZ)

[Earlier O.A. No. 1097 of 2024 (PB)]

IN THE MATTER OF:

Tribunal on its own motion SUO MOTU based on the news item in The Hindu dated 22.08.2024, titled “17 killed 20 injured in reactor blast at pharma company in Andhra Pradesh’s Anakapalli”.

with

CPCB

Through its Member Secretary
New Delhi & Ors.

.....Respondent(s)

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Signed and verified on this the 6th day of January, 2025 at Chennai.



Counsel for CPCB



Deponent

H.D.VARALAXMI
Regional Director
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Regional Directorate (Chennai)
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2nd Floor, 40-E, BSNL Building, TVK Industrial Estate,
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with

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Through its Member Secretary
New Delhi & Ors.

.....Respondent(s)

**REPLY ON BEHALF OF RESPONDENT NO. 1,
CENTRAL POLLUTION CONTROL BOARD (CPCB)**

1. That, Hon’ble NGT vide order dated 22.08.2024 has impleaded CPCB as Respondent No. 1 and directed to file the response atleast one week before the next date of hearing before the Southern Zonal Bench of the Tribunal. Thereby, the reply is made in succeeding paragraphs.
2. That at the outset, the answering respondents deny all claims, contentions, allegations and averments against answering respondent CPCB in the above OA contrary to anything stated or submitted in this reply. Nothing in the OA may be deemed to have been accepted or admitted by the answering Respondent for want of a specific denial or on the ground of non-traverse, save and except any averment which has been expressly admitted hereinafter.



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3. That, CPCB is a statutory Board constituted under Section 3 of The Water (Prevention and control) Act, 1974. It performs the functions under The Water (Prevention and control) Act, 1974, The Air (Prevention and control) Act, 1981 and The Environment (Protection) Act, 1986.
4. That the Hon'ble NGT (PB) Delhi has registered Suo Motu case Original Application No. 1097 of 2024 based on a news item published in The Hindu dated 22.08.2024 titled "17 killed 20 injured in reactor blast at pharma company in Andhra Pradesh's Anakapalli". The matter was heard on 22.08.2024 and the Hon'ble NGT in its order dated 22.08.2024 impleaded CPCB as 1st Respondent and directed to file the response atleast one week before the next date of hearing before the Southern Zonal Bench of the Tribunal. The case was transferred to Hon'ble NGT Southern Zone, Chennai and was re-numbered as OA No. 279 of 2024 (SZ).
5. It is humbly submitted that Central Pollution Control Board has prepared a guideline on Integrated Guidance Framework for Chemicals Safety in Respect of the Isolated Storages and Industries Covered Under Manufacture, Storage and Import of Hazardous Chemicals Rules, 1989 and has circulated to all SPCBs/PCCs on 24.12.2021 to ensure compliance of the guidelines.
6. It is humbly submitted that the officials of CPCB, Regional Directorate-Chennai, inspected M/s. Escientia Advanced Sciences Private Limited located at Atchutapuram in Anakapalli District, Andhra Pradesh on 26.09.2024. The copy of the CPCB report is annexed as **Annexure-I.**
7. The major observations of the CPCB on the compliance status of the industry with reference to consent issued under the Water and the Air Acts, Authorization under the HWM Rules, 2016, damage to the environment and individuals in the accident and compensation paid to the victims'/family members of victims are summarized below:



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I. Major observations:

1. M/s. Escientia Advanced Sciences Private Limited is a pharmaceutical industry located in AP Special Economic Zone (SEZ) at Atchutapuram, Anakapalli District, Andhra Pradesh. It is established in the year 2018 and engaged in manufacture of Bulk drug and intermediates since April, 2019. The industry has a valid Consent For Operation (CFO) issued on 25.05.2024 by APPCB for production of 10 products of total capacity 2600 kg/day and 2 byproducts of capacity 453.7 kg/day, valid till 31.12.2028.
2. An explosion causing a massive fire due to leakage of Methyl Tertiary Butyl Ether (MTBE) solvent during manufacture of Rimegepant Sulphate was reported to have occurred on 21.08.2024 around 02:15 PM causing death of 17 employees and 39 employees were injured in the accident.
3. It was reported that on 21.08.2024 between 2.00 PM to 02:15 PM, 200 Liters of MTBE solvent was leaked from the flange joint of pipeline at 1st floor while transferring the solvent from the receiver tank located in 2nd floor to the bulk storage tank located in ground floor. The leaked solvent fell directly on the electrical panel located in the ground floor through cut open in the floors made for laying pipelines and electrical cables leading to the blast of electric panel. The MTBE vapors accumulated in the Air Handling Unit duct in the ground floor caught spark and high intensity explosion and fire took place in the ground floor leading to collapse of internal walls and deformation of columns. Due to sudden explosion and fire and resultant damages, many workers present in the Industry got trapped in the fire, smoke and debris of collapsed walls, piping, ducting and fallen equipment.
4. During the inspection it was observed that the Industry has obtained CFO for production of Rimegepant Sulphate (210 kg/day) and its byproduct Triethylamine HCl (312.7 kg/day) on 25.05.2024 and the accident occurred on 21.08.2024 during manufacture of Rimegepant Sulphate bulk drug intermediate.



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II. Non- Compliance to the Conditions of CFO

On the day of inspection, the Industry was under complete shutdown. The compliance to the consent conditions were verified based on the records furnished by the Industry. The major non-compliance to consent conditions observed are as below:

1. The Industry conducted Hazard Analysis and Risk Assessment in the year 2022, but manufacture of Rimegepant Sulphate was not included in the study for hazard and Risk assessment.
2. In the status of compliance of Hazard Analysis and Risk Assessment (HARA) carried out in Year 2022, it is observed that Factories Department has recommended the Industry to immediately revise the Hazard Analysis and Risk Assessment report as it has not covered risk assessment of 15 numbers of products/intermediates of the products.
3. The Occupational Health and Safety Audit for the year 2023 was conducted and the Annual Safety Audit was due to be conducted before the accident on 21.08.2024.
4. In the report of Safety Audit conducted on 05.07.2023, recommendation was made to provide exhaust fans at main PCC, MCC, ETP MCC & Production block electrical panels area for appropriate ventilation. The details of corrective action taken to provide appropriate ventilation are not available. The extent of fire and explosion due to flammable solvents is dependent on ventilation and lack of ventilation might be one of the reasons for the Accident to become fatal.
5. The Industry informed that leak detectors were not available for the pipeline and flange where leakage of solvent occurred leading to the accident.
6. The Industry informed that the LEL sensors with alarm system and oxygen/VOC detector with hooter were installed only at process area, but no sensors and leakage detection were installed in the technical area and electrical panel area.



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7. Only one VOC meter was installed in the Industry, at Northern side ground floor, which is not sufficient for measuring VOC concentrations in other locations and floors. As there were no adequate VOC meters installed in the Industry including 1st floor and ground floor southern area, accumulation of VOC was not detected. Installation of VOC sensors with alarm system in the technical area might have alerted employees of possible high VOC concentration.
8. The Standard Operating Procedure for conducting Pressure test and Leak test for pipelines was prepared on 05.12.2024. Before the accident, there was no SOP for Pressure test and Leak test for finding out defects in pipelines and joints.
9. Pressure test and Leak test for pipelines were not conducted periodically.
10. The industry has not provided hoods on top of effluent storage tanks and connected to the vents to scrubbers.

III. Loss of life and status of award of compensation

It is reported that in the accident occurred on 21.08.2024, a total of 56 employees were injured, out of this 17 employees suffered fatal injuries and got deceased. The remaining 39 employees with major and minor injuries were hospitalized. The Industry informed that the management of M/s. Escientia Advanced Sciences Private Limited has paid compensation of Rupees One Crore each for 17 deceased employees' families, Rupees 50 Lakhs each to 21 injured employees with major injuries and Rupees 25 Lakhs each to 18 minor injured employees.

1. Estimation of compensation for deceased

- i. To ascertain the adequacy of compensation paid to the family members of deceased employees, the compensation are estimated using following two methods:
 - a. As per the Order and Judgements of Hon'ble Supreme Court of India in the Judgment dated 16.08.2019 in Civil Appeal No. 6339 of 2019 in the matter of Sunita Tokas vs New India Insurance Co. Ltd; the Judgement dated



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31.10.2017 in SLP(C) No. 25590 of 2014 in the matter of Pranay Sethi vs National Insurance Co. Ltd; Order dated 15.04.2009 of Hon'ble Supreme Court of India in Civil Appeal No. 3483 of 2008 in the matter of Smt. Sarla Verma vs Delhi Transport Corporation.

- b. As per the Employee's Compensation Act, 1923 as amended through EC(Amendment) Act, 2017
- ii. The amount of compensation calculated based on methods described in the Orders and Judgements of the Hon'ble Supreme Court and the Employee's Compensation Act, 1923 as amended through EC(Amendment) Act, 2017 are compared with the compensation of Rupees One Crore each fixed by the Industry to the families of 17 number of deceased employees are compared.
- iii. The highest amount among the compensations assessed based on above two methods and the amount fixed by the Industry on individual bases, is recommended as compensation to be paid by the Industry to the individual victims' family. The details of compensation estimated are furnished in the CPCB report enclosed at Annexure – I.
- iv. On comparison, it is observed that the Compensation of Rupees One Crore each fixed to the family of 16 number of deceased employees are found to be adequate. The compensation calculated for **Sh Rami Reddy Neelapu**, Associate General Manager / Associate Director based on EC(Amendment) Act, 2017 is **Rs 1,58,39,302/- (Rupees One Crore Fifty Eight Lakhs Thirty Nine Thousand Three Hundred and Two)**. The Industry informed that it has paid Rupees One Crore as compensation to the family of Sh Rami Reddy Neelapu. Accordingly, the additional compensation of **Rs 58,39,302/- (Rupees Fifty Eight Lakhs Thirty Nine Thousand Three Hundred and Two)** is to be paid to the family of Sh Rami Reddy Neelapu.

2. Compensation for injured employees

The Industry informed that it has paid a compensation of Rupees Fifty Lakhs to the persons with major injuries (21 Nos.) and Rupees Twenty Five Lakhs to the persons with minor injuries (18 Nos.). The adequacy of the Compensation paid to the injured



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employees is assessed as per the Hon'ble NGT Order dated 16.01.2023 in case of O.A. No. 66 of 2022 (PB) and Order dated 11.04.2023 in case of O.A. No. 251/2023 (PB). In both the cases, the Hon'ble NGT has directed that compensation payable is Rs.10 Lakhs to the persons injured due to explosion of firecrackers. Thus, the Compensation fixed by M/s. Escientia Advanced Sciences Private Limited to the injured persons are found to be adequate.

IV. Environmental damages due to accident:

a. Damage to Water Environment:

As per the Action Taken Report furnished by APPCB, during firefighting operations, the Industry used 150 KL of water and 1 KL of foam for controlling fire. The monitoring results of wastewater generated from firefighting shows that Chemicals Oxygen Demand was 336 mg/L and 320mg/L; and Total Dissolved Solids was 1428 mg/L and 1352 mg/L. This shows that the wastewater generated during firefighting operation was LTDS effluent.

The Industry representatives informed that the wastewater generated during firefighting was collected in the rainwater runoff collection tank through storm water drains and 100 KL of wastewater was sent to CETP as LTDS effluent for treatment and disposal in September 2024. As the Industry has disposed firefighting LTDS effluent to the CETP, no major environmental damage was caused.

b. Damage to Air quality:

As per the information furnished by the Industry, on the day of accident, the concentration of VOC in the Production block during 10.00 hrs to 14.00 hrs was in the range 0.82 to 0.90 ppm with average concentration of 0.86 ppm, prior to the accident.

As per the Action taken report furnished by APPCB, VOC monitoring in ambient air after the accident was carried out by APPCB within and outside the Industry premises from 21.08.2024, 15.00 hrs to 22.08.2024, 12.30 hrs. The average concentration of VOC near the production block was 0.32 ppm with a range of 0.1 to 0.8 ppm. The maximum VOC concentration was 0.8 ppm near production block at



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15.00 hrs on 21.08.2024. Subsequently from 16.00 hrs, VOC concentration near the production block was reduced and during 21.08.2024, 22.30 hrs to 22.08.2024, 02.0 hrs VOC was in the range 0.1 to 0.3 ppm.

The VOC monitoring in the ambient air carried out by APPCB near the security back gate (East), Security main gate (North), drum storage area (West) and Laurus unit -2 Road (South) shows that on 21.08.2024, 15 hr, VOC concentration near Security main gate (North) was 0.3 – 0.6 ppm and drum storage area (West) was 0.1 – 0.2 ppm.

The VOC concentration at Security main gate (North) gradually reduced and reached concentration of 0.1 – 0.2 ppm at 21.00 hrs on 21.08.2024. At remaining locations, namely, security back gate (East), drum storage area (West) and Laurus unit -2 Road (South), VOC levels in ambient air were Below Detectable Limit since 21.08.2024, 18.00 hrs onwards.

The Particulate Matter data is not available for the period of accident as there were no Continuous Ambient Air Quality Monitoring Stations in the Industry premises.

c. Status of hazardous waste generated and its disposal:

It is informed by the Industry that 410 Liters of MTBE was recovered from the Receiver after the accident and sent to TSDF on 23.10.2024, after taking required clearance from the Insurance agency. 1500 Liters of Reaction mass including 1210 Liters of MTBE was recovered from the Reactor after the accident and stored in the Hazardous Waste Storage area of the Industry and it was reported that the same will be sent to TSDF after getting clearance from the Insurance agency.

V. Conclusion

- i. On 21.08.2024, a fire accident in the production block of M/s. Escientia Advanced Sciences Private Limited, occurred due to leakage of MTBE solvent from the flange joint of the pipeline during the manufacturing of Rimegepant sulphate, for which CFE was obtained on 23.04.2024 and CFO on 25.05.2024.



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- ii. The delay in conducting annual safety audit, manufacturing of Rimegepant sulphate without its inclusion in the HARA study, absence of a Standard Operating Procedure for conducting pressure and leak tests of pipelines and lack of periodic pipeline testing were the primary causes of the accident. In addition, improper ventilation system, lack of leak detectors in pipelines, absence of sensors and leak detectors in technical and electrical panel areas to alert the personnel and inadequate number of VOC meters further contributed to the severity of accident.
- iii. During the accident, 17 people were deceased and 39 people were injured. The management of the Industry informed that it has paid compensation of Rupees One Crore each for 17 deceased employees' families, Rupees Fifty Lakhs each to 21 employees with major injuries and Rupees Twenty Five Lakhs each to 18 employees with minor injuries.
- iv. The adequacy of compensation paid to deceased employees is assessed as per the Hon'ble Supreme Court of India Judgment in Civil Appeal No. 6339 of 2019, SLP(C) No. 25590 of 2014 and Civil Appeal No. 3483 of 2008 and the Employee's Compensation Act, 1923 as amended through EC(Amendment) Act, 2017. Based on calculations, the compensation mentioned as paid by the Industry to the families of 16 deceased employees are found to be adequate.
- v. The compensation calculate for **Sh Rami Reddy Neelapu**, based on EC(Amendment) Act, 2017, is Rs 1,58,39,302/- (Rupees One Crore Fifty Eight Lakhs Thirty Nine Thousand Three Hundred and Two). Therefore, an additional compensation of **Rs 58,39,302/-** (Rupees Fifty Eight Lakhs Thirty Nine Thousand Three Hundred and Two only) is to be paid by the Industry to the family of deceased Late **Sh. Rami Reddy Neelapu**.
- vi. The adequacy of compensation paid to injured employees is assessed as per Hon'ble NGT Order dated 16.01.2023 in case of O.A. No. 66 of 2022 (PB) and Order dated 11.04.2023 in case of O.A. No. 251/2023 (PB). Based on this, the compensation mentioned as paid by the Industry for the injured employees are found to be adequate.



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- vii. The Industry representatives informed that the effluent generated during fire extinguish was collected and sent to CETP as LTDS effluent for treatment and disposal in September 2024. As the Industry has disposed firefighting LTDS effluent to the CETP, no major environmental damage was caused.
- viii. As per the information furnished by the Industry, on the day of accident, the concentration of VOC in the production block was in the range 0.82 to 0.90 ppm with average concentration of 0.86 ppm. APPCB carried out VOC monitoring after the accident and the average concentration of VOC near the production block was 0.32 ppm with a range of 0.1 to 0.8 ppm with maximum VOC of 0.8 ppm near production block at 15.00 hrs on 21.08.2024. VOC concentrations outside the premises were in the range of Below Detectable Level to 0.4 ppm.
- ix. 1500 Litres of Reaction mass including 1210 Litres of MTBE stored in the hazardous waste storage area in the Industry premises shall be disposed as per the provisions of the Hazardous Waste Management Rules, 2026 as Amended.
8. That, in light of the above submission, it is respectfully submitted that this Answering Respondent, i.e. CPCB shall abide by any order(s) or direction(s) passed by this Hon'ble Tribunal in the instant OA.

Dated at Chennai on this the 6th day of January, 2025.




Counsel for the 1st Respondent



RESPONDENT NO. 1,
CENTRAL POLLUTION CONTROL BOARD (CPCB)

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with

CPCB

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.....Respondent(s)

AFFIDAVIT

I, H. D. Varalaxmi, D/o Shri H.S. Devaiah, Hindu, aged about 55 years currently working as Scientist ‘E’ in Central Pollution Control Board, Regional Directorate- Chennai, 2nd Floor, 40-E, BSNL Building, TVK Industrial Estate, CIPET Road, Guindy, Chennai – 600 032, do hereby solemnly affirm, declare on oath and sincerely state as under: -

1. That the deponent is authorized representative to represent the Respondent CPCB in the present case, and as such, I am well conversant with the facts and circumstances of the present case on the basis of the information derived from the official records, and hence, I am competent and authorized to verify, sign and swear this affidavit on behalf of the Respondent CPCB.
2. That the accompanying reply may be read part and parcel of the present affidavit as I am competent to swear this affidavit.
3. That the accompanying reply has been drafted and filed under my instructions and authority the contents thereof are true and correct on the basis of the record maintained during ordinary course of business of CPCB

and available records and documents and the contents of the same are read over and explained to me and are not repeated herein for the sake of brevity.



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DEPONENT

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VERIFICATION

Verified at Chennai on this day of 6th day of January, 2025 that the contents of the above reply are correct and true on the basis of the record of the cases as mentioned in the day to day affairs of the CPCB. Nothing has been concealed therefrom or mis-stated.

Verified at New Delhi on this the 4th day of January, 2025.

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REPORT OF CENTRAL POLLUTION CONTROL BOARD (CPCB) IN THE MATTER OF ORIGINAL APPLICATION NO. 1097/2024 (SUO MOTU) IN THE HON'BLE NATIONAL GREEN TRIBUNAL, PRINCIPAL BENCH, DELHI AND RENUMBERED AS ORIGINAL APPLICATION NO. 279/2024 IN THE HON'BLE NATIONAL GREEN TRIBUNAL, SOUTHERN ZONE, CHENNAI IN COMPLIANCE TO THE ORDER DATED 22.08.2024

1.0 Preamble

The news item titled “17 killed 20 injured in reactor blast at pharma company in Andhra Pradesh’s Anakapalli” appeared in The Hindu dated 22.08.2024. The news item was related to the death of 17 workers and injuries caused to 20 others due to eruption of a major fire reportedly after a reactor blast in M/s Escientia Advanced Sciences Private Ltd., a pharmaceutical company located in the Special Economic Zone at Atchutapuram in Anakapalli District of Andhra Pradesh.

2.0 Order of the Hon’ble NGT dated 22.08.2024

The Hon’ble National Green Tribunal (Principal Bench, New Delhi) had registered a Suo Motu case Original Application No. 1097 of 2024 based on a news item published in The Hindu dated 22.08.2024 titled “17 killed 20 injured in reactor blast at pharma company in Andhra Pradesh’s Anakapalli” and directed the following in the order dated 22.08.2024:

“3. The Tribunal has passed orders in order dated 01.06.2020 in OA No. 73/2020, order dated 31.08.2021 in OA No. 79/2021, order dated 21.09.2022 in OA 284/2022 with OA 45/2022 (SZ), order dated 18.01.2023 in OA 448/2022 and order dated 28.02.2023 in OA No. 111/2023 in cases relating to industrial accidents forming Committees to find out the cause of accidents and take remedial actions and further directing payment of compensation to the victims. In the present case, it is required to be ascertained if the unit was complying with environmental norms and if compensation to the victims/family member of victims has been paid.”

Further, Central Pollution Control Board was impleaded as Respondent -1 and directed the following:

“ 7. Issue notice to the above respondents for filing their response/reply by way of affidavit before the Southern Zonal Bench of the Tribunal at least one week before the next date of

hearing. If any of the respondents directly files the reply without routing it through his advocate then the said respondent will remain virtually present to assist the Tribunal.”

The copy of the Hon’ble NGT order dated 22.08.2024 is enclosed as Annexure - 1.

The case was transferred to Hon’ble National Green Tribunal, Southern Zone, Chennai and was renumbered as Original Application No. 279 of 2024 (SZ).

3.0 Guidelines and Inspection by CPCB

3.1 CPCB Guidelines under MSIHC Rules 1989

Central Pollution Control Board has prepared a guideline on “Integrated Guidance Framework for Chemicals Safety in Respect of the Isolated Storages and Industries” Covered Under Manufacture, Storage and Import of Hazardous Chemicals (MSIHC) Rules, 1989 and has circulated to all SPCBs/PCCs on 24.12.2021 to ensure compliance of guidelines. The copy of letter dated 24.12.2021 and guidelines are enclosed as Annexure – 2.

3.2 Inspection by CPCB and Scope of Inspection

In compliance with the Hon’ble NGT Order dated 22.08.2024, a team of following officials from CPCB, Regional Directorate, Chennai inspected M/s. Escientia Advanced Sciences Private Limited, Achutapuram, Anakapalli District, Andhra Pradesh on 26.09.2024 in presence of Assistant General Manager , EHS of the Industry:

1. Smt. H. D. Varalaxmi, Regional Director
2. Smt. Sowmya D, Scientist E
3. Smt. Budigi Reddy Soni, Scientist B

The site visit was carried out with the mandate to inspect the site in question and vested with following scope as per the Order dated 22.08.2024:

1. To verify the compliance status of the Industry with reference to consents issued under the Water and the Air Acts, Authorization under the Hazardous & other Wastes (Management and Transboundary Movement) Rules, 2016
2. To ascertain damage to the environment and individuals in the accident dated 21.08.2024 and compensation paid to the victims’/family members of victims.

4.0 General Information of M/s. Escientia Advanced Sciences Private Limited

M/s. Escientia Advanced Sciences Private Limited is located at Plot No. 11, 11A, 12 & 12A, APSEZ, Atchutapuram & Rambilli (M), Anakapalli District, Andhra Pradesh in an area of 40 acres. The Industry is located in AP Special Economic Zone (SEZ) at Atchutapuram established by Andhra Pradesh Industrial Infrastructure Corporation Limited (APIICL). It is a pharmaceutical Industry established in the year 2018 and engaged in manufacture of Bulk drug and intermediates since April, 2019. Total number of employees working in the Industry are 490, out of this 320 are permanent employees and 170 are contract workers.

5.0 Details of the Accident

The CPCB through letter dated 22.08.2024 requested APPCB to furnish the report of the accident occurred at M/s. Escientia Advanced Sciences Private Limited on 21.08.2024 and take necessary actions to sample/monitor environmental pollutants and contain discharge/emissions caused due to the accident. The copy of the letter dated 22.08.2024 is enclosed at Annexure - 3. The copy of Form 18 dated 22.08.2024 furnished by the Industry is enclosed at Annexure - 4. Based on the report furnished by APPCB, Form -18 and information furnished by the Industry representatives during the inspection, the sequence of the accident is as follow:

- The Industry has one production block consisting of 3 floors. Each floor is divided into 4 suites. Suit – 1, Suit – 2 and Southern technical area are in the southern side of the floor and Suit – 3, Suit – 4 and Northern technical area are in the northern side.
- On 21.08.2024, a batch of FCP-3, the stage -3 intermediate for the final API namely BHV 3000 (Rimegepant Sulphate), was processed in the Reactor R-2220 located in 2nd floor, Suit - 2 of Production block.
- During this process, 1820 Liters of a solvent Methyl Tertiary Butyl Ether (MTBE) was taken into the Reactor R-2220. After the reaction process, MTBE solvent was distilled in distillation column.
- The distilled MTBE was being collected into the Receiver tank VR-2225 located at 2nd floor of Suite-2 and further transferred to a bulk Storage tank located in ground floor, outside the plant. The nitrogen pressure was applied for transfer of solvent.
- At around 2:00 PM on 21.08.2024, at the time of beginning of 2nd shift of the day, MTBE was getting transferred from the Receiver tank to the Storage tank through

a dedicated 1½-inch diameter stainless steel pipeline connecting both the tanks from second floor to ground floor passing via first floor.

- During that time, leakage occurred from the flange joint of the pipeline carrying MTBE in the first floor, adjoining southern wall of the production block. The leaked solvent started falling on first and ground floors through a wide cut opening made for laying pipe lines and electrical cables along the southern wall in all floors.
- The staff noticed the leakage and immediately the bottom valve of the receiver was closed and Nitrogen supply to the receiver was stopped, to prevent further leakage.
- The leaked solvent fell directly on the electrical panel located in the ground floor near southern technical area next to Suit – 2.
- Meanwhile MTBE solvent vapours were collected in the electric panel room and Air Handling Unit (AHU) installed in the ground floor. The solvent vapors were sucked into entire air handling unit duct system in the first and ground floor and vapour cloud was formed.
- At that time around 2:15 PM, when the leaked solvent fell on the electric panel board, the board got blasted and MTBE vapors accumulated in the AHU duct in the ground floor caught spark and loud explosion followed by fire took place on the ground floor near the technical area and electrical panel section.
- Due to high intensity explosion and fire, many beams and columns got bent/damaged/deformed and false ceiling and internal walls collapsed and fell down on the ground floor.
- Due to sudden explosion & fire and resultant damages, many workers present in the Industry got trapped in the fire, smoke and debris of collapsed walls, piping, ducting and fallen equipment.
- Hearing the explosion, other employees of the Industry rushed to the site, started firefighting and evacuation of people trapped inside the Industry.
- The fire brigade and additional fire tender from neighboring factories arrived at the site and joined in fire-fighting operation. The entire rescue operation was continued till 06:00 PM in the evening of 21.08.2024.
- A total of 56 employees were injured in the accident, out of which 17 employees suffered fatal injuries and deceased, the remaining 39 employees were hospitalized.

The layout of the ground floor with location of explosion, major affected areas and location of deceased as furnished by the Industry are as in Figure 1, 2 and 3.

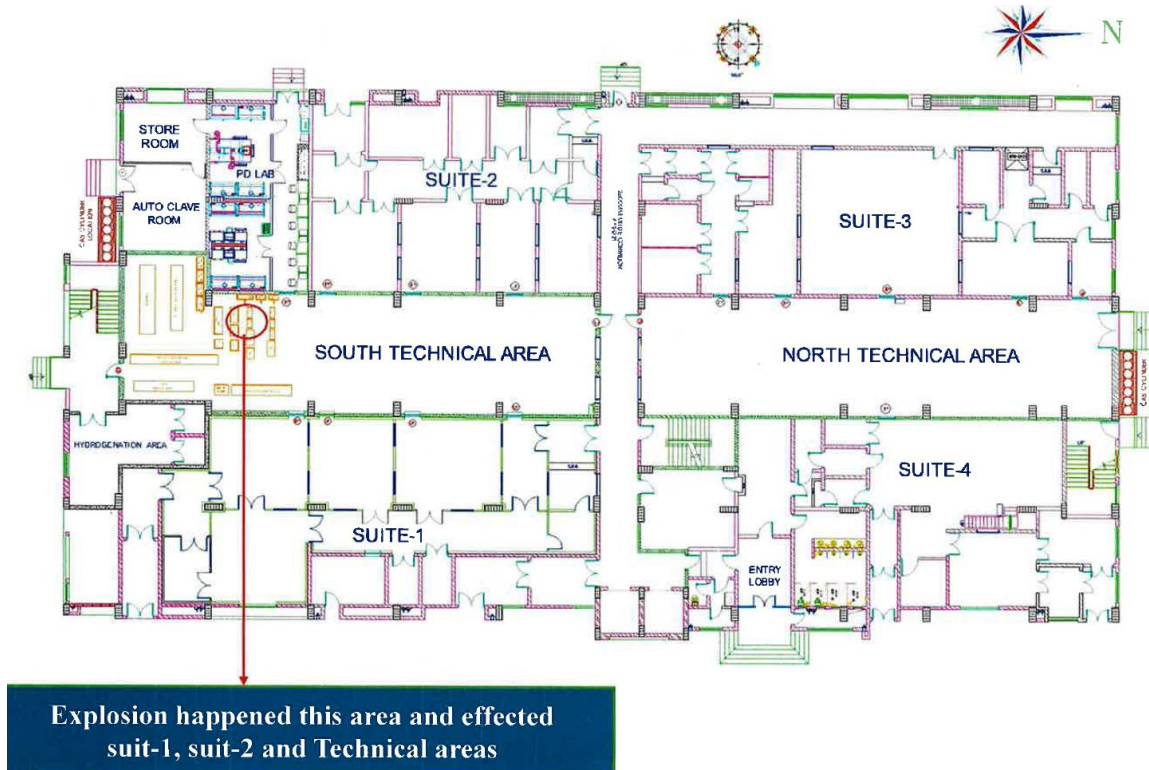


Figure 1: Layout of ground floor with location of explosion

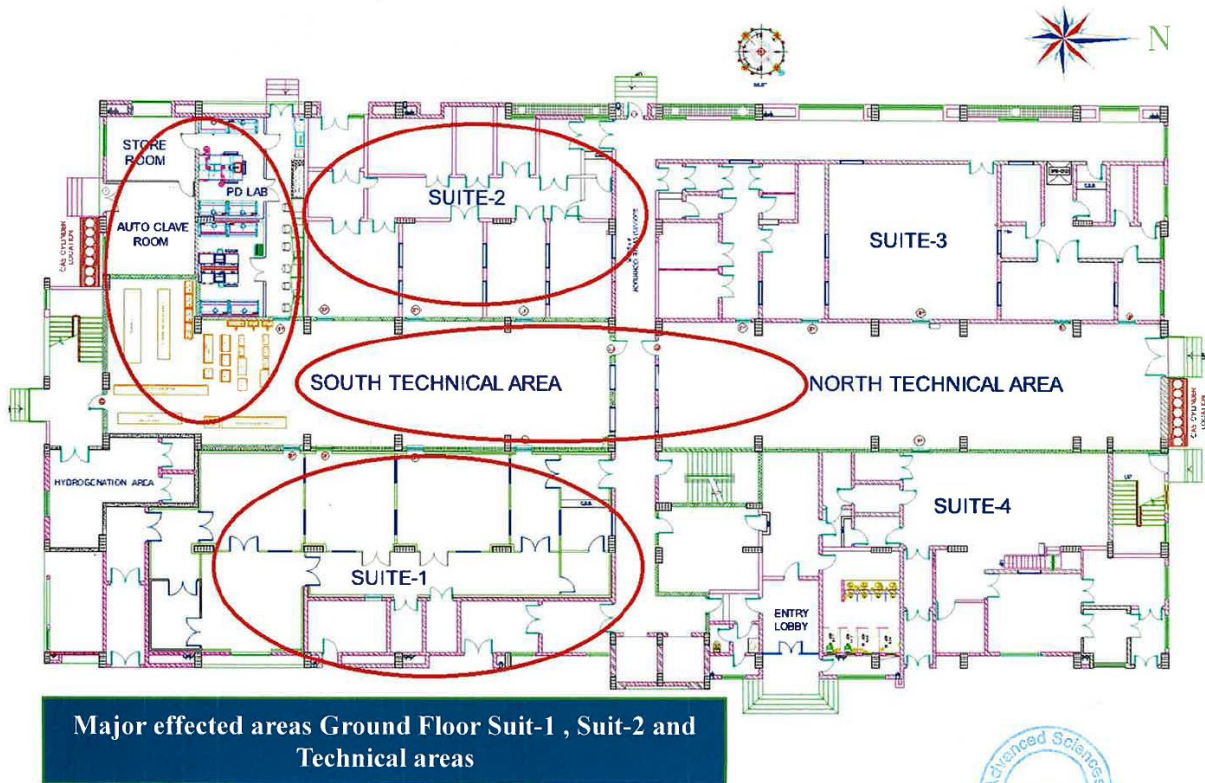


Figure 2: Layout of ground floor with location of major affected area

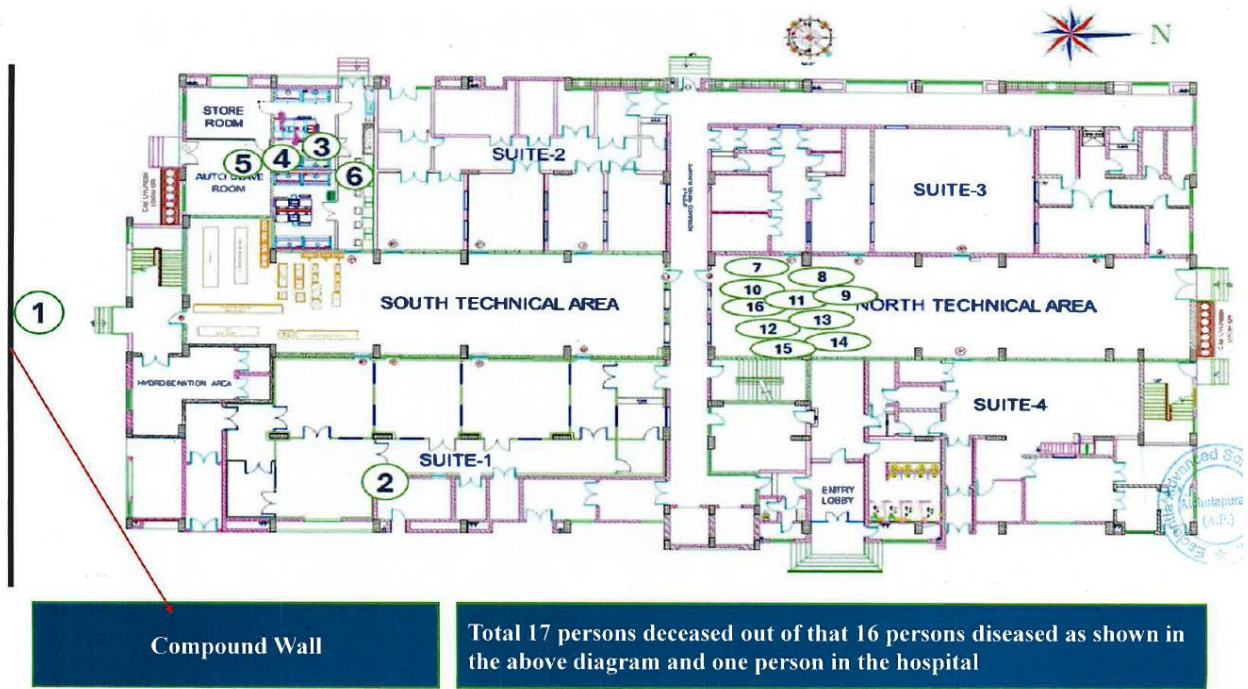


Figure 3: Layout of ground floor with location of deceased

The photographs of accident locations taken during the inspection are in Figure 4 to 10.

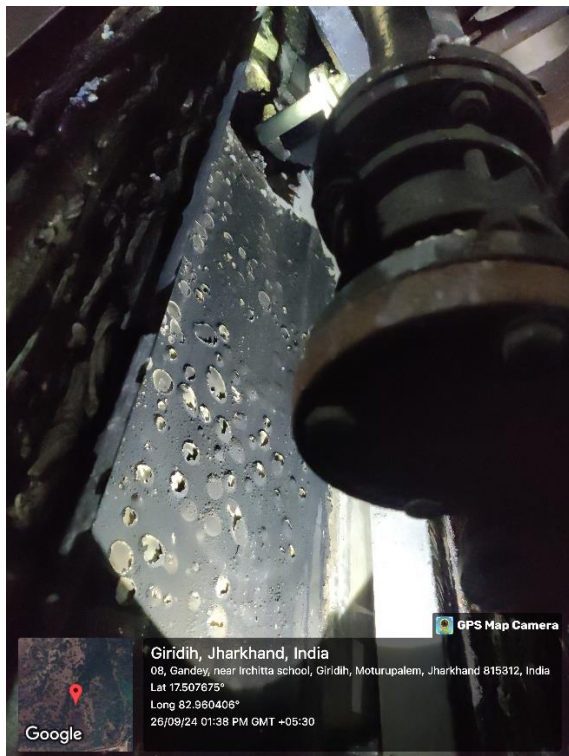


Figure 4: Cutout made for pipeline in first floor

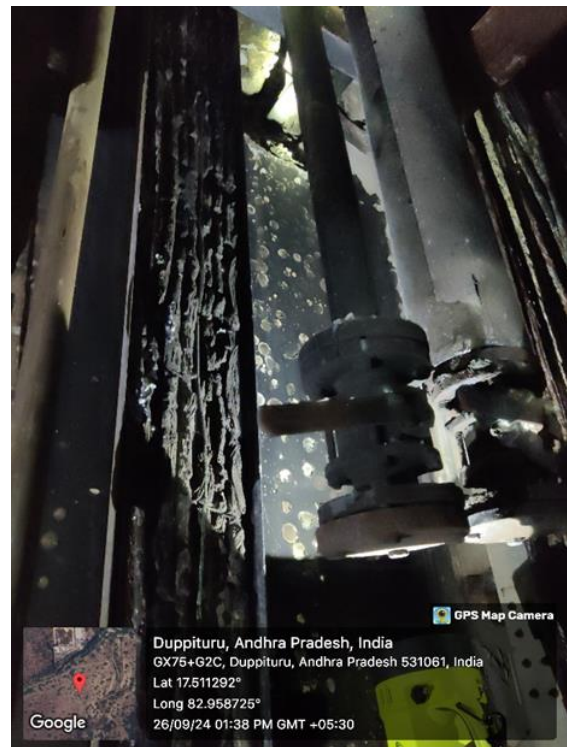


Figure 5: Corroded pipelines after the accident



Figure 6 & 8: Inside the API Building after the Accident



Figure 7 & 10: Outside the API Building after the Accident

6.0 Status of compliance of consent conditions issued under the Water and the Air Acts, Authorization under the HWM Rules, 2016

6.1 Details of Consents and Clearances

The details of Consents and Clearances obtained by the Industry from MoEF&CC, SEIAA-AP and APPCB are furnished in Table 1 and 2.

Table 1: Details of Consents and Clearances obtained by the Industry from MoEF&CC, SEIAA-AP and APPCB

Document No.	Permissions obtained by the Industry																								
F.No.21-379/2007-IA.III dated 13.02.2012	Environment Clearance (EC) was issued by MoEC&CC to M/s Andhra Pradesh Industrial Infrastructure Corporation Ltd for establishing Multiproduct Andhra Pradesh SEZ at Achutapuram and Rambilli Mandals, Vishakhapatnam and CRZ Clearance for laying Marine disposal pipeline by APIIC.																								
327/PCB/CFE/RO-VSP/HO/2014 dated 07.02.2014	Consent for Establishment (CFE) issued by APPCB to M/s Escientia Advanced Sciences Private Ltd (Annexure – 5)																								
327/APPCB/CFE/RO-VSP/HO/2014 dated 25.02.2018	Amendment to the CFE Order dated 07.02.2014 with respect to water consumption, waste water generation, disposal and solid waste generation, boiler capacities issued by APPCB to M/s Escientia Advanced Sciences Private Ltd																								
APPCB/VSP/VSP/327/HO/CFO/2018 dated 28.02.2018. Valid till 31.12.2018	Consent For Operation (CFO) & HW Authorization by APPCB to M/s Escientia Advanced Sciences Private Ltd for manufacturing the following products and by-products: <table border="1" data-bbox="587 1574 1489 2022"> <thead> <tr> <th>Sl.</th> <th>Name of the Product</th> <th>Quantity (kg/day)</th> </tr> </thead> <tbody> <tr> <td>1.</td> <td>Atazanavir Sulphate</td> <td>300</td> </tr> <tr> <td>2.</td> <td>Darunavir Ethanolate</td> <td>300</td> </tr> <tr> <td>3.</td> <td>Donepezil Hydrochloride</td> <td>300</td> </tr> <tr> <td>4.</td> <td>Febuxostat</td> <td>300</td> </tr> <tr> <td>5.</td> <td>Fexofenadine Hydrochloride</td> <td>300</td> </tr> <tr> <td>6.</td> <td>Glipizide</td> <td>300</td> </tr> <tr> <td>7.</td> <td>Lanzoprazole</td> <td>300</td> </tr> </tbody> </table>	Sl.	Name of the Product	Quantity (kg/day)	1.	Atazanavir Sulphate	300	2.	Darunavir Ethanolate	300	3.	Donepezil Hydrochloride	300	4.	Febuxostat	300	5.	Fexofenadine Hydrochloride	300	6.	Glipizide	300	7.	Lanzoprazole	300
Sl.	Name of the Product	Quantity (kg/day)																							
1.	Atazanavir Sulphate	300																							
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3.	Donepezil Hydrochloride	300																							
4.	Febuxostat	300																							
5.	Fexofenadine Hydrochloride	300																							
6.	Glipizide	300																							
7.	Lanzoprazole	300																							

	8.	Levetiracetam	400	
	9.	R&D/ Custom Synthesis Products	100	
	Total		2600 kg/day	
	S. No.	Product	By-Product	Quantity (kg/day)
	1.	Atazanavir Sulphate	Triethylamine HCl	312.7
	2.	Glipizide	Triethylamine HCl	141.0
	Total			453.7 kg/day
APPCB/VSP/VSP/327 /CFO/HO/2018 dated 25.12.2018 Valid till 31.12.2023	Auto renewal of Consent For Operation and Hazardous Waste Authorization by APPCB to M/s Escientia Advanced Sciences Private Ltd.			
APPCB/VSP/VSP/327 /HO/CTO/2018 dated 09.01.2024 Valid till 31.12.2028	Renewal of CFO & HW Authorization issued by APPCB for manufacturing the following products and by-products (Annexure -6):			
	Sl	Name of the Product	Quantity (kg/day)	
	1.	Atazanavir Sulphate	300	
	2.	Darunavir Ethanolate	300	
	3.	Donepezil Hydrochloride	300	
	4.	Febuxostat	300	
	5.	Fexofenadine Hydrochloride	300	
	6.	Glipizide	300	
	7.	Lanzoprazole	300	
	8.	Levetiracetam	400	
	9.	R&D/ Custom Synthesis Products	100	
	Total			2600
	Sl	Product	By-Product	Quantity (kg/day)
	1.	Atazanavir Sulphate	Triethylamine HCl	312.7
	2.	Glipizide	Triethylamine HCl	141.0
	Total			453.7

<p>327/APPCB/CTE/RO-VSP/HO/2014 dated 23.04.2024</p> <p>Valid till 23.04.2031</p>	<p>CTE for Change of Product Mix issued by APPCB to M/s Escientia Advanced Sciences Private Ltd by changing following product mix (Annexure - 7):</p> <ol style="list-style-type: none"> 1. Product mix and by-products removed from production list: <ol style="list-style-type: none"> i. Atazanavir Sulphate (300 kg/day) ii. Triethylamine HCl byproduct of Atazanavir Sulphate (312.7 kg/day) 2. Product mix and by-products newly added to production list: <ol style="list-style-type: none"> i. Rimegepant Sulphate (210 kg/day) ii. Zavegepant Hydrochloride (90 kg/day) iii. Triethylamine HCl byproduct of Rimegepant Sulphate (312.7 kg/day) 																																												
<p>APPCB/VSP/VSP/418 /HO/CTO/2024 dated 25.05.2024</p> <p>Valid till 31.12.2028</p>	<p>Consent For Operation & HW Authorization Order for Change of Product Mix from APPCB to the Industry for manufacturing the following products and by-products (Annexure - 8):</p> <table border="1" data-bbox="587 1128 1477 1809"> <thead> <tr> <th>Sl</th> <th>Name of the Product</th> <th>Quantity (kg/day)</th> </tr> </thead> <tbody> <tr><td>1.</td><td>Darunavir Ethanolate</td><td>300</td></tr> <tr><td>2.</td><td>Donepezil Hydrochloride</td><td>300</td></tr> <tr><td>3.</td><td>Febuxostat</td><td>300</td></tr> <tr><td>4.</td><td>Fexofenadine Hydrochloride</td><td>300</td></tr> <tr><td>5.</td><td>Glipizide</td><td>300</td></tr> <tr><td>6.</td><td>Lanzoprazole</td><td>300</td></tr> <tr><td>7.</td><td>Levetiracetam</td><td>400</td></tr> <tr><td>8.</td><td>Rimegepant Sulphate</td><td>210</td></tr> <tr><td>9.</td><td>Zavegepant Hydrochloride</td><td>90</td></tr> <tr><td>10.</td><td>R&D/ Custom Synthesis Products</td><td>100</td></tr> <tr> <td colspan="2" style="text-align: right;">Total</td> <td>2600</td> </tr> </tbody> </table> <table border="1" data-bbox="587 1861 1477 2024"> <thead> <tr> <th>Sl.</th> <th>Product</th> <th>By-Product</th> <th>Quantity (kg/day)</th> </tr> </thead> <tbody> <tr> <td>1.</td> <td>Rimegepant Sulphate</td> <td>Triethylamine HCl</td> <td>312.6</td> </tr> </tbody> </table>	Sl	Name of the Product	Quantity (kg/day)	1.	Darunavir Ethanolate	300	2.	Donepezil Hydrochloride	300	3.	Febuxostat	300	4.	Fexofenadine Hydrochloride	300	5.	Glipizide	300	6.	Lanzoprazole	300	7.	Levetiracetam	400	8.	Rimegepant Sulphate	210	9.	Zavegepant Hydrochloride	90	10.	R&D/ Custom Synthesis Products	100	Total		2600	Sl.	Product	By-Product	Quantity (kg/day)	1.	Rimegepant Sulphate	Triethylamine HCl	312.6
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7.	Levetiracetam	400																																											
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Sl.	Product	By-Product	Quantity (kg/day)																																										
1.	Rimegepant Sulphate	Triethylamine HCl	312.6																																										

	2.	Glipizide	Triethylamine HCl	141.0
			Total	453.6

Table 2: Permissions/Licenses obtained by the Industry

Document No.	Licenses obtained by the Industry
Rc.No.339/MSB/ER/VSP/2016 dated 26.05.2017 Valid till one year from the date of issue	No Objection Certificate for Part Occupancy to Three Blocks of the existing Multi Storeyed building from A.P. State Disaster Response and Fire Services Department
License Number: 3/2018 dated 05.02.2018	License to work a factory
Rc.No.339/MSB/ER/VSP/2016 dated 25.04.2023 Valid till three years from the date of issue	Periodical Occupancy Renewal Certificate to existing building
S/SH/AP/03/1(S100439) dated 08.12.2021 Valid till 30.09.2025	PESO License for storage of Liquid Nitrogen gas in pressure vessels
G/SZ/AP/06/7287(G45274) dated 18.07.2024 Valid till 30.09.2025	PESO License to store compressed gas in Cylinders
P/HQ/AP/15/4098 (P369718) dated 06.08.2024 Valid till 31.12.2026	PESO License to import and store Petroleum
11303/14/2024-25 Valid till 01.04.2025	Boiler License

6.1.1 Status of latest consent for operation and product mix change

The Industry has obtained Consent for Operation & HW Authorization from APPCB vide Order No. APPCB/VSP/VSP/327/HO/CTO/2018 dated 09.01.2024 which is valid till 31.12.2028. The Industry had consent for production of 9 products of total capacity 2600 kg/day and 2 by products of capacity 453.7 kg/day.

The Industry applied for change of product mix and obtained CTE dated 23.04.2024 for production of Product mix and by-products by adding two new products namely Rimegepant Sulphate (210 kg/day) and its byproduct Triethylamine HCl (312.7 kg/day) and Zavegepant Hydrochloride (90 kg/day). Meanwhile, Atazanavir Sulphate (300 kg/day) and its byproduct Triethylamine HCl (312.7 kg/day) was removed from the production list.

Subsequently, the CFO dated 25.05.2024 valid till 31.12.2028 was issued by APPCB to the Industry for production of 10 products of total capacity 2600 kg/day and 2 by products of capacity 453.7 kg/day, including production of Rimegepant Sulphate (210 kg/day) and its byproduct Triethylamine HCl (312.7 kg/day) and Zavegepant Hydrochloride (90 kg/day).

The accident on 21.08.2024 occurred in the Industry during manufacture of Rimegepant Sulphate (RGP) bulk drug intermediate, which was newly included in the CFO dated 25.05.2024.

6.1.2 Present Compliance status of the Industry with reference to consent conditions under the Water and the Air Acts, Authorization under the HWM Rules, 2016

On the day of inspection, the Industry was under complete shutdown. The compliance to the consent conditions were verified based on the records maintained and furnished by the Industry. The Compliance status of the Industry with reference to consent conditions under the Water and the Air Acts, Authorization under HWM Rules are as detailed in Table 3.

Table 3: Compliance status of the Industry with reference to Consent and Authorization conditions

Sl	CTO Condition	Status of the Consent Conditions	Status of Compliance
1.	<p>Production Quantity:</p> <p>The Industry has consent for production of 10 products of total capacity 2600 kg/day and 2 by products of capacity 453.7 kg/day.</p>	<p>As per the production details furnished by the Industry, 9.48 TPA, 10.33 TPA and 10.87 TPA of products and byproducts are manufactured in the Industry during the Financial Years 2021 – 22, 2023-23 and 2023 – 24, respectively.</p> <p>Accordingly, the average daily production in the Industry during 2023- 24 was 30 kg/day and it is 1.15% of the consented production capacity.</p> <p>During the period April – August 20, 2024, Industry was operated at the production capacity 31.78 kg/day.</p>	<p>Complied</p> <p>The quantity of daily production is 31.78 kg/day and it is less than the consented production capacity.</p>
2.	<p>Water Consumption:</p> <p>The Industry is permitted to utilize water supplied from APIIC and total consumption shall not exceed 335.38</p>	<p>The raw water to the Industry is supplied by APIIC through pipeline for process, non-process and domestic use.</p>	<p>Complied</p> <p>The total quantity of water consumption in the Industry is 77 KLD and it is less than the quantity (335.38 KLD) permitted in the consent conditions.</p>

	<p>KLD with specific quantity at each process.</p> <p>The Separate meter with necessary pipeline shall be provided for assessing the quantity of water used for each of the purpose.</p>	<p>The flow meter is installed at pipeline connecting to raw water sump of capacity 1000 KL and records of meter reading are maintained.</p> <p>Separate flow meters are installed at water distribution lines of scrubber, boiler feed, cooling tower, DM plant, RO permeate (Process), domestic and gardening for quantifying process wise raw water consumption.</p> <p>As per the records furnished by the Industry, during the period January – July 2024, water utilized in the Industry is 99 KLD and details of are as follow:</p> <table border="1" data-bbox="814 948 1419 1336"> <thead> <tr> <th>Purpose</th> <th>Permitted Quantity (KLD)</th> <th>Quantity utilised (KLD)</th> </tr> </thead> <tbody> <tr> <td>Process</td> <td>82.38</td> <td rowspan="2">6</td> </tr> <tr> <td>Washing</td> <td>10.0</td> </tr> <tr> <td>Scrubbing</td> <td>15.0</td> <td>0.6</td> </tr> <tr> <td>Boiler feed</td> <td>45.0</td> <td>8.4</td> </tr> </tbody> </table>	Purpose	Permitted Quantity (KLD)	Quantity utilised (KLD)	Process	82.38	6	Washing	10.0	Scrubbing	15.0	0.6	Boiler feed	45.0	8.4	
Purpose	Permitted Quantity (KLD)	Quantity utilised (KLD)															
Process	82.38	6															
Washing	10.0																
Scrubbing	15.0	0.6															
Boiler feed	45.0	8.4															

		DM plant /Softener rejects	10.0	5.7																	
		Cooling Tower	145.0	59.7																	
		Domestic	15.0	10.9																	
		Gardening	13.0	7.9																	
		Total	335.38	99																	
3. i	<p>Effluent generation and treatment:</p> <p>The Industry is permitted to segregate HTDS and LTDS effluent streams and send the effluent to CETP of Atchutapuram Effluent Treatment Ltd (AETL) located at Atchutapuram.</p> <p>The Industry shall maintain proper manifest system for effluent transported to CETP and maintain the records of quantity of High TDS and Low TDS effluents sent to CETP of AETL.</p> <p>The LTDS and HTDS effluents shall be stored in above ground level collection tanks separately.</p>	<p>The Industry is segregating HTDS effluent generated from process, washing, scrubber, and LTDS effluent generated from boiler and cooling tower blowdown, DM water RO reject are stored in separate tanks.</p> <p>The storage capacity of HTDS effluent tanks are as follow:</p> <table border="1"> <thead> <tr> <th>Sl</th> <th>HTDS storage tanks</th> <th>Capacity in KL</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Collection sump</td> <td>10</td> </tr> <tr> <td>2</td> <td>Mixer Tank</td> <td>5</td> </tr> <tr> <td>3</td> <td>Holding Tank-I</td> <td>50</td> </tr> <tr> <td>4</td> <td>Holding Tank-II</td> <td>50</td> </tr> <tr> <td>5</td> <td>Holding Tank-III</td> <td>50</td> </tr> </tbody> </table> <p>The storage capacity of LTDS effluent tanks are as follow:</p>	Sl	HTDS storage tanks	Capacity in KL	1	Collection sump	10	2	Mixer Tank	5	3	Holding Tank-I	50	4	Holding Tank-II	50	5	Holding Tank-III	50	<p>Partially Complied</p> <p>The Industry complied the consent conditions of segregation, storage and sending the effluent to CETP for treatment.</p> <p>The Industry complied the conditions of installation of flowmeters and PTZ camera and connection to OCEMS portal, and records of effluent generated and sent to CETP are maintained.</p> <p>The Industry has not provide hoods on top of effluent storage tanks and connect the vents to scrubbers.</p>
Sl	HTDS storage tanks	Capacity in KL																			
1	Collection sump	10																			
2	Mixer Tank	5																			
3	Holding Tank-I	50																			
4	Holding Tank-II	50																			
5	Holding Tank-III	50																			

<p>The Industry shall provide hoods with scrubber and vent condensers on top of the effluent storage tanks.</p> <p>The Industry shall provide tank in tank system for effluent collection at production blocks. Free board shall be maintained in the tanks to prevent spillages</p>	Sl	LTDS storage tanks	Capacity in KL	<p>OCEMS data of flow meters are not available in CPCB RTDMS portal from 26.07.2024 till the date of accident, i.e., 21.08.2024.</p> <p>Verification of OCEMS data for HTDS and LTDS effluent for the period 01.06.2024 to 26.07.2024 indicates that flow meter data are not transmitted to CPCB RTDMS portal properly.</p>
	1	Equalization Tank-I	100	
	2	Equalization Tank-II	100	
	3	Final storage tank-I	50	
	4	Final storage tank-II	50	
	5	Final storage tank-III	50	
<p>After neutralization, HTDS and LTDS effluent are sent separately to Common Effluent Treatment Plant (CETP) of M/s Atchutapuram Effluent Treatment Ltd (AETL) located at Atchutapuram through tankers for treatment and disposal.</p> <p>The Industry has made an agreement with the M/s Atchutapuram Effluent Treatment Ltd, CETP on 14.12.2020 for sending segregated HTDS and LTDS effluent to CETP for treatment and disposal.</p> <p>Two flow meters and PTZ camera focusing flow meters are installed at outlet of HTDS and LTDS tanks to quantify the effluent sent to CETP through tankers.</p>				

		<p>The flowmeter and PTZ cameras are connected to Online Continuous Effluent Monitoring Systems (OCEMS) portals of CPCB and APPCB.</p> <p>The flow meters were calibrated on 03.07.2024 and due for next calibration on 02.10.2024.</p> <p>Verification of OCEMS data shows that flow meter data of HTDS and LTDS effluent are not available in CPCB RTDMS portal available from 27.07.2024 till the date of Accident, i.e., 21.08.2024.</p> <p>The manifestos and records of quantity of effluent sent to CETP for treatment are maintained.</p> <p>LTDS and HTDS effluent storage tanks are designed above ground.</p> <p>Hoods with scrubber and vent condensers on top of the effluent storage tanks are not provided.</p>	
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		Tank in tank system for effluent collection is provided in process area and float is provided at the tanks to avoid overflow and spillages.									
3. ii	<p>High TDS effluent:</p> <p>The Maximum Daily Discharge of HTDS & HCOD Effluents permitted as per CFO are as follow:</p> <table border="1"> <tr> <td>1. Process</td> <td>87.84 KLD</td> </tr> <tr> <td>2. Washing</td> <td>10.0 KLD</td> </tr> <tr> <td>3. Scrubbing water</td> <td>15.0 KLD</td> </tr> <tr> <td>Total</td> <td>112.84</td> </tr> </table>	1. Process	87.84 KLD	2. Washing	10.0 KLD	3. Scrubbing water	15.0 KLD	Total	112.84	<p>As per the records of flowmeter furnished by the Industry, during 01.06.2024 – 21.08.2024, total HTDS effluent generated is 311 KL with an average daily generation of 4.09 KLD (range 1KLD – 8 KLD). Total HTDS effluent discharged to CETP for treatment during the period was 220 KL.</p> <p>The average quantity of HTDS effluent generated (4.09 KLD) is less than the quantity (112.84 KLD) permitted in CFO.</p>	<p>Complied</p> <p>The quantity of effluent generated in the Industry and disposed to CETP is less than the consented capacity and complying.</p>
1. Process	87.84 KLD										
2. Washing	10.0 KLD										
3. Scrubbing water	15.0 KLD										
Total	112.84										
3. iii	<p>Low TDS effluent:</p> <p>The Maximum Daily Discharge of LTDS Effluent permitted as per CFO is 35.0 KLD</p>	<p>As per the records of flowmeter furnished by the Industry, during 01.06.2024 – 21.08.2024, total LTDS effluent generated is 1411 KL with an average 17.2 KLD (range 9 KLD – 24 KLD) was generated. Total LTDS effluent discharged to</p>	<p>Complied</p> <p>The quantity of LTDS effluent disposed by the Industry is within the consented capacity and complying.</p>								

		<p>CETP for treatment during the period was 1200 KL.</p> <p>The average quantity of LTDS effluent generated (17.2 KLD) is less than the quantity (35 KLD) permitted in CFO.</p>	
3. iv	<p>Domestic sewage:</p> <p>Maximum Daily Discharge of Domestic sewage – 13.0 KLD</p> <p>The over flow from the septic tank shall be sent to the CETP, Atchutapuram along with LTDS effluent through APEMC.</p>	<p>As per the information provided by the Industry, the domestic sewage disposed to the CETP along with LTDS effluent during the period March to August 2024 is 3 KLD.</p>	<p>Complied</p> <p>The quantity of domestic effluents disposed by the Industry along with LTDS effluent to CETP and it is within the consented capacity.</p>
4.	<p>Air Pollution Control</p> <p>Boiler: 3.5 TPH and 2.5 TPH Boilers</p> <p>Emission Standards: PM – 100 mg/Nm³</p>	<p>The Industry has two boilers of capacity 3.5 TPH and 2.5 TPH (stand by).</p> <p>The boilers are provided with stack of height 30 M.</p> <p>Diesel is used as fuel in the boilers.</p>	<p>Complying</p> <p>The Industry furnished a report of source emission monitoring carried out by third party laboratory on 14.08.2024 at stack attached to 3.5 TPH boiler. As per the report, PM concentration was 60.9 mg/Nm³ and it is less than the emission standards</p>

		As boiler was not in operation and source emission monitoring was not carried out during the inspection.	for PM (100) prescribed by APPCB in the consent.
5.	<p>Fugitive emissions and Odour Control</p> <p>The Industry shall implement the following:</p> <ol style="list-style-type: none"> i. Adequate measures to control all fugitive emissions from the plant. ii. Vent condensers to solvent storage tanks. iii. Multi stage scrubbers for scrubbing of process emissions. iv. Install online pH measuring facility with auto recording system at scrubber and connect to APPCB. v. VOC meter with auto recording facility and connect to APPCB website. 	<p>Closed loop (pipeline) transfer system for solvent, vent condensers/nitrogen blanketing systems provided to solvent storage tanks.</p> <p>Primary and secondary condensers are installed for reactors wherever solvent distillation are carried out.</p> <p>Vent condensers at solvent storage tanks are provided.</p> <p>Double stage scrubber with online pH measuring facility with auto recording system are installed and pH meter data is connected to APPCB website. pH meters were calibrated on 06.02.2024 and due to next calibration on 05.02.2025. The frequency of calibration is once a year.</p>	<p>Partially Complied</p> <p>The measures implemented for fugitive emission and odour control are complying the Consent conditions.</p> <p>Only one VOC meter was installed in the Industry at Northen side ground floor, which is not sufficient for measuring VOC concentrations in other locations and floors in the Industry. On the day of accident, leak occurred in 1st floor suite 2 and MTBE solvent vapours accumulated in the electrical panel room and technical area in southern area of the Industry. Since there were no</p>

		<p>One VOC meter installed near Northern side Production block ground floor and connected to APPCB website. As per the records available, during 15.08.2024 – 21.08.2024, the average concentration of VOC recorded is 0.79 $\mu\text{g}/\text{m}^3$ with as range 0.69 – 0.96 $\mu\text{g}/\text{m}^3$.</p> <p>The VOC meter was calibrated on 05.03.2024 and due to next calibration on 04.03.2025. The frequency of calibration is once a year.</p>	adequate VOC meters installed in the Industry, accumulation of VOC was not detected and alarms were not generated.
6.	<p>Hazardous Waste Generation and disposal</p> <p>The Industry shall provide containers detoxification facility and route container wash water to low TDS collection tank.</p> <p>The Industry is Authorized to dispose the hazardous waste generated through APEMC to TSDF/authorized recyclers depending on type of hazardous waste.</p>	<p>The container detoxification facility is installed in the Industry and container wash water is collected in LTDS tank and handed over to CETP for treatment.</p> <p>The quantity of hazardous waste generated during FY 2023- 24 as per the records maintained in the Industry are as follow:</p>	<p>Complied</p> <p>The hazardous waste generated in the Industry is less than the quantity permitted in the combined CFO and Authorization, stored separately in the sheds, dispose through APEMC to TSDF/authorized recyclers and records are maintained.</p>

HW Generated	Authorized Quantity	Quantity Generated
ETP Waste/Sludge	10 kg/day	0.7 kg/day
Used Oil	6 KL/Annum	0
Discarded containers	500 Nos/month	1640 Nos/month
Off spec material	250 kg/day	0
Distillation residues	NA	0
Spent Carbon	178.9 kg/day	32.757 kg/day
Process Inorganic waste	891.10 kg/day	47.91 kg/day
Process Organic waste	2778.9 kg/day	2.32 kg/day

The Industry is a member of M/s Coastal Waste Management Project, TSDF, Parawada for disposal of hazardous waste and membership certificate No: CWMP/VSP/EAS/496 is valid from 22.06.2024 to 21.06.2025.

The separate storage sheds are provided in the Industry premises for storage of hazardous waste separately.

		<p>Discarded containers after decontamination are handed over to Authorized Recyclers through Online Manifest system.</p> <p>ETP sludge, spent carbon and process inorganic and organic waste are handed over to Resustainability TSDF, Parawada.</p> <p>Manifestos and records of quantity of hazardous waste generated and disposed are maintained by the Industry. The quantity of hazardous waste generated are less than the quantity permitted in the combined CFO and Authorization.</p>	
7. i	<p>Assessments and Audits under Manufacture, Storage, and Import of Hazardous Chemicals (MSIHC) Rules, 1989</p> <p>The Industry shall prepare a safety report and carry out an independent safety audit report of the respective industrial activities associated with</p>	<p>The Industry informed that Occupational Health and Safety Audit (IS 14489) for the year 2023 was conducted by the external Auditor and a copy of health and safety audit report and compliance status was submitted to Factories Department vide letter dated 01.11.2023 (Annexure - 9).</p> <p>The copy of letter dated 05.03.2024 to APPCB about submission of annual safety audit report,</p>	<p>Partially Complied</p> <p>Annual Safety Audit was due to be conducted before the accident on 21.08.2024 as last audit was conducted on 05.07.2023.</p> <p>In the report of Safety Audit conducted on 05.07.2023, vide SI No. 28, recommendation was made to provide exhaust fans at main</p>

	such industrial activity as required under Rule 10 of MSIHC Rules, 1989	Onsite emergency Plan, Fire NOC, Hazard Analysis and Risk Assessment (HARA) report and safe handling of hazardous chemicals training sheets furnished by the Industry is enclosed as Annexure - 10.	PCC, MCC, ETP MCC & Production block electrical panels area for appropriate ventilation. As per the compliance status of the safety audit report submitted to Deputy Chief inspector of Factories vide letter dated 01.11.2023, the status was Open and target date for completion was 30.03.2024. The details of corrective action taken to provide appropriate ventilation are not available.
7.ii	The Industry shall carryout calibration of safety equipment and leak detection systems at regular intervals and shall certify the same with the Factories Department. That certified copy shall be submitted to the APPCB, Regional Office.	The Industry informed that calibration of leak detection equipment such LEL/Oxygen/VOC detectors were carried out and calibration report was submitted to Factories Department and APPCB on 05.03.2024 and copy enclosed as Annexure - 11 and 12.	Partially Complied Leak detectors are not available for the pipeline and flange where leakage occurred before the accident. The Industry representatives informed that LEL sensors with alarm system and oxygen/VOC detector with hooter installed at process area, but no

			<p>sensors and leakage detection were installed in the technical area and electrical panel area, since these areas are not designed for handling of chemicals.</p> <p>The Standard Operating Procedure for conducting Pressure test and Leak test for pipelines is prepared on 05.12.2024. Before the accident, there was no SOP for Pressure test and Leak test for finding out defects in the pipelines and joints (Annexure - 13).</p>
7.iii	<p>The Industry shall submit Risk analysis and risk assessment covering worst scenario clearly describing impact within the Industry premises and outside the Industry premises and emergency response system.</p>	<p>The Industry informed that Hazard Analysis and Risk Assessment (HARA) was conduct in 2022 and 2024. The copy of HARA report dated 30/09/2022 conducted in 2022 is placed at Annexure - 14.</p> <p>The copy of status of compliance to the HARA report submitted to Factories Department on</p>	<p>Partially Complied</p> <p>As per the HARA study report dated 30/09/2022, HARA was not carried out for manufacture of Rimegepant Sulphate, which was being manufactured during the accident.</p> <p>In status of compliance to the HARA report submitted by the Industry to the Factories Department</p>

		<p>07.04.2023 furnished by the Industry is enclosed as Annexure -15.</p> <p>The Industry informed that report of HARA conducted in 2022 and status of compliance was submitted to APPCB on 05.03.2024 and the letter copy enclosed as Annexure - 10.</p> <p>The report of HARA conducted in 2024 is not yet submitted to APPCB.</p>	<p>dated 07.04.2023 it is observed that Factories Department has recommended the Industry to immediately revise the HARA report as it not covered risk assessment of 15 numbers of products/intermediates of the products.</p>
7.iv	<p>The Industry shall submit the copy of the safety audit report and On-Site / Off Site Emergency Plans as applicable after being certified by the Factories Department to the APPCB, Regional Office from time to time, if the storage quantity of hazardous chemicals is equal to or, in excess of the threshold quantities specified in schedule 2 & 3 of MSIHC Rules, 1989.</p>	<p>The Industry informed that annual safety audit report and Onsite emergency Plan was submitted to APPCB on 05.03.2024 and copy of letter is enclosed as Annexure - 10.</p>	<p>Complied</p> <p>The list of chemicals (76 Nos) and maximum storage capacity of each chemical furnished by the Industry is enclosed at Annexure - 16. The maximum storage capacities of the hazardous chemicals listed are less than the threshold quantities specified in schedule 2 & 3 of MSIHC Rules, 1989.</p>

6.1.3 Major non-compliances to conditions of Consent for Operation

The Industry had CFO valid till 31.12.2028 for production of 9 products of total capacity 2600 kg/day and 2 byproducts of capacity 453.7 kg/day. It applied for change of product mix and obtained CTE dated 23.04.2024 for production of Product mix and byproducts by adding two new products namely Rimegepant Sulphate and its byproduct Triethylamine HCl and Zavegepant Hydrochloride in addition to earlier 8 products, replacing Atazanavir Sulphate. Subsequently, the CFO was issued to the Industry by APPCB on 25.05.2024 for production of 10 products of total capacity 2600 kg/day and 2 byproducts of capacity 453.7 kg/day, including production of Rimegepant Sulphate (210 kg/day) and its byproduct Triethylamine HCl (312.7 kg/day) and Zavegepant Hydrochloride (90 kg/day). The accident on 21.08.2024 occurred in the Industry during manufacture of Rimegepant Sulphate (RGP) bulk drug intermediate, which was newly included in the CFO dated 25.05.2024.

The major non-compliances to conditions of Consent for Operation are as follow:

1. The Industry conducted Hazard Analysis and Risk Assessment in the year 2022 but manufacture of Rimegepant Sulphate was not included in the study for hazard and Risk assessment.
2. In the status of compliance of Hazard Analysis and Risk Assessment 2022, furnished to the inspecting team, it is observed that Factories Department has recommended the Industry to immediately revise the HARA report as it has not covered risk assessment of 15 numbers of products/intermediates of the products. Rimegepant Sulphate is one of 15 products not included in the HARA study.
3. The Occupational Health and Safety Audit (IS 14489) for the year 2023 was conducted by the external Auditor and the Annual Safety Audit was due to be conducted before the accident on 21.08.2024 as last audit was conducted on 05.07.2023.
4. In the report of Safety Audit conducted on 05.07.2023, recommendation was made to provide exhaust fans at main PCC, MCC, ETP MCC & Production block electrical panels area for appropriate ventilation. As per the compliance status of the safety audit report submitted to Deputy Chief inspector of Factories vide letter dated 01.11.2023 by the

Industry, the status was Open and target date for completion was 30.03.2024. The details of corrective action taken to provide appropriate ventilation are not available. The extent of fire and explosion due to flammable solvents is dependent on ventilation and lack of ventilation might be one of the reasons for the Accident to become fatal.

5. The Industry informed that leak detectors were not available for the pipeline and flange where leakage of solvent occurred leading to the accident.
6. The Industry informed that the LEL sensors with alarm system and oxygen/VOC detector with hooter were installed only at process area, but no sensors and leakage detection were installed in the technical area and electrical panel area.
7. Only one VOC meter was installed in the Industry, at Northern side ground floor, which is not sufficient for measuring VOC concentrations in other locations and floors. As there were no adequate VOC meters installed in the Industry including 1st floor and ground floor southern area, accumulation of VOC before the accident was not detected. Installation of VOC sensors with alarm system in the technical area might have alerted employees of possible high VOC concentration.
8. The Standard Operating Procedure for conducting Pressure test and Leak test for pipelines was prepared on 05.12.2024. Before the accident, there was no SOP for Pressure test and Leak test for finding out defects in pipelines and joints.
9. Pressure test and Leak test for pipelines were not conducted periodically.
10. The Industry has not provided hoods on top of effluent storage tanks and vents are not connected to scrubbers.
11. OCEMS data of flow meters are not available in CPCB RTDMS portal from 26.07.2024 till the date of accident, i.e., 21.08.2024. Verification of OCEMS data for HTDS and LTDS effluent indicates that flow meter data are not transmitted to OCEMS portal properly.

7.0 Damage Assessment and Calculation of Compensation

The accident was restricted to ground floor and 1st floor of the production block and 2nd and 3rd floors were found intact. No impact was observed outside the production block or outside the unit. Accordingly, the damage assessment and compensations are estimated for following components:

- i. Compensation for loss of life and injured
- ii. Environmental damage and compensation for air and water pollution caused due to accident

7.i Loss of life and status of award of compensation

During the accident occurred in the Industry on 21.08.2024, a total of 56 employees were injured, out of this 17 employees suffered fatal injuries and got deceased. The remaining 39 employees with major and minor injuries were hospitalized. Nearly 8 workers were trapped due to collapse of wall near entry of North Technical area. As informed by the Industry, since the accident happened during shift changing time of employees; more people were present at the technical area of ground floor.

The Industry informed that the management of M/s. Escientia Advanced Sciences Private Limited has paid compensation of Rupees One Crore each for 17 deceased employees' families, Rupees 50 Lakhs each to 21 injured employees with major injuries and Rupees 25 Lakhs each to 18 minor injured employees. The details of the deceased and injured persons, compensation paid by the Industry as furnished by the Industry are in Table 4 and 5.

Table 4: Details of the deceased and compensation paid as informed by the Industry

S. No	Name of the Employee	Age	Department	Designation	Compensation Amount paid (Rs)
1	Surendra Marni	36	Production	Assistant Manager / Team leader	1,00,00,000/-
2	Rami Reddy Neelapu	49	R&D - (PD Lab)	Associate General Manager / Associate Director	1,00,00,000/-
3	Prasanth Hamsa	34	Production	Senior Executive	1,00,00,000/-

4	Narayana Rao Mahanti	34	R&D - (PD Lab)	Asst. Manager/Team Leader	1,00,00,000/-
5	Venkata Sai Pusalra	27	Production	Senior Executive	1,00,00,000/-
6	Nageswara Ramachandra Rao Boddu	46	Production	Assistant Manager / Team leader	1,00,00,000/-
7	Ganesh Kumar Kopparti	33	Production	Senior Executive	1,00,00,000/-
8	Harika Challapalli	21	R&D - (PD Lab)	Trainee Engineer	1,00,00,000/-
9	Naga Babu Mondi	36	Production	Asst. Manager	1,00,00,000/-
10	Ananda Rao Bammidi	36	Production	Asst. Manager	1,00,00,000/-
11	Satish Mariseti	30	Production	Senior Executive	1,00,00,000/-
12	Rajasekhar Paidi	23	Process Engineering	Trainee Process Engineer	1,00,00,000/-
13	Sanyasi Naidu Vegi	53	Engineering	HK BOY	1,00,00,000/-
14	Chinnarao Yallabilli	33	Engineering	PAINTER	1,00,00,000/-
15	Pardasaradi Jawadi	27	Engineering	FITTER	1,00,00,000/-
16	Mohan Durga Prasad Pudi	19	PD Lab	HK BOY	1,00,00,000/-
17	Chiranjeevi Javvadi	24	Engineering	FITTER	1,00,00,000/-

Table 5: Details of the injured persons and compensation paid by the Industry

S. No	Name of the Employee	Department	Designation	Injured category	Compensation Amount (Rs)
1	Jagadeesh Ponnada	Production	Manager / Group leader	Major	50,00,000/-
2	Srinivasa Rao Panga	Production	Deputy Manager / Sr Team leader	Major	50,00,000/-
3	Santhosh Gedda	R&D - (PD Lab)	Executive	Major	50,00,000/-
4	Baba Srinivasa Varma Dandu	Production	Senior Executive	Major	50,00,000/-
5	Jagadeeswara Rao Pasupureddi	Production	Deputy Manager / Sr. Team leader	Major	50,00,000/-
6	B Siva Venkata Ratnam	Production	HK Helper	Major	50,00,000/-
7	Rambabu Kondru	Production	Senior Executive	Major	50,00,000/-
8	K Chandra Sekhar	ESD	Utility Operator	Major	50,00,000/-
9	Y Mahesh Babu	ESD	ESD	Major	50,00,000/-
10	Narayana Rao Kondala	R&D - (PD Lab)	Asst. Manager/Team Leader	Major	50,00,000/-
11	Demudu Pikki	Engineering	Senior Engineer	Major	50,00,000/-

12	Kiran Satyanarayana Mandapati	Production	Senior Executive	Major	50,00,000/-
13	G Raja Rao	Production	HK Boy	Major	50,00,000/-
14	B Suribabu	Production	HK Boy	Major	50,00,000/-
15	J Vardhan	Production	HK Helper	Major	50,00,000/-
16	R Satyanarayana	Production	HK Helper	Major	50,00,000/-
17	Yaamini Saragadam	R&D - (PD Lab)	Trainee Chemist	Major	50,00,000/-
18	Vamsi Saragadam	Production	Junior Chemist	Major	50,00,000/-
19	Nalinprabath Chinnala	R&D - (HYD)	PRE	Major	50,00,000/-
20	N Pydi Kalyan	PD Kalyan	HK	Major	50,00,000/-
21	Yandava Tejeswara Rao	Production	Sr Executive	Major	50,00,000/-
22	Gangadhar Tamarana	Quality Control	Junior Chemist- Analytical	Minor	25,00,000/-
23	Sashikanth Bandi	Quality Control	Executive	Minor	25,00,000/-
24	Saikumar Gudisa	Production	Executive	Minor	25,00,000/-
25	Prakash Jagarapu	Production	Executive	Minor	25,00,000/-
26	Kasi Naidu Jeerreddi	R&D - (PD Lab)	Senior Executive	Minor	25,00,000/-
27	Satyanarayana Vara Prasad Raju Gandraju	Quality Assurance	Senior Manager / Sr Group leader	Minor	25,00,000/-
28	Aruna Kumar Pottasiri	Quality Assurance	Manager	Minor	25,00,000/-
29	V V Lakshmi Chaitanya Gandreti	Production	Senior Executive	Minor	25,00,000/-
30	Shanmukharao Kella	Quality Control	Chemist	Minor	25,00,000/-
31	Dhannjaya Bodala	Quality Control	Trainee Chemist	Minor	25,00,000/-
32	Shanmukharaju Kanchu	Production	Senior Executive	Minor	25,00,000/-
33	Bangarinaidu Chandaka	Production	Executive	Minor	25,00,000/-
34	Ch Apparao	Production	HK Boy	Minor	25,00,000/-
35	N Apparao	Production	HK Helper	Minor	25,00,000/-
36	Parameswar Rao Allaka	R&D - (PD Lab)	Executive	Minor	25,00,000/-
37	P Ram Mehar Babu	Production	HK Helper	Minor	25,00,000/-
38	D Apparao	Admin	Security	Minor	25,00,000/-
39	M Nagabushanam	ESD	Painter	Minor	25,00,000/-

7.ii Estimation of compensation for deceased

The Industry has informed that it has paid compensation of Rupees One Crore to the families of each of the deceased persons. To ascertain the adequacy of compensation paid, the compensation is estimated using following two methods based on the details of the employees affected provided by the Industry:

1. As per the Order and Judgements of Hon'ble Supreme Court of India in the Judgment dated 16.08.2019 in Civil Appeal No. 6339 of 2019 in the matter of Sunita Tokas vs New India Insurance Co. Ltd; the Judgment dated 31.10.2017 in SLP(C) No. 25590 of 2014 in the matter of Pranay Sethi vs National Insurance Co. Ltd; Order dated 15.04.2009 of Hon'ble Supreme Court of India in Civil Appeal No. 3483 of 2008 in the matter of Smt. Sarla Verma vs Delhi Transport Corporation.
2. As per the Employee's Compensation Act, 1923 as amended through EC(Amendment) Act, 2017

The highest amount out of two is considered for assessing whether the compensation paid by the Industry to the family of deceased persons is adequate or not.

7. iii. Compensation estimation as per the Order and Judgements of Hon'ble Supreme Court of India

In Table 6, compensation is calculated as per the methods in the Order and Judgements of Hon'ble Supreme Court of India in Civil Appeal No. 6339 of 2019, SLP(C) No. 25590 of 2014 and Civil Appeal No. 3483 of 2008.

Table 6: Amount of compensation in INR as per Hon'ble Supreme Court Order and Judgement in Civil Appeal No. 6339 of 2019, SLP(C) No. 25590 of 2014 and Civil Appeal No. 3483 of 2008.

S. No	Name	DOB	Age at the time of death (Years)	Net salary per month after deducting taxes	Future prospects	Total monthly Income	Loss of future income	Loss of estate, Loss of consortium and Funeral expenses (approx. cost)	Loss of Love and affection	Total compensation payable (Rs)
				A	B	$C = 0.5 * (A+B)$	$D = C * 12 * M$	E	F	$G = D + E + F$
1	Surendra Marni	24.12.1987	36	63,325	31662.5	47493.75	8548875	100000	200000	8848875
2	Rami Reddy Neelapu	20.08.1975	49	1,44,408	43322.4	93865.2	14642971.2	100000	200000	14942971
3	Prasanth Hamsa	22.08.1990	34	36,291	18145.5	27218.25	5225904	100000	200000	5525904
4	Narayana Rao Mahanti	25.06.1990	34	56,674	28337	42505.5	8161056	100000	200000	8461056
5	Venkata Sai Pusarla	05.07.1997	27	37,118	18559	27838.5	5679054	100000	200000	5979054
6	Nageswara Ramachandra Rao Boddu	02.12.1977	46	59,039	17711.7	38375.35	5986554.6	100000	200000	6286554.6

7	Ganesh Kumar Kopparti	20.08.1991	33	48,462	24231	36346.5	6978528	100000	200000	7278528
8	Harika Challapalli	14.12.2002	21	16,876	8438	12657	2733912	100000	200000	3033912
9	Naga Babu Mondi	20.02.1988	36	54,814	27407	41110.5	7399890	100000	200000	7699890
10	Ananda Rao Bammidi	01.02.1988	36	58,375	29187.5	43781.25	7880625	100000	200000	8180625
11	Satish Mariseti	03.12.1993	30	62,315	31157.5	46736.25	9534195	100000	200000	9834195
12	Rajasekhar Paidi	07.08.2001	23	12,268	6134	9201	1987416	100000	200000	2287416
13	Sanyasi Naidu Vegi	01.01.1971	53	12,196	1,219.60	6707.8	885429.6	100000	200000	1185429.6
14	Chinnarao Yallabilli	03.10.1990	33	21,723	8689.2	15206.1	2919571.2	100000	200000	3219571.2
15	Pardasaradi Jawadi	23.03.1997	27	22,692	9076.8	15884.4	3240417.6	100000	200000	3540417.6
16	Mohan Durga Prasad Pudi	26.08.2005	19	12,196	4878.4	8537.2	1844035.2	100000	200000	2144035.2
17	Chiranjeevi Javvadi	04.01.2000	24	17,265	6,906	12085.5	2610468	100000	200000	2910468

Note:

- *B – The Industry mentioned that 12 deceased employees are holding permanent job whereas 5 are contractual employees. For employees with permanent job (Sl 1 to 12), future prospects is calculated as 50% of salary if age was below 40 years, 30% if age was between 40 to 50 years and 15% if age was between 50 to 60 years.
For contractual employees (Sl 13 to 17), future prospects is calculated as 40% of salary if age was below 40 years, 10% if age was between 50 to 60 years. (As per the Judgment dated 31st October 2017 of Hon'ble Supreme Court of India in SLP(C) No. 25590 of 2014 in the matter of Pranay Sethi vs National Insurance Co. Ltd.)*
- *C – Total Income per month is calculated by considering 50% as the deduction towards personal expenses irrespective of whether the deceased person is bachelor or married (As per the Judgment dated 16th August 2019 of Hon'ble Supreme Court of India in civil appeal No. 6339 of 2019 and judgment in the matter of Sunita Tokas vs New India Insurance Co. Ltd..)*
- *D – Loss of future income is calculated by considering Multiplier M-18 for the age groups of 15 to 20 and 21 to 25 years, M-17 for 26 to 30 years, M- 16 for 31 to 35 years, M-15 for 36 to 40 years, M-13 for 46 to 50 years and M-11 for 51 to 55 years (As per the Order dated 15th April 2009 of Hon'ble Supreme Court of India in Civil Appeal No. 3483 of 2008 in the matter of Smt. Sarla Verma vs Delhi Transport Corporation)*
- *E - Loss of estate, Loss of consortium and Funeral expenses (approx. cost) is considered as Rs. 1,00,000/-.*
- *F - Loss of Love and affection is considered as Rs. 2,00,000/- (As per the Judgment dated 16th August 2019 of Hon'ble Supreme Court of India in civil appeal No. 6339 of 2019 and judgment in the matter of Sunita Tokas vs New India Insurance Co. Ltd.)*

7. iv. Compensation estimation as per the Employee's Compensation Act, 1923

The compensation calculated as per the method in the Employee's Compensation Act, 1923 as amended through EC(Amendment) Act, 2017 is as detailed in Table 7.

Table 7: Amount of compensation in INR as per the Employee's Compensation Act, 1923 as amended through EC(Amendment) Act, 2017

S. No.	Name	DOB	Age at the time of death (Years)	Gross Salary per month	Factor to be multiplied	Total compensation (Rs)
				A	B	A*0.5*B
1	Surendra Marni	24.12.1987	36	69613	194.64	6774737
2	Rami Reddy Neelapu	20.08.1975	49	202458	156.47	15839302
3	Prasanth Hamsa	22.08.1990	34	39819	199.4	3969954
4	Narayana Rao Mahanti	25.06.1990	34	62023	199.4	6183693
5	Venkata Sai Pusarla	05.07.1997	27	41376	213.57	4418336
6	Nageswara Ramachandra Rao Boddu	02.12.1977	46	65290	166.29	5428537
7	Ganesh Kumar Kopparti	20.08.1991	33	53793	201.66	5423948
8	Harika Challapalli	14.12.2002	21	19033	222.71	2119420
9	Naga Babu Mondi	20.02.1988	36	60583	194.64	5895938
10	Ananda Rao Bammidi	01.02.1988	36	64369	194.64	6264391
11	Satish Mariseti	03.12.1993	30	68227	207.98	7094926
12	Rajasekhar Paidi	07.08.2001	23	15008	219.95	1650505
13	Sanyasi Naidu Vegi	01.01.1971	53	13308 [#]	142.68	1070100
14	Chinnarao Yallabilli	03.10.1990	33	23500	201.66	2369505
15	Pardasaradi Jawadi	23.03.1997	27	23000	213.57	2456055
16	Mohan Durga Prasad Pudi	26.08.2005	19	13308 [#]	225.22	1689150
17	Chiranjeevi Javvadi	04.01.2000	24	17500	218.47	1911613

Note:

- As per the Employee's Compensation Act, 1923 as amended through EC(Amendment) Act, 2017, the compensation is calculated in case of accidents result in death as an amount equal to fifty percent of the monthly wages of the deceased multiplied by the relevant factor as per Schedule IV; or an amount of Rs. 1,20,000, whichever is more.

- *As per Notification S.O.71 (E) dated 03.01.2020 of Ministry of Labour and Employment, the amount of monthly wages considered for the calculation of compensation is Rs. 15,000/-.*
- *The actual monthly wage of 15 employees were more than notified minimum monthly wage, thus actual monthly salary is considered for Compensation estimation. Monthly salary of 2 employees Sh. Mohan Durga Prasad Pudi at # Sl 16 and Sh Sanyasi Naidu Vegi at # Sl 13 are less than notified minimum monthly wage, therefore Rs. 15,000/-, i.e notified minimum monthly wage is considered as the monthly salary Compensation estimation.*

7. v Assessment of compensation paid to the deceased

The amount of compensation calculated based on methods described in the Orders and Judgements of the Hon'ble Supreme Court, the Employee's Compensation Act, 1923 as amended through EC(Amendment) Act, 2017 and compensation paid as informed by the Industry to the family of deceased are compared. The highest among the three is considered as the actual compensation to be payable by the Industry.

On comparison, it is observed that the compensation of Rupees One Crore each fixed to the family of 16 number of deceased employees listed in Table 4 are found to be adequate. The compensation calculate for **Sh Rami Reddy Neelapu**, Associate General Manager / Associate Director based on EC(Amendment) Act, 2017 is **Rs 1,58,39,302/- (Rupees One Crore Fifty Eight Lakhs Thirty Nine Thousand Three Hundred and Two)**. The Industry informed that it has paid Rupees One Crore as compensation to the family of Sh Rami Reddy Neelapu. Accordingly, the additional compensation of **Rs 58,39,302/- (Rupees Fifty Eight Lakhs Thirty Nine Thousand Three Hundred and Two)** is to be paid to the family of Sh Rami Reddy Neelapu.

The details of compensation calculated based on two methods and paid as informed by the Industry are as show in Table 8.

Table 8: Comparative table compensations estimated and compensation paid

S. No.	Name of the deceased	Total Compensation as per Method 1 (Court Orders) (Rs.)	Total Compensation as per Method 2 (EC Act) (Rs.)	Compensation paid by the Industry (Rs.)	Actual compensation to be paid
1	Surendra Marni	8848875	6774737	10000000/-	Compensation fixed by Industry as Rupees One Crore is adequate.
2	Rami Reddy Neelapu	14942971	15839302	10000000/-	Actual compensation to be paid is Rs. 15839302/- As Industry informed that Rupees One Crore fixed as compensation, an additional compensation of Rs. 5839302/- has to be paid by the Industry
3	Prasanth Hamsa	5525904	3969954	10000000/-	Compensation fixed by Industry as Rupees One Crore is adequate.
4	Narayana Rao Mahanti	8461056	6183693	10000000/-	Compensation fixed by Industry as Rupees One Crore is adequate.
5	Venkata Sai Pusalra	5979054	4418336	10000000/-	Compensation fixed by Industry as Rupees One Crore is adequate.
6	Nageswara Ramachandra Rao Boddu	6286555	5428537	10000000/-	Compensation fixed by Industry as Rupees One Crore is adequate.
7	Ganesh Kumar Kopparti	7278528	5423948	10000000/-	Compensation fixed by Industry as Rupees One Crore is adequate.
8	Harika Challapalli	3033912	2119420	10000000/-	Compensation fixed by Industry as Rupees One Crore is adequate.
9	Naga Babu Mondi	7699890	5895938	10000000/-	Compensation fixed by Industry as Rupees One Crore is adequate.
10	Ananda Rao Bammidi	8180625	6264391	10000000/-	Compensation fixed by Industry as Rupees One Crore is adequate.
11	Satish Mariseti	9834195	7094926	10000000/-	Compensation fixed by Industry as Rupees One Crore is adequate.

12	Rajasekhar Paidi	2287416	1650505	10000000/-	Compensation fixed by Industry as Rupees One Crore is adequate.
13	Sanyasi Naidu Vegi	1185430	1070100	10000000/-	Compensation fixed by Industry as Rupees One Crore is adequate.
14	Chinnarao Yallabilli	3219572	2369505	10000000/-	Compensation fixed by Industry as Rupees One Crore is adequate.
15	Pardasaradi Jawadi	3540418	2456055	10000000/-	Compensation fixed by Industry as Rupees One Crore is adequate.
16	Mohan Durga Prasad Pudi	2144036	1689150	10000000/-	Compensation fixed by Industry as Rupees One Crore is adequate.
17	Chiranjeevi Javvadi	2910468	1911613	10000000/-	Compensation fixed by Industry as Rupees One Crore is adequate.

7.vi Compensation for injured employees

The Industry informed that it has paid a compensation of Rupees Fifty Lakhs to the persons with major injuries (21 Nos.) and Rupees Twenty Five Lakhs to the persons with minor injuries (18 Nos.). The adequacy of the Compensation paid to the injured employees is assessed as per the Hon'ble NGT Order dated 16.01.2023 in case of O.A. No. 66 of 2022 (PB) and Order dated 11.04.2023 in case of O.A. No. 251/2023 (PB). In both the cases, the Hon'ble NGT has directed that compensation payable is Rs.10 Lakhs to the persons injured due to explosion of firecrackers. Thus, the Compensation fixed by M/s. Escientia Advanced Sciences Private Limited to the injured persons are found to be adequate.

7.vii Environmental damages due to accident:

a. Damage to Water Environment:

As per the Action Taken Report dated 27.08.2024 furnished by APPCB, during firefighting operations, the Industry used 150 KL of water and 1 KL of foam for controlling fire. The wastewater generated during firefighting entered into storm water drains in the Industry. APPCB carried out monitoring from 21.08.2024 to 22.08.2024 and collected samples from front side & back side of the production block. The monitoring results shows that Chemicals Oxygen Demand was 336 mg/L & 320mg/L and Total Dissolved Solids

was 1428 mg/L & 1352 mg/L respectively. This shows that the effluent generated during firefighting operation was LTDS effluent.

The Industry representatives informed that the effluent was collected in the rainwater runoff collection tank through storm water drains, the same was pumped and sent to CETP as LTDS effluent for treatment and disposal in September 2024. The manifesto of LTDS effluent handed over to the CETP by the Industry on 10.09.2024, 11.09.2024, 12.09.2024, 13.09.2024 and 20.09.2024 are enclosed at Annexure -17. During 10.09.2024 to 20.09.2024, 100 KL of LTDS effluent was handed over to the CETP. As the Industry has disposed firefighting LTDS effluent to the CETP, no major environmental damage was caused.

b. Damage to Air quality:

As per the information furnished by the Industry, 200 Litres of MTBE solvent was leaked on the day of accident. The Industry has installed One VOC meter near Northern Side Production block ground floor and connected to APPCB website. As per the records provided by the Industry, during 15.08.2024 00.00 hrs to 21.08.2024 14.00 hrs, the average concentration of VOC recorded was 0.79 ppm with a range 0.69 to 0.96 ppm in the Production Block. On the day of accident, during 10.00 hrs to 14.00 hrs, the concentration of VOC in the production block was in the range 0.82 to 0.90 ppm with average concentration of 0.86 ppm.

As per the report dated 27.08.2024 furnished by APPCB, VOC monitoring was carried out by APPCB from 21.08.2024 15.00 hrs to 22.08.2024 12.30 hrs after the accident. VOC monitoring data shows that, average concentration of VOC near the production block was 0.32 ppm with a range of 0.1 to 0.8 ppm. The maximum VOC was 0.8 ppm near production block at 15.00 hrs on 21.08.2024. VOC concentration near the production block was reduced and during 21.08.2024, 22.30 hrs to 22.08.2024, 02.0 hrs VOC was in the range 0.1 to 0.3 ppm.

The VOC monitoring in the ambient air carried out by APPCB near the security back gate (East), Security main gate (North), drum storage area (West) and Laurus unit -2 Road (South) shows that on 21.08.2024, 15 hr, VOC concentration near Security main gate

(North) was 0.3 – 0.6 ppm and drum storage area (West) was 0.1 – 0.2 ppm. The VOC concentration at Security main gate (North) gradually reduced and reached concentration of 0.1 – 0.2 ppm at 21.00 hrs on 21.08.2024. At remaining locations, namely, security back gate (East), drum storage area (West) and Laurus unit -2 Road (South), VOC levels in ambient air were Below Detectable Limit since 21.08.2024, 18.00 hrs onwards.

The Particulate Matter is one of the predominant pollutant released to atmosphere during fire accidents. The Industry representatives informed that there is no Continuous Ambient Air Quality Monitoring Station installed inside the Industry premises. Therefore, Particular Matter emission during the accident and fire was not monitored.

c. Status of hazardous waste generated and its disposal:

It is informed by the Industry that on the day of accident, 1820 Liters of MTBE solvent was taken into the Reactor R-2220. After the reaction process, 610 Liters of distilled MTBE was collected into the Receiver tank VR-2225. While transferring this 610 Liters of MTBE from Receiver to Storage tank MLST-3401, 200 Liters of MTBE got leaked and caused the accident. The remaining 410 Liters of MTBE was recovered from the Receiver after the accident and sent to TSDF on 23.10.2024, after taking required clearance from the Insurance agency. The manifest of TSDF is enclosed as Annexure -18.

It is informed by the Industry that approximately, 1500 Liters of Reaction mass including 1210 Liters of MTBE was recovered from the Reactor after the accident and stored in the Hazardous Waste Storage area of the Industry and the same will be sent to TSDF after getting clearance from the Insurance agency.

8.0 Conclusion

- i. On 21.08.2024, a fire accident in the production block of M/s. Escientia Advanced Sciences Private Limited, occurred due to leakage of MTBE solvent from the flange joint of the pipeline during the manufacturing of Rimegepant Sulphate, for which CFE was obtained on 23.04.2024 and CFO on 25.05.2024.
- ii. The delay in conducting annual safety audit, manufacturing of Rimegepant Sulphate without its inclusion in the HARA study, absence of a Standard Operating Procedure for

conducting pressure and leak tests of pipelines and lack of periodic pipeline testing were the primary causes of the accident. In addition, improper ventilation system, lack of leak detectors in pipelines, absence of sensors and leak detectors in technical and electrical panel areas to alert the personnel and inadequate number of VOC meters further contributed to the severity of accident.

- iii. During the accident, 17 people were deceased and 39 people were injured. The management of the Industry informed that it has paid compensation of Rupees One Crore each for 17 deceased employees' families, Rupees Fifty Lakhs each to 21 employees with major injuries and Rupees Twenty Five Lakhs each to 18 employees with minor injuries.
- iv. The adequacy of compensation paid to deceased employees is assessed as per the Hon'ble Supreme Court of India Judgment dated 16th August 2019 in Civil Appeal No. 6339 of 2019 in the matter of Sunita Tokas vs New India Insurance Co. Ltd; the Judgement dated 31st October 2017 in SLP(C) No. 25590 of 2014 in the matter of Pranay Sethi vs National Insurance Co. Ltd; Order dated 15th April 2009 in Civil Appeal No. 3483 of 2008 in the matter of Smt. Sarla Verma vs Delhi Transport Corporation and as per the Employee's Compensation Act, 1923 as amended through EC(Amendment) Act, 2017. Based on this, the compensation mentioned as paid by the Industry to the families of 16 deceased employees are found to be adequate. The compensation calculated for **Sh Rami Reddy Neelapu**, based on EC(Amendment) Act, 2017, is Rs 1,58,39,302/- (Rupees One Crore Fifty Eight Lakhs Thirty Nine Thousand Three Hundred and Two). Therefore, an additional compensation of **Rs 58,39,302/-** (Rupees Fifty Eight Lakhs Thirty Nine Thousand Three Hundred and Two only) is to be paid by the Industry to the family of deceased Late **Sh. Rami Reddy Neelapu**.
- v. The adequacy of compensation paid to injured employees is assessed as per Hon'ble NGT Order dated 16.01.2023 in case of O.A. No. 66 of 2022 (PB) and Order dated 11.04.2023 in case of O.A. No. 251/2023 (PB). Based on this, the compensation mentioned as paid by the Industry for the injured employees are found to be adequate.

- vi. The Industry representatives informed that the effluent generated during fire extinguish was collected and sent to CETP as LTDS effluent for treatment and disposal in September 2024. As per manifests, during 10.09.2024 to 20.09.2024, 100 KL of LTDS effluent was handed over to the CETP. As the Industry has disposed firefighting LTDS effluent to the CETP, no major environmental damage was caused.
- vii. As per the information provided by the Industry, on the day of accident, during 10.00 hrs to 14.00 hrs, the concentration of VOC was in the range 0.82 to 0.90 ppm with average concentration of 0.86 ppm. APPCB carried out VOC monitoring after the accident and the average concentration of VOC near the production block was 0.32 ppm with a range of 0.1 to 0.8 ppm. The maximum VOC was 0.8 ppm near production block at 15.00 hrs on 21.08.2024. VOC concentrations outside the premises were in the range of Below Detectable Level to 0.4 ppm. The Particulate Matter data is not available for the period of accident as there were no Continuous Ambient Air Quality Monitoring Stations in the Industry premises.
- viii. It is informed by the Industry that 410 Liters of MTBE was recovered from the Receiver after the accident and sent to TSDF on 23.10.2024, after taking required clearance from the Insurance agency and records are maintained. Further it is informed that approximately, 1500 Liters of Reaction mass including 1210 Liters of MTBE was recovered from the Reactor after the accident and stored in the Hazardous Waste Storage area of the Industry and the same will be sent to TSDF after getting clearance from the Insurance agency. The hazardous waste stored in the Industry premises shall be disposed as per the provisions of the Hazardous Waste Management Rules, 2026 as Amended.



(Budigi Reddy Soni)
Scientist B



(Sowmya D)
Scientist E



(H D Varalaxmi)
Regional Director

Item No. 18

Court No. 1

**BEFORE THE NATIONAL GREEN TRIBUNAL
PRINCIPAL BENCH, NEW DELHI**

Original Application No. 1097/2024

News Item titled "17 killed 20 injured in reactor blast at pharma company in Andhra Pradesh's Anakapalli" appearing in The Hindu dated 22.08.2024

Date of hearing: 22.08.2024

**CORAM: HON'BLE MR. JUSTICE PRAKASH SHRIVASTAVA, CHAIRPERSON
HON'BLE MR. JUSTICE ARUN KUMAR TYAGI, JUDICIAL MEMBER
HON'BLE DR. A. SENTHIL VEL, EXPERT MEMBER**

ORDER

1. This original application is registered *suo motu* on the basis of the news item titled "17 killed 20 injured in reactor blast at pharma company in Andhra Pradesh's Anakapalli" appearing in 'The Hindu' dated 22.08.2024.

2. The news item relates to the death of 17 workers and injuries caused to 20 others due to the eruption of a major fire reportedly after a reactor blast in Escientia Advanced Science Private Ltd. in the Special Economic Zone at Atchutapuram in Anakapalli of Andhra Pradesh. As per the article, the company manufactures intermediate chemicals and pharmaceutical ingredients. The article alleges that the death toll is likely to go up as bodies of several workers were feared trapped under the rubble of the slab of the first floor of the four-storey building. Furthermore, the impact of the blast was so strong that the severed body parts of some workers were thrown to some distance on the company premises. Thick flames and smoke engulfed the area. Spread across 40 acres, Escientia Advanced Sciences Private Limited was set up at Atchutapuram SEZ in 2019 with a budget of around ₹200 crore. The

company manufactures Active Pharmaceutical Ingredients (API). The news item highlights that as many as 381 workers have been working in two shifts in the company. The accident occurred around 2.15 p.m., during shift change. It is claimed that such accidents have been occurring frequently, and yet no measures have been taken. Moreover, the news item alleges that repeated accidents had been occurring due to alleged negligence and apathy of the managements. It had been several years since a safety audit was conducted.

3. The Tribunal has passed orders in order dated 01.06.2020 in OA No. 73/2020, order dated 31.08.2021 in OA No. 79/2021, order dated 21.09.2022 in OA 284/2022 with OA 45/2022 (SZ), order dated 18.01.2023 in OA 448/2022 and order dated 28.02.2023 in OA No. 111/2023 in cases relating to industrial accidents forming Committees to find out the cause of accidents and take remedial actions and further directing payment of compensation to the victims. In the present case, it is required to be ascertained if the unit was complying with environmental norms and if compensation to the victims/family member of victims has been paid.

4. The news item raises substantial issue relating to compliance of the environmental norms.

5. Power of the Tribunal to take up the matter *suo-motu* has been recognized by the Hon'ble Supreme Court in the matter of "*Municipal Corporation of Greater Mumbai vs. Ankita Sinha & Ors.*" reported in 2021 SCC Online SC 897.

6. Hence, we implead the following as respondents in the matter:

- (1). Central Pollution Control Board, Through its Member Secretary, Parivesh Bhawan, East Arjun Nagar, Delhi-110032.
 - (2). Andhra Pradesh Pollution Control Board, Through its Member Secretary, Dr. YSR Paryavaran Bhawan, APIIC Colony Road, Gurunanak Colony, Vijaywada-520007.
 - (3). Ministry of Environment, Forest and Climate Change, Through its Regional Office, Regional Office (SEZ), Ist and IInd Floor, Handloom Export Promotion Council, 34, Cathedral Garden Road, Nungambakkam, Chennai – 34.
 - (4). District Magistrate, Anakapalli, Collector's Office, Anakapalli.
 - (5). Director, Directorate of Industrial Safety and Health, Andhra Pradesh.
7. Issue notice to the above respondents for filing their response/reply by way of affidavit before the Southern Zonal Bench of the Tribunal at least one week before the next date of hearing. If any of the respondents directly files the reply without routing it through his advocate then the said respondent will remain virtually present to assist the Tribunal.
8. Since the matter falls within the jurisdiction of Southern Zonal Bench of the Tribunal, therefore, the OA is transferred to the Southern Zonal Bench, Chennai for appropriate further action. Let the original record of the OA be transferred to Southern Zonal Bench, Chennai.
9. List before Southern Zonal Bench at Chennai on 30.09.2024.

Prakash Shrivastava, CP

Arun Kumar Tyagi, JM

Dr. A. Senthil Vel, EM

August 22, 2024
Original Application No. 1097/2024
dv

Annexure 2

SPEED POST

B-29016/04/06/IPC-I

9930-9964

December 24, 2021

To

All SPCBs/PCCs

Sub. : Integrated Guidance Framework for Chemicals Safety in respect of the Isolated Storages and Industries covered under Manufacture, Storage and Import of Hazardous Chemicals Rules, 1989 in compliance to the Hon'ble National Green Tribunal order dated 11.06.2021 in Original Application No. 60/2021 - reg.

Sir,

As directed by Hon'ble National Green Tribunal on 11.06.2021 in Original Application No. 60/2021, Central Pollution Control Board and the Ministry of Environment, Forests and Climate Change in coordination with other concerned authorities viz. Directorate General Factory Advice Service and Labour Institute, National Institute of Disaster Management, Petroleum and Explosives Safety Organization, National Safety Council and Indian Chemical Council etc. have prepared the guidelines titled "Integrated Guidance Framework for Chemicals Safety in Respect of the Isolated Storages and Industries Covered Under Manufacture, Storage and Import of Hazardous Chemicals Rules, 1989."

On further hearing on this matter, the Hon'ble National Green on 14.12.2021 has passed the order. Para 5 of the aforementioned order reads as follows:

"While we take the above reports on record, further follow up action is taken. In particular, review meetings must be held at level of the Chief Secretary or his nominee atleast once in six months, if not earlier. Remedial measures in respect of 11 units mentioned in para 11 of order dated 11.06.2021, quoted above may be ascertained. CPCB may also take response from State PCBs as well as their regional offices about the status of compliance of guidelines at least once in every six months."

The above stated guidelines (Integrated Guidance Framework for Chemicals Safety in Respect of the Isolated Storages and Industries Covered Under Manufacture, Storage and Import of Hazardous Chemicals Rules, 1989) are enclosed for your reference and necessary action. It is requested to ensure the compliance of the aforementioned guidelines and submit the status of compliance of guidelines to Central Pollution Control Board on half yearly basis.

Yours faithfully,

(Ashbir Singh)

Sc. 'D', IPC-I Division

Encl.: As above

केन्द्रीय प्रदूषण नियंत्रण बोर्ड
निर्गत...
दिनांक... 28/12/2021

/c

Page 1 of 2

Copy to:

1. The Director,
HSM Division,
Ministry of Environment, Forests and Climate Change
Indira Paryavaran Bhawan ,
Aliganj, Jor Bagh Road,
New Delhi – 110003
2. DH – Law
3. All RDs (By Email) : For necessary follow up with SPCBs / PCCs please

Ashbir Singh
24.12.2024

(Ashbir Singh)

o/c

Integrated Guidance Framework for Chemicals Safety in Respect of the Isolated Storages and Industries Covered Under Manufacture, Storage and Import of Hazardous Chemicals (MSIHC) Rules, 1989.

Background:

Hon'ble National Green Tribunal on 11.06.2021 in Original Application No. 60/2021 passed the order. The Para 12 of the aforementioned order read as follows:

“We also direct CPCB and MoEF&CC in coordination with other concerned authorities to consider issuing appropriate guidelines for conducting safety audits and taking other remedial measures throughout India in the light of present report as well as other recent reports in respect of industrial accidents so as to prevent such incidents and to save human lives and health.”

In this regard, the guidelines are as follows:

A. Guidelines for Industries and Isolated Storages:

REPORTING

1. An occupier (of an industry or isolated storage) shall identify the major accident hazards and shall take adequate steps to prevent such major accidents and to limit their consequences to persons and the environment and shall provide the persons working on the site with the information, training and equipment including antidotes necessary to ensure their safety.
2. Where a major accident occurs on a site or in a pipe line, the occupier shall within 48 hours notify the concerned authority as identified in Schedule 5 (of the Manufacture, Storage and Import of Hazardous Chemical Rules, 1989 as amended) of that accident, and furnish thereafter to the concerned authority a report relating to the accidents in Schedule 6 (of the Manufacture, Storage and Import of Hazardous Chemical Rules, 1989 (as amended)). However, the concerned authorities, local crisis group, District emergency authorities etc. have to be informed by the occupier as early as possible.

3. The occupier shall not undertake any industrial activity or isolated storage unless he has been granted an approval for undertaking such an activity by the concerned authorities and has submitted a written report to the concerned authority containing the particulars specified in Schedule 7 of the Manufacture, Storage and Import of Hazardous Chemical Rules, 1989 as amended. In case of an activity in which subsequently there is or is liable to be a threshold quantity or more of an additional hazardous chemical shall be deemed to be a different activity and the occupier has to take a separate approval for undertaking such activity.
4. The occupier shall furnish a further report to the concerned authorities, in case the changes to the threshold quantity of hazardous chemicals are made.
5. An occupier shall not undertake any industrial activity or isolated storage to which the Manufacture, Storage and Import of Hazardous Chemical Rules, 1989 (as amended) applies, unless he has prepared a safety report on that industrial activity containing the information specified in Schedule 8 of the Manufacture, Storage and Import of Hazardous Chemical Rules, 1989 (as amended) and has sent a copy of that report to the concerned authority at least ninety days before commencing that activity.
6. The occupier of both the new and the existing industrial activities or isolated storage shall carry out an independent safety audit of the respective industrial activities with the help of an expert, not associated with such industrial activities. The occupier shall forward a copy of the auditor's report along with his comments to the concerned authorities within 30 days after the completion of such audit.
7. The occupier shall update the safety audit report once a year by conducting a fresh safety audit and forward a copy of it with his comments to the concerned authorities.
8. The occupier, within 30 days of the completion of the safety audit, shall send a report to the Chief Inspector of Factories with respect to the implementation of the audit recommendations.
9. The occupier shall not make any modification to the industrial activity or isolated storage to which that safety report relates which could materially affect the particulars in that report, unless he has made a further report to take

- account of those modifications and has sent a copy of that report to the concerned authorities at least 90 days before making those modifications.
10. Where an occupier has made a safety report and that industrial activity or isolated storage is continuing, the occupier shall within three years of the date of the last such report, make a further report which shall have regard in particular to new technical knowledge which has affected the particulars in the previous report relating to safety and hazard assessment and shall within 30 days send a copy of the report to the concerned authority.
 11. For the purpose of enabling the concerned authority to prepare the off-site emergency plan, the occupier shall provide the concerned authority with such information relating to the industrial activity or isolated storage under his control as the concerned authority may require, including the nature, extent and likely effects off-site of possible major accidents.
 12. The occupier of an industry or isolated storage shall take appropriate steps to inform persons outside the site either directly or through District Emergency Authority who are likely to be in an area which may be affected by a major accident about the nature of the major accident hazard and the safety measures and the "Do's' and 'Don'ts" which should be adopted in the event of a major accident. The occupier of a new industry or isolated storage shall take these steps, before that activity is commenced.
 13. The industries / isolated storages shall update the comprehensive safety audit, on-site emergency plans and risk analysis reports annually and ensure that the reports are furnished to the concerned authorities.
 14. The industry or isolated storage shall conduct comprehensive hazard identification and risk assessment (HIRA) to identify the non-compliances and take corrective actions for the non-compliances identified. Emergency plans shall be established to deal with leakages / accidents. The safety & hazard audit should identify the control measures necessary to be taken during an emergency.
 15. A detailed study on the risk assessment and disaster management shall be carried out by the industry / isolated storage. Hazard identification and evaluation in a local community, preparation of standard operating procedures for accident prevention, preparedness and response, onsite emergency plans etc. have to be reviewed at least once in a year.

16. In the industries / isolated storages where gas leakages are suspected, an emergency plan to vent out / neutralize the gases safely should be prepared.
17. All industries and isolated storages should have mitigation plans for spillages / leakages of hazardous chemicals, fires, explosion or any other accident.
18. Standard Operating Procedure (SOP) for the steps to be taken during emergency situations / accidents shall be prepared by all industrial activities / isolated storages that are handling hazardous chemicals.

TESTING

19. The pressure test and leak test must be ensured after replacement of valves, pipes, joints etc. as per the original equipment manufacturer (OEM) manual or as per standard established procedure.
20. Check valves, relief valves should be installed at appropriate locations. Flow meters, sensors, measuring devices have to be regularly calibrated. Vents from relief valves shall be directed to a safe place.
21. Seals, glands and gaskets shall be regularly inspected, without dismantling. Leak detectors should be provided for all piping, valves, seals, flanges, and other pertinent equipment.
22. All hazardous chemicals carrying piping should be periodically inspected for failed insulation/ vapour barrier, rust and corrosion. Damaged and deteriorated piping / equipment should be replaced.
23. Operation and process control systems like Supervisory Control and Data Acquisition (SCADA) and Leak Detection and Repair (LDAR) systems should be adopted by the major accident hazard installations.
24. The safety measures including valve regulated systems shall be regularly checked and the concerned workers involved in the activity shall be properly trained.
25. Periodic inspection of equipment and machineries w.r.t. safety aspects should be done.
26. Portable gas masks should be kept at critical locations for use in any emergency.
27. Material Safety Data Sheets of raw materials & products should be made available to all the concerned personnel.

28. The design of storage tanks, pressure vessels etc. should be as per applicable standards. The material of the storage tanks, pressure vessels etc. should be of adequate strength and chemically inert for the chemicals to be stored. The inspection of storage tanks, pressure vessels etc. should be as per standard protocols.
29. All the vessels should be examined periodically by a competent person under the Factory Act / applicable extant laws.
30. Blanketing of tanks for fire protection of volatile / flammable chemicals should be considered.
31. Free Fall of any flammable material in the vessel has to be avoided. All solvents and flammable material storage tanks should be at a safe distance from the Process plant and required quantity of material should be charged in reactor through appropriate safe mode.
32. Earth connection should be provided to all solvent handling equipment, pipelines, reactors, vessels etc. for protection from electric current/ static electricity.
33. Separate safety manual should be prepared for each equipment along with the emergency management plan.
34. Periodic testing of firefighting equipment should be conducted.

DUTIES

35. Mock drills must be conducted regularly at every six months by the industries / isolated storages in controlled environment on actions to be taken during accidents, gas leakage, failure of critical process parameters etc.
36. It shall be ensured that the chemical storage tanks should be appropriately located so that adequate space to take action during emergency situation is available.
37. A clear documented emergency procedure should be laid down which details the precise duties of all staff and arrangements for evacuation, rescue, first aid etc. during an emergency.
38. All pipework containing hazardous chemicals shall be identified by colour coding or labelling (as per standards notified by Bureau of Indian Standards) and shall be protected to prevent corrosion / damage. The practice to identify

the parts of the system that contain gas or liquid and the direction of flow should be followed.

39. The industry or isolated storage shall install sensors with alarm system for detecting leakage of hazardous chemicals. Emergency ventilation, electricity tripping system to stop the process, sprinkling system to contain the leaked hazardous chemicals / gases etc. may be interlinked with the sensors for taking a prompt action in case of leakage / emergency.
40. Suitable gas sensors and alarm system should be installed in the industrial unit / isolated storages at appropriate locations where emission of gas is suspected so that any leaked gas is detected and the employees are immediately alerted. In sensitive areas of the unit where gas leakages are suspected, the unit shall work out an emergency prepared plan to neutralize / vent out the gases safely.
41. The industries / isolated storages should install automatic alarming system to alert its personnel as well as surrounding localities simultaneously in case of emergency situation and likelihood of emergency situation if any process parameter goes out of control.
42. There should be auto alarm system to alert the employees in case of any deviations noticed in process parameter that may cause emergency.
43. Only fully trained and qualified operators shall be permitted to operate the industrial processes involving hazardous chemicals. Training to all employees on Standard Operating Procedures, production process, safety aspects etc. should be provided. Refresher trainings should be conducted at least every year regarding safety and emergency preparedness aspects associated with the industrial process / isolated storage. The employees shall be given hands on experience with the product process under the supervision of senior employees. The industries / isolated storages only after ensuring that adequate training is imparted to its employees should engage the employees for independent works.
44. The industries and isolated storages should impart regular training to the staff to make them aware about process details, process functionalities. The employees should be trained to deal with emergencies arising out of leakage, abnormal temperature & pressure, increased emissions, pump failures, failure

of air pollution control devices or effluent treatment plant, shock loads or any other accidents likely to occur. Overall the industries and isolated storages should be prepared for emergency response readiness & effectiveness in terms of major & minor accidents.

45. Any non-operational industry / isolated storage shall carry out proper risk study and safety audit before resuming the operations.
46. Hazard and operability study must be carried out strictly and regularly by the industries and isolated storages. The concerned personnel should be made aware of the hazard and safety aspects associated with the process and material handled by them.
47. The industry / isolated storage should procure chemicals from authorized dealers only. The spent solvents shall be procured from only those industries / solvent recyclers that are authorized by respective State Pollution Control Boards (SPCBs)/ Pollution Control Committees (PCCs).
48. The industry / isolated storage shall provide essential Personnel Protective Equipment (PPE) to all the concerned employees and make it mandatory that the employees have to wear PPE during working hours.
49. Occupational Health surveillance i.e., periodical health check-up of the employees should be conducted by the industries / isolated storage.
50. The industries / isolated storages have to ensure self-compliance regarding recruiting competent staff, imparting Industrial, Environmental and Safety training to the staff, conducting safety audit, onsite emergency plans with record maintenance and information to SPCBs/ PCCs/ concerned Authorities.
51. The distancing criteria for storage of hazardous chemicals have to be followed as per extant safety guidelines / rules. The chemicals should be stored as per compatibility and separate area for flammable, corrosive, explosive and toxic chemicals should be earmarked.
52. The labelling of hazardous chemical storing containers shall be as per extant rules. The concerned employees should be made aware of the risks associated with the stored hazardous chemicals and appropriate precautions that need to be taken.
53. To contain any spillage or leakage of hazardous chemicals or any uncontrolled reaction that may cause any emergency or accident, the industries / isolated storages should have sufficient stock of neutralizing

chemicals, absorbents, reaction quenchers with proper equipment and trained manpower.

54. Emergency ambulance services should be arranged in the industrial zones along with experienced doctors and paramedic staff.
55. Safety in operation greatly depends on proper commissioning of an industry / isolated storage and hence utmost care should be taken to monitor every aspect during erection and maintenance schedules or other areas which require proper planning.
56. The industries / isolated storages shall ensure that their premises should be constructed in accordance with the local government regulations.
57. A control room to deal with the emergencies should be commissioned by the industries / isolated storages. A quick response team of responsible officers should be constituted having duly assigned duties to be executed during emergencies.
58. The industry / isolated storage should conduct public awareness programmes in the surrounding localities about do's & don'ts during emergency situations on annual basis.
59. 'Mutual Aid Scheme' among industries to meet required response measures during chemical emergencies should be adopted.
60. Emergency contact numbers should be readily available at the isolated storages or industrial installations similar to 'Crisis Alert System' or Red Book.
61. Placing / indicating hazard signs at appropriate places in the isolated storage or industry or outside the shop floor (within the premises) should be done.
62. Increased automation that avoids physical handling of dangerous chemicals and substances should be brought into practice.
63. The industry / isolated storage should have proper firefighting arrangements in accordance with The Factories Act, 1948 / applicable extant laws.
64. All emergency valves and switches and emergency handling facilities should be easily accessible.
65. Safety audit reports shall be made online for public.
66. To ensure safety during operation/ handling / storage of hazardous chemicals, the industries/ isolated storages wherever and as applicable, shall obtain requisite clearances from The Chief Inspector, Factories and Boilers / Department of explosives / Fire Department etc. without fail.

67. The industries / isolated storages shall ensure that the effluent generated during any accident because of firefighting / decontamination activities etc. should be disposed in scientific manner after proper treatment. The hazardous wastes generated after any accident must be disposed in accordance with the extant rules.
68. Occupiers of storage installations like warehouses / tank farms are required to prepare an On-Site Emergency Plan and make available information regarding any possible off-site consequences to the District Collector to enable him to include the same in the Off Site Emergency Plan for the district or the particular area.
69. In order to avoid accidents, the following measures may be taken while establishing a warehouse/tank-farm. These should also be carried out in existing installations to enhance safety :
- i. Hazardous chemical storages should be located away from densely populated areas from drinking water sources, water bodies or from areas liable to flooding.
 - ii. The location should have easy access for transport and emergency services.
 - iii. Adequate emergency requirements like water for firefighting, drainage to prevent ground water contamination, standby source of electricity etc. should be provided.
 - iv. The layout of warehouses should be designed in accordance with nature of materials to be stored. The construction material should be non-flammable.
 - v. Floors should be impermeable to liquids and should be designed for easy cleaning.
 - vi. Drains should not be connected directly to water ways or public sewers. The drains should be connected to an interceptor pit.
 - vii. Proper embankments to contain any accidental spillage should be provided for all hazardous materials storages.
 - viii. Loading and unloading operations are to be done with utmost care.
 - ix. Procedure for receipt, despatch and transport should be clearly laid down.

- x. Details of hazardous chemicals, access and escape routes, available emergency & firefighting equipment should be available.
- xi. In addition to a storage plan, a safe operation of a storage facility should have planning for safety training, personal protective clothing and equipment, spillages and leaking containers, waste disposal, first aid, fire detection and protection equipment, environment protection, proper on site emergency plan etc.

70. Wherever applicable, the industries or the isolated storages shall invariably comply with the Manufacture, Storage and Import of Hazardous Chemical Rules, 1989 (as amended), The Major Accident Hazard Control Rules, 1997, The Factories Act, any other applicable rules or guidelines issued by the respective Government of State / Union Territory, The Ministry of Labour & Employment, Petroleum and Explosive Safety Organization, Oil Industry Safety Directorate etc.

B. Guidelines on the On Site Emergency Plans (for industries and isolated storages):

1. The occupier of an industrial activity / isolated storage shall prepare and keep up-to-date an on-site emergency plan containing details specified in Schedule 11 of the Manufacture, Storage and Import of Hazardous Chemical Rules, 1989 (as amended) detailing how major accidents will be dealt with on the site on which the industrial activity is carried on and that plan shall include the name of the person who is responsible for safety on the site and the names of those who are authorized to take action in accordance with the plan in case of an emergency.
2. The occupier shall ensure that the emergency plan prepared takes into account any modification made in the industrial activity / isolated storage and that every person on the site who is affected by the plan is informed of its relevant provisions.
3. The occupier shall prepare the emergency plan in the case of a new industrial activity or isolated storage, before that activity is commenced.

4. The occupier shall conduct a mock drill of the on-site emergency plan every six months and a detailed report of the mock drill conducted shall be made immediately available to the concerned authorities as and when demanded.
5. With every change or modification made in a factory, operation or process, the on-site emergency plan may have to be modified and updated to keep it meaningful and effective. An on-site emergency plan should contain the following key elements:
 - i. basis of the plan and hazard analysis;
 - ii. accident prevention procedure/measures;
 - iii. accident/emergency response procedure/measures; and
 - iv. recovery procedure.

Proper planning by industries / isolated storages helps in reducing the chances of accidents. For proper planning, the following needs to be considered:

- i. risk associated with the process technology;
- ii. safety measures;
- iii. siting and layout of industry / isolated storage ;
- iv. emergency preparedness; and
- v. compliance with the regulatory requirements.

Assessing the hazard potential of an installation is the first step in planning for emergencies. Preliminary Hazard Analysis which comprises hazard identification and vulnerability analysis should always be carried out at the conceptual stage for all installations including small and medium installation. However, Major Accident Hazard (MAH) installations, both existing and proposed ones, should carry out a risk analysis.

Hazard Analysis:

Hazard analysis is a critical component in planning for emergencies. To analyse the safety of a major installation as well as its potential hazards, a hazard analysis should be carried out covering the following areas:

- i. The toxic, reactive, explosive or flammable substance in the installation that constitute a major hazard.
- ii. The failures or errors that may cause abnormal conditions leading to a major accident.
- iii. The consequences of a major accident for the workers, people living or working outside the installation and the environment.
- iv. Preventive measures for accidents.
- v. Mitigation of the consequences of an accident.

Vulnerability Analysis:

Considering the maximum loss scenario e.g. catastrophic vessel rupture, the occupier may estimate the vulnerable zone or the zones which will be affected by the release of hazardous chemicals. It should be borne in mind that every effort should be made to confine the vulnerable zone within the factory premises. In order to achieve this, the following could be adopted:

- i. Reduce the quantity of hazardous substances stored.
- ii. Split the hazardous storages into number of smaller ones.
- iii. Isolate the storages that might lead to cascading effect.
- iv. Substitute extremely hazardous substances with less hazardous substance.

Risk Analysis:

Risk analysis can provide a relative measure of the likelihood and severity of various possible hazardous events and enable the emergency plan to focus on the greatest potential risks. Risk analysis involves an estimate of the probability or likelihood that an event will occur.

C. Guidelines for the Concerned Authorities:

1. The State Pollution Control Boards (SPCBs)/ Pollution Control Committees (PCCs) shall ensure that while issuing Consent to Establish (CET) or Consent to Operate (CTO) or renewing CET / CTO accorded to a plant,

industry or process under the Water (Prevention & Control Of Pollution) Act, 1974 and the Air (Prevention & Control of Pollution) Act, 1981, details on Onsite Emergency Plan, Safety Reports and Safety Audit Reports in accordance with The Manufacture, Storage and Import of Hazardous Chemical Rules, 1989 (as amended), be compulsorily sought from occupier, industry or installation handling hazardous chemicals in quantity equal to or more than the threshold quantity specified in the said rules.

2. The concerned authorities shall seek report from the occupier of the site in the event of major accident and shall undertake a full analysis of the major accident and send the requisite information within 90 days to the Ministry of Environment, Forests and Climate Change.
3. The concerned authorities in the event of major accident shall seek report from the occupier of the site regarding steps taken to avoid any repetition of such occurrence of accident on the site and The concerned authorities shall in writing inform the occupier, of any lacunae which are needed to be rectified to avoid major accidents.
4. The concerned authorities shall ensure that any person responsible for importing hazardous chemicals in India shall provide before 30 days or as reasonably possible but not later than the date of import to the concerned authorities in accordance with Rule 18 of the Manufacture, Storage and Import of Hazardous Chemical Rules, 1989 (as amended).
5. The concerned authorities shall direct the importer to take appropriate safety measures if the concerned authorities are satisfied that the chemical being imported is likely to cause major accidents.
6. The concerned authorities shall direct stoppage of import of the chemical which it considers not to be imported on safety or on environmental considerations and the concerned authorities shall simultaneously inform the concerned Port Authority to take appropriate steps regarding safe handling and storage of hazardous chemicals while off-loading the consignment within the port premises.

7. The concerned authorities shall ensure that any person importing hazardous chemicals shall maintain the records of the hazardous chemicals imported as specified in Schedule 10 of The Manufacture, Storage and Import of Hazardous Chemical Rules, 1989 (as amended) and the records so maintained shall be open for inspection by the regulatory authorities.
8. The concerned authorities shall ensure that any industry / isolated storage involved in the manufacturing, storage and import of hazardous chemicals shall comply with the stipulated provisions of The Manufacture, Storage and Import of Hazardous Chemical Rules, 1989 (as amended).
9. The offsite emergency plans as well as the management of chemical accidents may be integrated with the district level disaster management plan.
10. Local administration / Directorate of Industrial Safety and Health, SPCBs/ PCCs should keep stringent surveillance to avoid accidents at industries / isolated storages and to prevent environment damage.
11. Periodic inspections including surprise inspections should be conducted by concerned authorities to assess the safety measures and documents maintained by the industry / isolated storage. If found not complying, necessary action shall be initiated against the industry / isolated storage.
12. Maintenance of buffer zone for all industries / isolated storages, stoppage of encroachments and policy of not allocating residential houses near to industries / isolated storages should be strictly followed by the concerned authorities of State / Union Territory / Central Government.
13. Risk assessment mapping of the industrial areas may be done w.r.t. gas leakages, fires, explosion etc.
14. Awareness of the public residing around the isolated storages, industrial areas or industrial accident prone regions to deal with emergency situations shall be done by the industries / isolated storages as well as the district administration.

15. Each industrial pocket shall have a Local Crisis Group which shall act as per the stipulations of The Chemical Accidents (Emergency Planning, Preparedness and Response) Rules, 1996.
16. The District crisis group, State Crisis Group and the Central Crisis Group should act in accordance with The Chemical Accidents (Emergency Planning, Preparedness and Response) Rules, 1996.
17. Industries / isolated storages shall not be allowed to operate in a non industrial zone. The District administration shall ensure that there shall not be any unauthorized storage of hazardous chemicals.
18. Land use planning decisions by public authorities should be taken after considering all aspects related to safety viz. possible hazards / anticipated accidents at the hazardous installations, cumulative risk of various hazardous installations situated in vicinity, safe distance for the surrounding localities, buffer zones, applicability of rescue plans in the eventuality of accidents etc.
19. State Government should devise their own system in accordance with the basic provisions provided in The Major Accident Hazard Control Rules (under Factories Act, 1948). As per these rules the safety audit should be conducted by an independent accredited auditor, and every time a fresh audit should be carried out with a periodicity of one year.
20. Special courses should be designed for auditing the industries / isolated storages to build competence and capabilities in our country which includes hazard identification and risk assessment.
21. Comprehensive safety audit must be carried out by trained professionals and the corrective actions recommended by them should be implemented in a time bound manner. The comprehensive safety audit should include policy, procedure and practices to minimise the risk of exposure of people and environment to potentially hazardous chemicals.
22. The states and districts which are lagging behind in conducting the safety audits of the industries / isolated storages should be prioritised.
23. The gap between two consequent audits can be further minimized by taking the entire procedure online so that the recommendations enumerated during

the audits are available for the next audit. In this way, if a new safety auditor will become well-versed with the points of previous audits.

24. A robust and updated online mapping system, portraying all the hazards happening in the country can prove to be an aide in conducting the safety audits. A GIS- based system can be developed mapping all the hazards occurring in the industries containing all the information about the incident, which can be harnessed to make proper evaluations. This information can also be shared by the administrative authorities so that a prompt action can be taken to minimize the damage caused by the accident.

D. Guidelines on the Off Site Emergency Plans (for Concerned Authorities):

1. The concerned authority (as identified in Column 2 of Schedule 5 of the Manufacture, Storage and Import of Hazardous Chemical Rules, 1989 (as amended)) shall prepare and keep up-to-date an adequate off-site emergency plan containing particulars specified in Schedule 12 (of the Manufacture, Storage and Import of Hazardous Chemical Rules, 1989 (as amended)) and detailing how emergencies relating to a possible major accident on that site will be dealt with and in preparing that plan the concerned authority shall consult the occupier, and such other persons as it may deem necessary.
2. For the purpose of enabling the concerned authority to prepare the off site emergency plan the occupier of an industrial activity / isolated storage shall provide the concerned authority with such information relating to the industrial activity under his control as the concerned authority may require, including the nature, extent and likely effects off-site of possible major accidents and the authority shall provide the occupier with any information from the off-site emergency plan which relates to his duties under rule 13 (of the Manufacture, Storage and Import of Hazardous Chemical Rules, 1989 (as amended)).
3. In the case of a new industrial activity, before that activity is commenced, the concerned authority shall prepare off site emergency plan.
4. The concerned authority shall ensure that a rehearsal of the off-site emergency plan is conducted at least once in a calendar year.

5. All districts having major hazard installation should have an off-site emergency plan.
6. The off site emergency plan should be updated from time to time, especially when a new process is started or new units are established.
7. An off site emergency plan should have the following important components :
 - i. Aims & Objectives of the Plan
 - ii. Planning Team
 - iii. Hazard Analysis and Quantification
 - iv. Assessment of Capabilities
 - v. Information regarding relevant past incidents / anticipated incidents.
 - vi. Authorities for responding
 - vii. Names and addresses of the key personnel with contact numbers for emergency assistance
 - viii. Response components viz. Control Room, Communication amongst responders, Warning System/Emergency Notification , Public information, Resources Mobilisation and Management, Health and Medical Response, Public protection including evacuation, firefighting and rescue plans, law and order, ongoing incident assessment.
 - ix. Containment, clean up and disposal,
 - x. Mechanisms for plan testing and updating, community awareness, preparedness and training.

E. Guidelines on Safety Audit:

1. The safety audits should be conducted by the competent agency to be accredited by an Accreditation Board to be constituted by the Ministry of Labour and Employment, Government of India in this behalf and in absence of such Accreditation Board by a competent agency approved by Chief inspector of Factories.
2. The qualifications and experience of safety auditor should be as per extant rules.

3. The safety auditor carrying out the safety audit under Rule 10 of the Manufacture, Storage and Import of Hazardous Chemical Rules, 1989 (MSIHC Rules, 1989) shall bring out the status of compliance by the occupier in his safety audit report in addition to the compliance of provisions of the MSIHC Rules, 1989 (as amended from time to time) and the state CIMAH Rules. A copy of the safety audit report to be forwarded by the safety auditor to the concerned authority as identified under schedule 5 of the MSIHC Rules, 1989.
4. The audit should be carried out as per IS 14489:2018 – Code of Practice on Occupational Safety & Health Audit (as amended time to time).
5. The broad areas to be covered in the Safety Audit should be:
 - i. Occupational Health and Safety Management
 - ii. Physical, Mechanical and Electrical Hazards and their Control Measures
 - iii. Chemical Hazards and their Control Measures
 - iv. Fire and Explosion Hazard and their Control Measures
 - v. Industrial Hygiene/Occupational Health
 - vi. Accident/Incident Reporting, Investigation and Analysis.
 - vii. Emergency Preparedness (On-Site/ Off Site)
 - viii. Safety Inspection
6. The Objectives of Safety Audit should be :
 - i. To examine the existing procedures, system and control measures for hazards.
 - ii. To assess the adequacy of hazard identification.
 - iii. To identify potential hazards not covered by the existing safety systems, procedures and practices.
 - iv. To identify the adequacy of the control measures put in place by the occupier.
 - v. To bring out any deviation from the set procedures and statutory non-compliance.
 - vi. To recommend improvements for better effectiveness of the existing safety system, procedures & practices and also other measures of hazards control.
 - vii. To recommend system, procedure and control measures for identified hazards.

- viii. To study compliance with statutory provisions and relevant codes of practice and recommend actions to be taken, wherever there is non-compliance.
- ix. To identify the compliance with the provisions under these guidelines.

GLOSSARY

Authority means an authority mentioned in Column 2 of Schedule 5 of the Manufacture, Storage and Import of Hazardous Chemical Rules, 1989 (as amended).

Export with its grammatical variations and cognate expression, means taking out of India to a place outside India.

Exporter means any person under the jurisdiction of the exporting country and includes the exporting country, who exports hazardous chemical.

Hazardous Chemical means:

- i. any chemical which satisfies any of the criteria laid down in Part I of Schedule 1 or listed in Column 2 of Part II of Schedule 1 of the Manufacture, Storage and Import of Hazardous Chemical Rules, 1989 (as amended);
- ii. any chemical listed in Column 2 of Schedule 2 of the Manufacture, Storage and Import of Hazardous Chemical Rules, 1989 (as amended) ;
- iii. any chemical listed in Column 2 of Schedule 3 of the Manufacture, Storage and Import of Hazardous Chemical Rules, 1989 (as amended) .

Import with its grammatical variations and cognate expression, means bringing into India from a place outside India.

Importer means an occupier or any person who imports hazardous chemicals.

Industrial activity means an operation or process carried out in an industrial installation referred to in Schedule 4 involving or likely to involve one or more hazardous chemicals and includes on-site storage or on-site transport which is associated with that operation or process, as the case may be or isolated storage or pipeline.

Isolated storage means storage of a hazardous chemical, other than storage associated with an installation on the same site specified in Schedule 4 of the Manufacture, Storage and Import of Hazardous Chemical Rules, 1989 (as amended) where that storage involves at least the quantities of that chemical set out in Schedule 2 of the Manufacture, Storage and Import of Hazardous Chemical Rules, 1989 (as amended).

Occupier with its grammatical variations and cognate expression, means the person controlling the industrial activity or isolated storage.

Chemical accident means an accident involving a fortuitous, or sudden or unintended occurrence while handling any hazardous chemicals resulting in continuous, intermittent or repeated exposure to death, or injury to, any person or damage to any property but does not include an accident by reason only of war or radio-activity.

Major accident means an incident involving loss of life inside or outside the installation, or ten or more injuries inside and/or one or more injuries outside or release of toxic chemicals or explosion or fire or spillage of hazardous chemicals resulting in on-site or off-site emergencies or damage to equipment leading to stoppage of process or adverse effects to the environment.

Major Accident Hazards installations means - isolated storage and industrial activity at a site handling (including transport through carrier or pipeline) of hazardous chemicals equal to or, in excess of the threshold quantities specified in, Column 3 of schedule 2 and 3 [of the Manufacture, Storage and Import of Hazardous Chemical Rules, 1989 (as amended)] respectively.

Pipeline means a pipe (together with any apparatus and works associated therewith) or system of pipes (together with any apparatus and work associated therewith) for the conveyance of a hazardous chemical other than a flammable gas as set out in Column 2 of Part II of Schedule 3 of the Manufacture, Storage and Import of Hazardous

Chemical Rules, 1989 (as amended) at a pressure of less than 8 bars absolute; the pipeline also includes inter state pipelines.

Site means any location where hazardous chemicals are manufactured or processed, stored, handled, used, disposed of and includes the whole of an area under the control of an occupier and includes pier, jetty or similar structure whether floating or not.

Threshold quantity means:

- i. in the case of a hazardous chemical specified in Column 2 of Schedule 2 of the Manufacture, Storage and Import of Hazardous Chemical Rules, 1989 (as amended), the quantity of that chemical specified in the corresponding entry in Columns 3 and 4;
- ii. in the case of a hazardous chemical specified in Column 2 of Part I of Schedule 3 of the Manufacture, Storage and Import of Hazardous Chemical Rules, 1989 (as amended), the quantity of that chemical specified in the corresponding entry in Columns 3 & 4 of that part;
- iii. in the case of substances of a class specified in Column 2 of Part II of Schedule 3 of the Manufacture, Storage and Import of Hazardous Chemical Rules, 1989 (as amended); the total quantity of all substances of that class specified in the corresponding entry in Columns 3 and 4 of that part.

Industrial pocket means any industrial zone ear-marked by the Industrial Development Corporation of the State Government or by the State Government.



F. No. 12/Gen/RDC/AP/2024-25/450

August 22, 2024

To

The Member Secretary
Andhra Pradesh Pollution Control Board
D.No. 33-26-14 D/2, Near Sunrise Hospital
Pushpa Hotel Centre, Chalamalavari Street
Kasturibaipet, Vijayawada – 520 010

Sub: Preliminary report on fire accident at M/s. Escientia Advanced Science, Achutapuram in Ankapalli district, Andhra Pradesh

Sir,

This has reference to the print and media news items about reactor blast and fire incident at pharmaceutical industry M/s. Escientia Advance Science, Achutapuram, Ankapalli district, Andhra Pradesh on 21st August, 2024. In the news article published in The Hindu dated 21/08/2024 it is reported, “17 killed, 20 injured in reactor blast at pharma company in Andhra Pradesh’s Anakapalli”

In this connection it is requested to kindly arrange to take immediate necessary actions to sample/monitor environmental pollutants and contain discharge/emission caused due to the above referred accident.

Further, it is requested to furnish the following reports by 22nd August, 2024 before 7 pm:

1. A preliminary report about the incident including monitoring results.
2. The measures taken to contain solvent leak and any discharge of effluent/ emission caused during the incident.
3. The report on status of compliance to the conditions imposed in the consent to operation issued by APPCB to the industry.
4. The industry shall report related to the accident as per Schedule 6 of MSIHC Rules, 1989 within 48 hours.
5. The CPCB has issued directions under section 18(1) of the Water & Air Act in the matter of the Manufacture, Storage and Import of Hazardous Chemical Rules, 1989 dated 17/11/2017. CPCB vide letter dated 31/05/2024 requested SPCBs to submit the status of compliance on half yearly basis with respect to Integrated Guidance Framework for Chemicals Safety in respect of the Isolated Storages and Industries covered under Manufacture, Storage and Import of Hazardous Chemicals Rules, 1989 in compliance to the Hon’ble National Green Tribunal order dated 14/12/2021 in Original Application No. 60/2021. With reference to the aforementioned letters, it is requested to furnish the status of compliance of M/s. Escientia Advanced Science, Achutapuram, Ankapalli district, Andhra Pradesh.

Your faithfully,

(H. D. Varalaxmi)
Regional Director

Encl: As above

क्षेत्रीय निदेशालय (चेन्नई) : द्वितीय तल , 40-ई, बीएसएनएल बिल्डिंग, थिरु-वी-का औद्योगिक एस्टेट, सिपेट रोड गिंडी, चेन्नई – 600032

दूरभाष: 044-29998683/044-29567019 ईमेल: rdchennai.cpcb@gov.in

Regional Directorate (Chennai): Second Floor, 40-E, BSNL Building, TVK Industrial Estate, CIPET Road Guindy, Chennai – 600032

Phone: 044-29998683/044-29567019 Email: rdchennai.cpcb@gov.in

प्रधान कार्यालय : परिवेश भवन, पूर्वी अर्जुन नगर, दिल्ली -110 032

Head Office: Parivesh Bhawan, East Arjun Nagar, Delhi – 110032

दूरभाष /Telephone: 011-43102030, Fax : 22305793, 22307078, 22307079, 22301932, 22304948

ई-मेल / E-mail: cpcb@nic.in वैबसाइट / Website : www.cpcb.nic.in



Page No: 87
केन्द्रीय प्रदूषण नियंत्रण बोर्ड
CENTRAL POLLUTION CONTROL BOARD
पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय, भारत सरकार
MINISTRY OF ENVIRONMENT, FOREST & CLIMATE CHANGE, GOVT. OF INDIA

Copy to:

1. Joint Chief Environmental Engineer,
Andhra Pradesh Pollution Control Board,
Zonal Office, Madhavadhara,
VUDA Layout, Beside RTO Office,
Visakhapatnam – 018
2. Environmental Engineer,
Andhra Pradesh Pollution Control Board,
Regional Office, Madhavadhara, VUDA Layout,
Beside RTO Office, Visakhapatnam – 530 018

H. D. Varalaxmi
(H. D. Varalaxmi)

क्षेत्रीय निदेशालय (चेन्नई) : द्वितीय तल , 40-ई, बीएसएनएल बिल्डिंग, थिरु-वी-का औद्योगिक एस्टेट, सिपेट रोड गिंडी, चेन्नई – 600032
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ई-मेल / E-mail: cpcb@nic.in वैबसाइट / Website : www.cpcb.nic.in



o/c

Escientia Advanced Sciences Private Limited
Plot No. 11, 11A, 12 & 12A, APSEZ, Atchutapuram,
Anakapalli - 531 011, Andhra Pradesh, INDIA.
Telephone : +91 8924 665000
Facsimile : +91 8924 665299
Website : www.escientia.com

Date:22.08.2024

To,
The Deputy Chief Inspector of factories,
Factories Department,
Vizianagaram.

Respected Sir,

Sub: Submission of FORM-18 --- Regarding.

With reference to the above subject, herewith we are submitting the FORM-18 for your kind information and reference.

Requesting your good office to acknowledge the letter.

Thanking You,

Yours faithfully

For ESCIENTIA ADVANCED SCIENCES PRIVATE LIMITED


22/08/2024
AUTHORIZED SIGNATORY

Enclosures:

1. Form-18
2. Annexure-1 (Deceased Persons Details).
3. Annexure-2 (Injured Persons Details).
4. Annexure-3 (Regular Employees, Contract Employees and Visitors Attendance Details).



o/c

Escientia Advanced Sciences Private Limited
 Plot No. 11, 11A, 12 & 12A, APSEZ, Atchutapuram,
 Anakapalli - 531 011, Andhra Pradesh, INDIA,
 Telephone : +91 8924 665000
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 Website : www.escientia.com

Date:22.08.2024

To,
 The Deputy Chief Inspector of factories,
 Factories Department,
 Vizianagaram.

Respected Sir,

Sub: Submission of FORM-18 --- Regarding.

With reference to the above subject, herewith we are submitting the FORM-18 for your kind information and reference.

Requesting your good office to acknowledge the letter.

Thanking You,

Yours faithfully

For ESCIENTIA ADVANCED SCIENCES PRIVATE LIMITED


 22/08/2024
AUTHORIZED SIGNATORY

Enclosures:

1. Form-18
2. Annexure-1 (Deceased Persons Details).
3. Annexure-2 (Injured Persons Details).
4. Annexure-3 (Regular Employees, Contract Employees and Visitors Attendance Details).

Copy to:

✓ The Joint Deputy Inspector of Factories, Visakhapatnam.

o/c

Date:22.08.2024

To,
The Deputy Chief Inspector of factories,
Factories Department,
Vizianagaram.

Respected Sir,

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For ESCIENTIA ADVANCED SCIENCES PRIVATE LIMITED

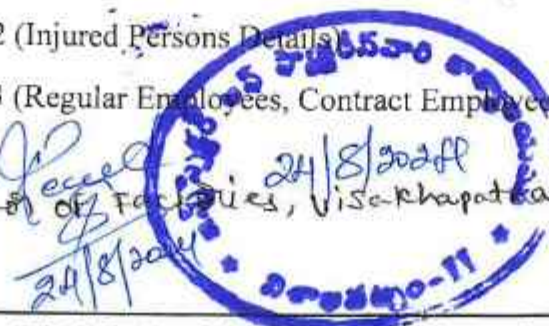

22/08/2024
AUTHORIZED SIGNATORY

Enclosures:

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2. Annexure-1 (Deceased Persons Details).
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Date:22.08.2024

To,
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Yours faithfully

For ESCIENTIA ADVANCED SCIENCES PRIVATE LIMITED
22/08/2024
AUTHORIZED SIGNATORY**Enclosures:**

1. Form-18
2. Annexure-1 (Deceased Persons Details).
3. Annexure-2 (Injured Persons Details).
4. Annexure-3 (Regular Employees, Contract Employees and Visitors Attendance Details).

Copy to!

① Environmental Engineer (Regional office), A.P Pollution Control Board, Visakhapatnam

FORM NO. 18

[prescribed under Rule 96 and under Regulation 68 of Employees State Insurance Act, 1948]

Notice of accident or dangerous occurrence resulting in death or bodily injury

1. Name of occupier (Factory/Employer)	KIRAN REDDY PENDRI M/s. ESCIENTIA ADVANCED SCIENCES PRIVATE LIMITED. Plot No:11,11A,12 & 12A,AP SEZ,Atchutapuram, Anakapalli-531011,Andhra Pradesh,India.
Employees State Insurance Employee Code No.	70000605710001020
2. Address of works/premises where accident or dangerous occurrence took place.	API Building Ground Floor
3. Nature of Industry.	API (Active Pharmaceutical Ingredients)
4. Branch or Department and exact place where the accident or dangerous occurrence took place	API Building ground floor Electrical panel area.
5. Employees State Insurance number (if covered)	Yes Details given in Annexure-1&2
6. Name and address of the injured person.	Total 17 persons are dead and details are attached as Annexure-1 Total 38 persons are injured and details are Attached as annexure-2
7. (a) Sex (b) Age (last birthday)	Information attached as Annexure-1 & 2
(c) Occupation of the injured person	
(d) Monthly wages of the person injured.	
8. Local Employees State Insurance Office to which the injured person is attached.	
9. Date, shift and hour of accident or dangerous occurrence.	21.08.2024, General shift and 14:20hrs.
10. (a) Hour at which the injured person started work on the day of accident or dangerous occurrence.	Information attached as Annexure-1 & 2
(b) Whether wages in full or part are payable to him for the day of the accident or dangerous occurrence.	Information attached as Annexure-1 & 2
11. Cause or nature of accident or dangerous occurrence.	NOT APPLICABLE
(a) if causes is by machinery	-NA-

<p>(i) give name of the machine and the part which involved the accident or dangerous occurrence.</p>	<p>Documentation & Process operations</p>
<p>(b) state whether it was moved by mechanical power at that time state exactly what the injured person was doing</p>	
<p>at that time.</p>	
<p>(c) in your opinion, was the injured person at the time of accident or dangerous occurrence</p>	<p>-NA-</p>
<p>(i) acting in contravention of provisions of any law applicable to him, or</p>	<p>-NA-</p>
<p>(ii) acting in contravention of any orders given by or on behalf of his employer, or</p>	<p>-NA-</p>
<p>(iii) acting without instructions from his employer.</p>	
<p>(d) in case reply to (c), (i), (ii), or (iii) is in the affirmative, state whether the act was done for the purpose of and in connection with the employers trade or business.</p>	
<p>12. in case the accident or dangerous occurrence happened while travelling in the employer's transport, state whether -</p>	<p>NOT APPLICABLE</p>
<p>(i) the injured person was travelling as a passenger to or from his place of work.</p>	<p>-NA-</p>
<p>(ii) the injured person was travelling with the express or implied permission of his employer.</p>	<p>-NA-</p>
<p>(iii) the transport is being operated by or on behalf of the employer or some other person by whom it is provided in pursuance of arrangements made with the employer; and</p>	<p>-NA-</p>
<p>(iv) the vehicle being/not being operated in the ordinary course of public transport service.</p>	<p>-NA-</p>
<p>13. In case the accident or dangerous occurrence happened while meeting an emergency, state-</p>	<p>-NA-</p>

(i) its nature.

(ii) whether the injured person at the time of accident or dangerous occurrence was employed for the purpose of his employer's trade or business in or about the premises at which the accident or

dangerous occurrence took place

14. Describe briefly how the accident or dangerous occurrence occurred.

-NA-

While performing FCP-3 Process, Methyl Tert-Butyl Ether (MTBE) distillation in reactor (R-2220, 3000 liters) distilled collected in vacuum receiver (V-R-2225, capacity 500 liters), located at the back of the respective reactor and then it is transferred to a separate Storage tank (MLST-3401, Capacity: 10 KL) located at Ground Floor for further disposal.

During transferring of the distillate from vacuum receiver to storage tank through SS pipeline leakage of the distilled solvent, i.e. Methylene Tertiary Butyl Ether (MTBE) happened along the pipeline in first floor technical area. Further, solvent spillage was identified at ground floor. Subsequently vacuum receiver valve was closed immediately to stop the solvent transfer and leakage, and fitter to rectify the line holdup leakage, meanwhile the explosion was happened due to the heavy solvent vapor cloud at power panel area in Ground Floor.

15. Names and addresses of witness

(1)

Bhagya Raju Siruvuri

Emp Code: E0026
Designation: Manager
Department: Production

(2)

J Srinivasa Rao

Emp Code: E0031
Designation: Asst. Manager
Department: Production

16. (a) Nature and extent of injury (e.g. fatal, loss of fingers, fracture of leg, scaled or scratch and followed by sepsis).

Fatal

(b) Location of injury (right leg, left hand or left eye, etc.)

Multiple injuries and Fractures.

17. (a) If the accident is dangerous occurrence and is not fatal, state whether the injured person was disabled for more than 48 hours.

NA

(b) Date and hour of return to work.

-NA-

18. (a) Physician, dispensary or hospital from whom or in which, the injured person received or is receiving treatment.

(b) Name of dispensary / panel doctor elected by the injured person.

19. (i) Has the injured person died.

Yes

(ii) If so, date of death.

21.08.2024

Note:- (1) To be completed in legible handwriting or Type writing.

(2) For purposes of item 7-(d) in this Form the definition of wages in Section 2 (m) of the Workmen's Compensation Act, 1923 (Central Act VIII of 1923) and the method laid down in Section 5 of the said Act, regarding calculation of monthly wages shall be adopted.

I certify that to the best of my knowledge and belief the above particulars are correct in every respect.


Signature

Date of dispatch of report-22.08.2024	Name: Kiran Reddy Pendri and Designation of Occupier or manager/Employer: Director
	Employer's address: Kiran Reddy Pendri S/O Yadagiri Reddy Pendri Age:36 Yeras Flot No-705,MVV&MKS Royal Gardens,Ramnagar-Visakhapatnam.
(This space is to be completed by the Inspector of Factories)	
District	
Number of the accident or dangerous occurrence ;	
Industry No. ;	
Other particulars (e.g. fatal, leg injury, arm injury etc.) ; Date of investigation ;	
Result of investigation ;	
Date of receipt ;	
Causation No.:	
Sev (W.M.B. or G.):	

ESSENTIA ADVANCED SCIENCES PRIVATE LIMITED

Dual Persons Details

(Annexure-1)

S. No	Employee Name	Department	Designation	Gender	PF Code	UAN	ESIC Number	Highest Qualification	Contact Number (Personal)	Contact Number (Emergency)	Emergency Contact Name & Relationship	Marital Status	Onroll/Contract	Address
1	SUBENDRA MASHI	Production	Asst. Manager	Male	GRVSP1547373	100629059929		B.Sc.	9703373336	952467255	Srinivas	Married	Onroll	S/o Krishna Rao, D.No. 10-1, Ganganur village, Avarepalle, Khammam, Andhra Pradesh
2	KAMU REDDY NEELAPATI	PD Lab	AGM	Male	GRVSP1547373	100636792328		Ph.D.	7989741811	799053389	Saaveetha, Wife	Married	Onroll	S/o Narasimha Reddy, D.No. 1-1-21, Kotta Vankolipalem, 11B Colony, Visakhapatnam
3	PRASANTH RAMSA	Production	Sr. Executive	Male	GRVSP1547373	100150872024		B.Sc.	888510705	778291907	Rajyanarayana, Father	Married	Onroll	S/o Saiyanarayana, 5-23, Jangala Street, Pundarikota, Srikalahasti District, 522104
4	NARAYANA RAO MAJUMTI	PD Lab	Asst. Manager	Male	GRVSP1547373	100535660834		M.Sc.	940494639	955261308	Suryana, Father	Married	Onroll	S/O Sagar, D NO 2-49, Raja Vudhli, Avilamuru, Guntur, Vizianagaram, Andhra Pradesh-523101
5	VENKATA SAI PUSARLA	Production	Sr. Executive	Male	GRVSP1547373	100643072830		B. VOC	810566666	798072094	Nageswari Rao, Father	Single	Onroll	S/O Nageswari Rao, H.NO. 3-29.3, Rajavaram, Bangarimangalam, Visakhapatnam, Andhra Pradesh-521083
6	MAGESWARA RAMACHANDRA RAO BODDU	Production	Sr. Executive	Male	GRVSP1547373	100102162898		M.Sc.	998516484	905971675	Kanaka Meela Lakshmi, Wife	Married	Onroll	S/O Ramana, Plot No: 201, Delta Sea Residency, Plot no: 207, 20, Vuda Phase-6, Kurummapalem, Visakhapatnam, Andhra Pradesh-520046
7	GANESH KUMAR KOPPARTI	Production	Sr. Executive	Male	GRVSP1547373	100150283758		B.Sc.	979570780	965215993	Durga Bhavani, Mother	Married	Onroll	S/O Srinivas, D.NO 13-2329, Juvvula, Dandli Sirm, Biccavada, East Godavari, Andhra Pradesh-523341
8	PABUKA CHALLAPALLI	PD Lab	Trainee Engineer	Female	GRVSP1547373	101987640522	701140272	B.TECH	9381179025	790152898	Shyamkumar Uncle	Single	Onroll	DNO Eswarnam Lane, D.NO. 70-17, 24/8, Ramayyapeta, Srisaigamapur Kalanaba, East Godavari, AP-520005
9	NAGA BABU MONDI	Production	Asst. Manager	Male	GRVSP1547373	10786051691		B.Sc.	999898926	965218237	Sri Durga Spouse	Married	Onroll	S/O Saiyanarayana, D NO 18-10-87, Gwalhinagara, Samalalota, East Godavari, AP-523448
10	ANANDA RAO BAMPUDI	Production	Asst. Manager	Male	GRVSP1547373	100999190636		B.Sc.	995900004	951844708	Saiyenithi, Spouse	Married	Onroll	S/O B Poojamma, H NO. 7-23, Godapeta, Poojamma, Vijayanagara, AP-525204
11	SATISH MARSETTI	Production	Sr. Executive	Male	GRVSP1547373	10727263223		B.Sc.	9848796902	8984312414	Rajesh, Brother	Married	Onroll	S/O Srini, d no 2/205, Main road, Near Shobhapalem, Patalipatnam
12	RAJASEKHAR PAIDI	Process Engineering	Trainee Process Engineer	Male	GRVSP1547373	10267416466		B.TECH	7993369172	808463104	Dharmarao, Father	Single	Onroll	S/O Dharamarao, H NO 1-368, Vairanga, Anasabailasa, Srikalahasti, AP-523484
13	SANTASI NAIDU VEDI	Production	HK Boy KAPSTRON	Male		10150900623	7010794974	Bth Class	Not Available	Not Available	Not Available	Not Available	Contract	S/O Poojitha, D No-73, Muljampuri, Gokulva, Rantoli, Anaparthi, AP 521051
14	CHINNAO YALLABELLI	Engineering Services Department	Painter S/VIEW	Male		101471423308	701049474	Junior	Not Available	Not Available	Not Available	Not Available	Contract	S/O Divjan, D No 48-1, Vasistapalem, Chibhapalem, Anaparthuram, AP 521011
15	PAIDASAKADI JAWADE	Production		Male		101180967963		ITI	Not Available	Not Available	Not Available	Not Available	Contract	S/O Koteswara Rao, Dakshin Charnulavala, Purvaikgaram, AP 525527
16	MOHAN DURGA PRASAD PUDI	PD Lab	HK Boy IFS	Male		100281740295	701158672	ITI	Not Available	Not Available	Not Available	Not Available	Contract	S/O Sanyasi, H No-92, BEZ colony, Motungapalem, Dibhapalem, Anaparthuram, AP 521011
17	CHIRANJEET JAVVADE			Male		101621572413	7011212644	ITI	Not Available	Not Available	Not Available	Not Available	Contract	S/O Sanyasirajam, H No-2-118, S Rayavaram, Darlapudi, Andhapudi, AP 521082

ANNEXURE-2

Statement showing the details of the severely injured persons being treated at various hospitals

S.No	Full Name of the seriously injured	Age	Gender	Aadhar Number of seriously injured	Name of the Father/Spouse of seriously injured	Address of seriously injured	State, District, Pincode	Name of the Hospital
1	2	3	4	5	6	7	8	9
1	Bandi Sashikanth	32	Male	38305752214	Bandi Brahma Rao	Boddurai Centre, Kambhampadu Vatsavai, Krishana District	521402	Pavan Sai Hospital, Vadlapudi Gajuwaka
2	Gudisa Sai Kumar	32	Male	484020446277	Gudisa Appalanaidu	Diguva Veedhi Bonangi Vizianagaram	535160	Pavan Sai Hospital, Vadlapudi Gajuwaka
3	Ponnada Jagadeesh	38	Male	505899740754	Rama Murthy	TNR Road, Pedagantyada, Visakhapatnam	530044	Pavan Sai Hospital, Vadlapudi Gajuwaka
4	Tamarana Gangadhar	28	Male	711028394122	Raju Naidu	Theeda Kasimkota Mandal	531031	Pavan Sai Hospital, Vadlapudi Gajuwaka
5	Panga Srinivasa Rao	42	Male	585453626468	Papayya	Chinna Veedhi, Dandugopalapuram, Srikakulam	532212	Pavan Sai Hospital, Vadlapudi Gajuwaka
6	Gedda Santhosh	30	Male	421302452841	Venkata Ramana	Parasam, Nellimaria, Vizianagaram	535280	Pavan Sai Hospital, Vadlapudi Gajuwaka
7	Jecreddi Kasi Naidu	33	Male	2850 8785 2360	Demudu	Pedaveedhi, Bodapalem village, Kotauratla Mandal	Andhra Pradesh, Anakapalli - 531117	Pavan Sai Hospital, Vadlapudi Gajuwaka
8	J. Prakash	35	Male			Sompuram, Vepada, Vijayanagaram	Andhra Pradesh, Vijayanagaram	Pavan Sai Hospital, Vadlapudi Gajuwaka
9	Jagarapu Vardhan	22	Male	5350 6212 3303	Jagarapu Ramana	Jangalapalem, Atchutapuram	ANDHRA PRADESH, ANAKAPALLI, RAMBILLI- 531011	Usha Prime Hospital, Anakapalli
10	G. Raja	48	Male	6978 0785 2120	Gaji ramulu	Venkatapuram, Rambilli	ANDHRA PRADESH, ANAKAPALLI, RAMBILLI- 531061	Usha Prime Hospital, Anakapalli
11	B. Suribabu	50	Male	2950 0017 2400	Bodi Chinnabbai	Y Lova, Rambilli	ANDHRA PRADESH, ANAKAPALLI, RAMBILLI- 531061	Usha Prime Hospital, Anakapalli
12	M. Kiran Satyanarayana	37	Male	4723 0665 5157	Ramakarishnareju M	Srinagar, Gajuwaka	ANDHRA PRADESH, VISAKHAPATNAM, GAJUWAKA - 530026	Usha Prime Hospital, Anakapalli

ANNEXURE - 2

S.No	Full Name of the seriously injured	Age	Gender	Aadhar Number of seriously injured	Name of the Father/Spouse of seriously injured	Address of seriously injured	State, District, Pincode	Name of the Hospital
1	2	3	4	5	6	7	8	9
13	D.Apparao	51	Male	6789 7849 7520	Digumarthi Kondayya	Yelamanchili	ANDHRA PRADESH, ANAKAPALLI, YELAMANCHILLI - 531055	Usha Prime Hospital, Anakapalli
14	Prabath Yadav	23	Male	3014 1826 4832	Chinnala Bhaskar	Warangal	TELANGANA, MUSHERABAD, HYDERABAD - 500020	Usha Prime Hospital, Anakapalli
15	Bangeru Chandaka Naidu	29	Male	6997 9239 6258	Chandaka Narayana	Vizianagaram	ANDHRA PRADESH, VIZIANAGARAM, TATIPUDI - 535218	Usha Prime Hospital, Anakapalli
16	S.Yamini	22	Female	6919 0061 7927	Sargadam Maha Lakshmi Naidu	Munagapaka	ANDHRA PRADESH, ANAKAPALLI, MUNAGAPAKA - 531001	Usha Prime Hospital, Anakapalli
17	Ch.Apparao S/o Saryasinaidu	49	Male	7866 7319 1672	Chandaka Sanyasi Naidu	Panchadarla	ANDHRA PRADESH, ANAKAPALLI, RAMBILLI - 531061	Usha Prime Hospital, Anakapalli
18	R.Satyanarayana S/o Narayana	50	Male	3067 9304 2452	Rayi Narayana	Darlapalem	ANDHRA PRADESH, ANAKAPALLI, RAMBILLI - 531061	Usha Prime Hospital, Anakapalli
19	K.SHANMUKHA RAO	27	Male	3331 1317 2501	Kella Adhi Narayana	Srikakulam	ANDHRA PRADESH, SRIKAKULAM, RANASTALAM - 532403	Usha Prime Hospital, Anakapalli
20	B.DHANUNJAY	24	Male	2279 9831 2846	Bodalu Haribabu	Oddissa	ODISHA, KASHINAGARA, GAJAPATI - 761206	Usha Prime Hospital, Anakapalli
21	K.Shanmukha Raju	35	Male	6528 7816 8773	Kanchu Mangaiiah	Srikakulam	ANDHRA PRADESH, VISAKHAPATNAM, VADLAPUDI, GAJUWAKA - 530046	Usha Prime Hospital, Anakapalli
22	A.P.RAMESH	28	Male	7310 2254 1100	Allaka Srinivasa Rao	Fire Office Colony, Yelamanchali	ANDHRA PRADESH, ANAKAPALLI, YELAMANCHILLI - 531055	Usha Prime Hospital, Anakapalli

ANNEXURE-2

S.No	Full Name of the seriously injured	Age	Gender	Aadhar Number of seriously injured	Name of the Father/Spouse of seriously injured	Address of seriously injured	State, District, Pincode	Name of the Hospital
1	2	3	4	5	6	7	8	9
23	P.RAMA MEHARA BABU	43	Male	6420 6300 7770	Pilla Someswara Rao	Yelamanchali	ANDHRA PRADESH, ANAKAPALLI, YELAMANCHILI - 531035	Usha Prime Hospital, Anakapalli
24	N.APPARAO	49	Male	8079 8002 6020	Nethala Kondayya	Navy Colony, VSP	ANDHRA PRADESH, ANAKAPALLI, RAMBILLI - 531061	Usha Prime Hospital, Anakapalli
25	N.Nagabushnam	31	Male	6841 1396 2245	Malla Bangaraya	Vadrapalli, Munagapaka	ANDHRA PRADESH, ANAKAPALLI, MUNAGAPAKA - 531033	Usha Prime Hospital, Anakapalli
26	S.Vamsi	24	Male	7481 0985 2821	Sargadam Vara Prasad	Haripalem, Atchuthapuram	ANDHRA PRADESH, ANAKAPALLI, ATCHUTHAPURAM - 531033	Usha Prime Hospital, Anakapalli
27	NOTLA PAIDI KALYAN	19	Male	5705 1275 6562	Notla Varlakshmi	Vasettipalem, SEZ Colony	ANDHRA PRADESH, ANAKAPALLI, RAMBILLI - 531011	Usha Prime Hospital, Anakapalli
28	Kondala Narayanarao	36	Male	523400786076	Ramu	Mahasinghi Village, saravakota mandal, srikakulam District	Andhra Pradesh, Pin Code 532214	Medicovar Hospital, Venkojipalem, Visakhapatnam
29	Kondru Rambabu	33	Male	383160653396	Akkanna	Subhadrapuram village, Laveru Mandalam, Srikulam District	Andhra Pradesh, Pin Code 532407	Medicovar Hospital, Venkojipalem, Visakhapatnam
30	Boopathi Siva Venkata Ratnam	24	Male	635863422825	Ramana	Peda Kalavalapalli Village, Rambilli Mandal, Anakapalli	Andhra Pradesh, Pin Code 531061	Medicovar Hospital, Venkojipalem, Visakhapatnam
31	Kasetti Chandra Sekhar	25	Male	935561063411	Govinda	Sista Seetharamapuram Village, Ramabhadrapuram Mandalam, Vizainagaram District	Andhra Pradesh, Pin Code 535579	Medicovar Hospital, Venkojipalem, Visakhapatnam

ANNEXURE - 2

S.No	Full Name of the seriously injured	Age	Gender	Aadhar Number of seriously injured	Name of the Father/Spouse of seriously injured	Address of seriously injured	State, District, Pincode	Name of the Hospital
1	2	3	4	5	6	7	8	9
32	Yellapu Mahesh Babu	24	Male	850016550287	Naga Bhoosana Rao	Patipalli Village, Managapaka Mandal, Anakapalli District	Andhra Pradesh, Pin Code 531033	Medicovar Hospital, Venkojipalem, Visakhapatnam
33	Pilki Demudu	28	Male	838391467507	Kasi Rao	Boyapadu Village, Nakkapalli Mandal, Anakapalli	Andhra Pradesh, Pin Code 531081	Medicovar Hospital, Venkojipalem, Visakhapatnam
34	Pesupureddy Jagadeeswara rao	40	Male	815933738399	China Satyanarayana	Lakkavarapu kota Village, Lakkavarapu kota Mandal, Vizianagaram	Andhra Pradesh, Pin Code 535161	Medicovar Hospital, Venkojipalem, Visakhapatnam
35	G S Vara Prasad Raju S/o Sanyasi Raju	40	Male	741484399615	G Bhagyaracka	Flat No.402, Ma Sai Enclave, Road No.3, Sathavahan Nagar, Kurmanapalem,	Visakhapatnam-530046	Kims Hospital, Sheelanagar, Gajuwaka
36	Pottasiri Aruna Kumar S/o Subbaiah	42	Male	996223828623	Subbaiah	Flat No. 101, 1st Floor, K M Heights, 31-2-2/7/8, SF 302, Shiva Sai Nagar, Behind cygnett ramachandra hotel, Kurmannapalem	Visakhapatnam-530046.	Kims Hospital, Sheelanagar, Gajuwaka
37	Bandu Baba Srinivasa Varma S/o Gopala Krishnam Raju	32	Male	888394351951	Gopala Krishnam Raju	D.No.2-114/2, Srinivas Nagar, Near Prasanthi Nagar, VTC Aganampudi	Visakhapatnam-530053	Kims Hospital, Sheelanagar, Gajuwaka
38	Gandireti V.V.Lakshmi Chaitanya	33	Male	801669865869	G.V.V.L.Satyana rayana	V.Krishnapuram, Dattirajuru, Vindhayasi, Vijayanagaram	Vijayanagaram, Andhra Pradesh, 535580	RK Hospital, Gajuwaka

Rajy...
For Collector
Anakapalli

22/10/24
...

...
...

Annexure-3

ESCIENTIA ADVANCED SCIENCES PRIVATE LIMITED

Regular Employees, Contract Employees and visitors attendance details.

Shift	Regular Employees		Contract Employees		Visitors		Total
	Male	Female	Male	Female	Male	Female	
A	42	0	35	4	0	0	81
G	137	24	100	23	11	0	295
B	44	1	43	0	0	0	88
Total Manpower							464

Affected persons Details

	Male	Female	Total
Injured Persons	37	1	38
Deceased (Death)	16	1	17
Total			55

Handwritten signature
(overleaf)



REGD.POST WITH ACK.DUE

CONSENT ORDER FOR ESTABLISHMENT

Order No.327/PCB/CFE/RO-VSP/HO/2014

Dt. 07.02.2014

Sub: PCB - CFE - M/s. Escientia Advanced Sciences Pvt. Ltd., Plot No.11, 11 A, 12 & 12 A, APSEZ, Krishnampalem (V) Rambilli (M), Visakhapatnam District - Consent for Establishment of the Board under Sec.25 of Water (P & C of P) Act, 1974 and Under Sec.21 of Air (P&C of P) Act, 1981 - Issued - Reg.

- Ref: 1) Industry's application received through SWCC from the Development Commissioner, APSEZ on 4.11.2013 and Addl. Information received on 18.11.2013.
2) R.O's inspection report dt.13.12.2013.
3) CFE Committee meeting held on 20.01.2014.
4) Industry submitted clarification on 22.01.2014.

1. In the reference 1st cited, an application was submitted to the Board seeking Consent for Establishment (CFE) to produce the following products with installed capacities as mentioned below, with a project cost of Rs.78.0 Crores.

Sl. No.	Products	Capacity (Kg/day)	No.of stages to be manufactured	Starting Raw Material & Molecular Formula for product	Quantity of Starting Raw Material (Kg/day)
Phase -I					
1.	Atazanavir Sulphate	300	4	(2S)-2-amino-3,3-dimethylbutanoic acid	179.9
2.	Darunavir Ethanolate	300	4	DNV-II intermediate	372.4
3.	Donepezil Hydrochloride	300	2	5,6 Dimethoxy-1-inadanone	261.7
4.	Febuxostat	300	2	Ethyl-2-(3-cyano-4-isobutoxyphenyl)-4-methyl-5-thiazolecarboxylate	463.8
5.	Fexofenadine Hydrochloride	300	6	2-[4-(4-chloro-1-oxobutyl)phenyl]-2-methylpropanoic acid (BW-08)	361.6
6.	Glipizide	300	4	5-Methyl-2-pyrazine carboxylic acid (5-MPCA)	262.5
7.	Lanzoprazole	300	4	2-Chloro-3-methyl-4-(2,2,3-trifluoroethoxy) Pyridine HCl	461.7
8.	Levetiracetam	400	2	(2S)-2-aminobutanamide HCl	412

9.	R & D / Custom Synthesis Products	100	--	--	
	Total	2600			
	Phase -II				
10.	Abacavir Sulphate	200	4	Pyrimidinyl formamide	301.6
11.	Atorvastatin Calcium	100	3	Cyano compound	318.2
12.	Clopidogrel Bisulfate	100	5	2-Chlorophenyl acetic acid	119.2
13.	Duloxetine Hydrochloride	50	5	DTP-Hydrochloride	228.6
14.	Efavirenz	200	3	PMB Amino alcohol	241
15.	Emtricitabine	50	5	L-methyglyoxlate hydrate	256.8
16.	Festerodine Fumerate	50	4	Methyl paraben / Methyl 4-Hydroxy benzoate	62.5
17.	Lopinavir	50	6	Enaminone	321.7
18.	Pioglitazone Hydrochloride	50	4	4-(2-(-Ethyl-2 Pyridine)Ethoxy) Nitrobenzene	179.8
19.	Rabeprazole Sodium	100	3	Chloro compound	325.1
20.	Raltegravir Potassium	100	3	RLT-II	138.7
21.	Ranolazine	200	5	2,6 xylidiene	119.9
22.	Ritonavir	200	3	BDH-succinate salt	223.1
23.	Telmisartan	200	2	Bienzimidazole	168.4
24.	Tenofovir dispproxil Fumarate	100	3	Adenine	38,2
25.	R & D / Custom Synthesis Products	100	--	--	
	Total	1850			

- As per the application, the above activity is to be located at Plot No.11, 11 A, 12 & 12 A, APSEZ, Krishnampalem (V) Rambilli (M), Visakhapatnam District in an area of 40 Acres or 1,61,880 Sq.m.
- The above site was inspected by the Environmental Engineer and Asst. Environmental Engineer-I, Regional office, Visakhapatnam, A.P Pollution Control Board on 19.11.2013 and observed that the site is surrounded by
 - North** : APIIC Road followed by APIIC vacant industrial plot
 - South** : APIIC Road followed by vacant plot & water tank
 - East** : M/s. Vasant Chemicals Pvt. Ltd.
 - West** : M/s. Sundaram Alloys Ltd.
- The Board, after careful scrutiny of the application and verification report of Regional Officer, hereby issues **CONSENT FOR ESTABLISHMENT** to your activity Under Section 25 of Water (Prevention & Control of Pollution) Act 1974 and Section 21 of Air (Prevention & Control of Pollution) Act, 1981 and the rules made there under. **This order is issued to manufacture the products as mentioned at para (1) only.**

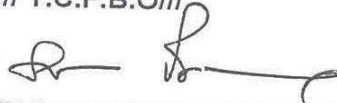
5. This Consent Order now issued is subject to the conditions mentioned in Schedule 'A' and Schedule 'B'.
6. This order is issued from pollution control point of view only. Zoning and other regulations are not considered.

Encl: Schedule 'A'
Schedule 'B'

Sd/-
MEMBER SECRETARY

To,
M/s. Escentia Advanced Sciences Pvt., Ltd.,
101, Saptagiri Residency, 1-10-98/A,
Chikoti Gardens, Begumpet, Hyderabad – 500 016.

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

B. 

JOINT CHIEF ENVIRONMENTAL ENGINEER(CFE)

13

SCHEDULE - A

1. Progress on implementation of the project shall be reported to the concerned Regional Office, A.P. Pollution Control Board once in six months.
2. Separate energy meters shall be provided for Effluent Treatment Plant (ETP) and Air pollution Control equipments to record energy consumed.
3. The proponent shall obtain Consents for Operation (CFO) from APPCB, as required Under Sec.25/26 of the Water (P&C of P) Act, 1974 and under sec. 21/22 of the Air (P&C of P) Act, 1981, before commencement of the activity.
4. Notwithstanding anything contained in this conditional letter or consent, the Board hereby reserves its right and power Under Sec.27(2) of Water (Prevention and Control of Pollution) Act, 1974 and Under Sec.21(4) of Air (Prevention and Control of Pollution) Act, 1981 to review any or all the conditions imposed herein and to make such alternation as deemed fit and stipulate any additional conditions by the Board.
5. The consent of the Board shall be exhibited in the factory premises at a conspicuous place for the information of the inspecting officers of different departments.
6. Compensation is to be paid for any environmental damage caused by it, as fixed by the Collector and District Magistrate as civil liability.
7. Floor washing shall be admitted into the effluent collection system only and shall not be allowed to find their way in storm drains or open areas. The industry shall maintain a good housekeeping. All pipe valves, sewers, drains shall be leak proof. Dyke walls shall be constructed around storage of chemicals.
8. Rain Water Harvesting (RWH) structure (s) shall be established on the plant site. The proponent shall ensure that effluent shall not enter the Rain Water harvesting structure.
9. The rules and regulations notified by Ministry of Law and Justice, GOI, regarding the Public Liability Insurance Act, 1991 shall be followed.
10. **This order is valid for period of 5 years from the date of issue.**

SCHEDULE - B**Water:**

1. The source of water is APSEZ supply, and the maximum permitted fresh water consumption 109.75 KLD for Phase-I & 191.82 KLD.

Sl. No.	Purpose	Quantity		
		PHASE - I	PHASE - II	TOTAL
1.	Process (Including R & D)	94.75 KLD	184.82 KLD	279.57 KLD
2.	Washings	10.0 KLD	20.0 KLD	30.0 KLD
3.	Scrubber	10.0 KLD + 5.0 KLD (Recycled)	15.0 KLD + 5.0 KLD (Recycled)	25.0 KLD + 10.0 KLD (Recycled)
4.	Boiler Feed	45.0 KLD	90.0 KLD	135.0 KLD
5.	Rejects from Boiler treatment	10.0 KLD	24.0 KLD	34.0 KLD

6.	Cooling Tower	70.0 KLD + 127.0 KLD (Recycled)	100.0 KLD + 240.0 KLD (Recycled)	170.0 KLD + 367 KLD (Recycled)
7.	Gardening	13.0 KLD (Recycled)	27.0 KLD (Recycled)	40.0 KLD (Recycled)
8.	Domestic	15.0 KLD	30.0 KLD	45.0 KLD
Total		254.75 KLD	463.82 KLD	718.57 KLD
Recycled		145.0 KLD	272.0 KLD	417.0 KLD

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

Sl. No.	Source	Phase – I		Phase – II		Total (Phase I & II)	
		*HTDS	LTDS	*HTDS	LTDS	*HTDS	LTDS
1.	Process	99.86	--	192.68	--	292.54	--
2.	Washings	10.0	--	20.0	--	30.0	--
3.	Scrubber water	15.0	--	20.0	--	35.0	--
4.	DM Rejects	10.0	--	24.0	--	34.0	--
5.	Boiler Blow down	--	5.0		12.0	--	17.0
6.	Cooling tower blow downs	--	8.0		18.0	--	26.0
7.	Domestic & Canteen	--	13.0		27.0	--	40.0
Total		134.86	26.0	256.68	57.0	391.54	83.0
Grand total		160.86		313.68		474.54	

* Considering TDS > 5000 mg/l as HTDS as reported in EMP.

Treatment & disposal:

Sl. No	Effluent source	Treatment facilities	Mode of final disposal
1.	HTDS & HCOD effluents	Equalization tank, Neutralization, Settling tank, Stripper, MEE & ATFD	<ul style="list-style-type: none"> Shall be stripped off for organics recovery. Stripper condensate to distillate for separation of organic compounds followed by disposal to cement plants for co-processing & distilled effluents shall be routed to ETP. Stripped effluents for forced evaporation in MEE followed by ATFD. Condensate from MEE shall be routed to Biological ETP ATFD salts to TSDF.
2.	LTDS effluents including utilities blow down	Biological ETP & RO system	<ul style="list-style-type: none"> Treated effluents from ETP shall be filtered in the RO Plant. RO permeate to reuse and RO reject to MEE & ATFD for forced evaporation.
3.	Domestic effluents	STP	Reused for gardening

The Capacities of ZLD Systems for both Phases shall be as mentioned below:

	ZLD facilities	Phase – I	Phase – II
		Capacity (KLD)	
1.	Stripper	135	260
2.	Multi Effect Evaporator	220	400

3.	Agitated Thin Film Dryer	25	50
4.	Biological Treatment Plant	250	420
5.	Reverse Osmosis Plant	250	420

3. The Effluent Treatment Plant (ETP) shall be constructed and commissioned along with the commissioning of the activity. All the units of the ETP shall be impervious to prevent ground water pollution. The ETP units shall be constructed above the ground level.
4. The ZLD system consisting of stripper, MEE & ATFD and RO system and Effluent Treatment Plant (ETP) shall be operated regularly. All the units of the ZLD system shall be impervious to prevent ground water pollution. The units of ZLD system shall be constructed above the ground level.
5. Effluents shall not be discharged onland or into any water bodies under any circumstances and **zero liquid discharge system shall be maintained**. Provisions shall be made for storage of primary treated trade effluents for one day in separate collection tanks constructed above ground level in case of any emergency and shall be treated within one day. The collection tank shall be impervious with proper lining to prevent ground water pollution.
6. During transfer of materials, spillages shall be avoided and garland drains shall be constructed to avoid mixing of accidental spillages with domestic waste and storm drains.
7. Separate meters with necessary pipe-line shall be provided for assessing the quantity of water used for each of the purposes mentioned below.
 - a) Industrial cooling, boiler feed.
 - b) Domestic purposes.
 - c) Processing, whereby water gets polluted and pollutants are easily bio-degradable.
 - d) Processing, whereby water gets polluted and the pollutants are not easily bio-degradable.
8. The industry shall provide flow meters with totalisers to assess the effluent generated for stream-wise and treated effluents recycled in the plant for each purposes.

Air:

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

Sl. No	Details of Stack	Phase - I			Phase - II	
		Stack 1 & 2	Stack - 3	Stack 4 to 7	Stack - 8	Stack 9 to 12
a)	Attached to:	Boilers 2 Nos. (Phase - 1)	Thermic fluid heater	D.G. Sets	Boilers (Standby & expansions)	D.G. Sets
b)	Capacity	2 X 4 TPH	30,00,000 K. Cal/hr	4 X 1250 KVA	1 X 12 TPH	4 X 1250 KVA
c)	Fuel form :	Furnace Oil	Furnace Oil	HSD	Coal	HSD
d)	Quantity:	300 Ltr/hr	400 Ltr/hr	500 Ltr/hr	3500 Kg/hr	500 Ltr/hr
e)	Stack height:	50	30		32	30
f)	Diameter	500	500	150	1000	150

g)	Control Equipment:	--	--	Acoustic enclosures	Cyclone separator followed by Bag filter	Acoustic enclosures
h)	Conc. Of Particulate matter	<115 mg/Nm ³	<115 mg/Nm ³		<115 mg/Nm ³	

10. The industry shall provide dedicated scrubbers to the process vents to control the process emissions. The industry shall provide online pH measuring facility with auto recording system to the scrubbers provided to treat the process emissions.
11. The industry shall implement adequate measures for control all fugitive emissions from the plant.
12. **The proponent shall ensure compliance of the National Ambient Air quality standards notified by MoEF, Gol vide notification No. GSR. 826 (E), dated. 16.11.2009 during construction and regular operational phase of the project**
13. The proponent shall not use odour causing substances such as Mercaptan or cause odour nuisance in the surroundings.
14. The industry shall not send the used /spent solvents to the recyclers and shall process them at their own solvent recovery plant within the plant premises. Solvents shall be recovered to the maximum extent possible and shall be reused.
15. The evaporation losses in solvents are to be controlled by taking the following measures:
 - i) Chilled brine circulation shall be carried out to effectively reduce the solvent losses into the atmosphere.
 - ii) Transfer of solvents shall be done by using pumps instead of manual handling.
 - iii) Closed centrifuges shall be used so as to reduce the solvent losses drastically.
 - iv) The reactor vents shall be connected with primary & secondary condensers to prevent escaping of solvent vapour emissions into atmosphere.
 - v) All the solvent storage tanks shall be connected with vent condensers to prevent escaping of solvent vapour emissions into atmosphere.
16. A sampling port with removable dummy of not less than 15 cm diameter shall be provided in the stack at a distance of 8 times the diameter of the stack from the nearest constraint such as bends etc. A platform with suitable ladder shall be provided below 1 meter of sampling port to accommodate three persons with instruments. A 15 AMP 250 V plug point shall be provided on the platform.
17. The generator shall be installed in a closed area with a silencer and suitable noise absorption systems. The ambient noise level shall not exceed 75 dB(A) during day time and 70 dB(A) during night time.

Solid Waste:

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

Sl. No.	Products	By product	Quantity Kg/day	
			Phase I	Phase II
1.	Atazanavir sulphate	Triethylamine HCl	312.7	--
2.	Glipizide	Triethylamine HCl	141.0	--
3.	Abacavir sulphate	Barium tartarate	--	382.0
4.	Atorvastatin calcium	Diketo Compound	--	234.1
Total			453.7	616.1

19. The proponent shall comply with the following

Sl. No.	Name of the solid waste	Quantity			Method of Disposal
		Phase - I	Phase- II	Total	
1.	Process organic residue	2840 Kg/day	6118 Kg/day	8958 Kg/day	Shall be disposed to TSDF / Cement Industries for incineration
2.	Process inorganic residue	864 Kg/day	0.2 Kg/day	864.2 Kg/day	Shall be disposed to TSDF
3.	Solvent Residue	2708 Kg/day	4535 Kg/day	7243 Kg/day	Shall be disposed to TSDF/Cement industries for co-incineration
4.	Spent carbon	162 Kg/day	310 Kg/day	472 Kg/day	Shall be disposed to TSDF
5.	Spent catalyst	160 Kg/day	333 Kg/day	493 Kg/day	Shall be disposed to authorized recyclers
6.	Spent solvents	97.85 KL/day	152 KL/day	249.85 KL/day	----
7.	Mixed solvents	10.87 KL/day	16.85 KL/day	27.72 KL/day	Shall be disposed to TSDF / Cement Industries for co-incineration.
8.	Evaporation salts	2.8 TPD	5.8 TPD	9.6 TPD	Shall be sent to TSDF
9.	Stripper Distillate	11.2 KL/day	21.3 KL/day	32.5 KL/day	Shall be sent to cement industries for co-incineration
10.	Chemical sludge / tank bottom sludge / ETP – STP Sludge/ Distillation Bottom residue from cleaning activities	950 Kg/day	3900 Kg/day	4850 Kg/day	Shall be disposed to TSDF
11.	Ash from boiler	--	32.6 TPD	32.6 TPD	Shall be disposed to brick manufacturers
12.	Waste / used spent oil	10 KL/month	10 KL/month	20 KL/month	Shall be disposed to authorized recyclers

13.	Discarded containers / barrels / liners contaminated with hazardous wastes or chemicals	500 nos/year	700 nos/year	1200 nos/year	Shall be disposed to authorized agencies
14.	Used Batteries	50 nos/year	50 nos/year	100 nos/year	Shall be disposed to authorized recyclers

20. The proponent shall place the chemical drums and / or any drums in a shed provided with concrete platform only. The Platform shall be provided with sufficient dyke wall and effluent collection system.
21. Container & Container liners shall be detoxified at the specified covered platform with dyke walls and the wash wastewater shall be routed to low TDS collection tank.
22. The following rules and regulations notified by the MoE&F, GoI shall be implemented.
- Hazardous waste (Management, Handling and Transboundary Movement) Rules, 2008.
 - Manufacture, Storage and Import of Hazardous Chemicals Rules, 1989.
 - Batteries (Management & Handling) Rules, 2010.
 - E-Waste (Management & Handling) Rules, 2012.

Other Conditions:

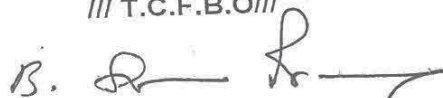
23. **The industry shall allocate a minimum of 1% of its project cost of Rs.78 crores towards CSR activities during construction period and 0.20% of the project cost per year during operational period for 10 years.**
24. Green belt of adequate width and density shall be developed along the boundary of the industry with minimum area of 20% of total area as stipulated in CFE order of APSEZ. Green belt development shall be started along with the construction.
25. **The industry shall maintain records on source of intermediates for each product-wise and the consolidated records shall be submitted to R.O., Visakhapatnam for every month along with invoice copies of the intermediates outsourced.**
26. The industry shall ensure that solvent recovery efficiency for each stream of solvent shall be minimum 95% after implementation of change of product mix.
27. **The industry shall provide continuous online VOC monitoring system and shall be networked to APPCB for website display.**
28. System of leak detection and repair of pump / pipeline shall be installed in the plant and immediate response team shall be identified for preventive maintenance.
29. The proponent shall ensure that there shall not be any change in the process technology, source of raw material and scope of working without prior approval from the Board.

30. The proponent shall comply with all the directions issued by the Board from time to time.
31. Concealing the factual data or submission of false information/ fabricated data and failure to comply with any of the conditions mentioned in this order and attract action under the provisions of relevant pollution control Acts.
32. The Board reserves its right to modify above conditions or stipulate new / additional conditions and to take action including revoke of this order in the interest of environment protection.
33. Any person aggrieved by an order made by the State Board under Section 25, Section 26, Section 27 of Water Act, 1974 or Section 21 of Air Act, 1981 may within thirty days from the date on which the order is communicated to him, prefer an appeal as per Andhra Pradesh Water Rules, 1976 and Air Rules, 1982, to such authority (hereinafter referred to as the Appellate Authority) constituted under Section 28 of Water (Prevention and Control of Pollution) Act, 1974 and Section 31 of the Air (Prevention and Control of Pollution) Act, 1981.

Sd/-
MEMBER SECRETARY

To,
M/s. Escientia Advanced Sciences Pvt., Ltd.,
101, Saptagiri Residency, 1-10-98/A,
Chikoti Gardens, Begumpet, Hyderabad – 500 016.

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



JOINT CHIEF ENVIRONMENTAL ENGINEER(CFE)

R



ANDHRA PRADESH POLLUTION CONTROL BOARD
Dr. YSR Paryavaran Bhavan, APIIC Colony Road,
Gurunanak Colony, Autonagar, Vijayawada- 520007
Phone. No.0866-2463200, Website : <https://pcb.ap.gov.in/>



RED CATEGORY

RENEWAL OF CONSENT TO OPERATE & AUTHORIZATION ORDER

Consent Order No : APPCB/VSP/VSP/327/HO/CTO/2018

09/01/2024

CONSENT is hereby granted to Operate under section 25/26 of the Water (Prevention & Control of Pollution) Act, 1974 and under section 21/22 of Air (Prevention & Control of Pollution) Act 1981 and amendments thereof and Authorisation under Rule 6 of the Hazardous & Other Wastes (Management and Transboundary, Movement) Rules, 2016 and the rules and orders made there under (hereinafter referred to as 'the Acts', 'the Rules') to:

M/s. Escientia Advanced Sciences Pvt., Ltd.,
Plot No.11, 11 A, 12 & 12 A,
APSEZ, Atchutapuram & Rambilli (M),
Anakapalli District

Email Id: Kiran.reddy.pendri@gmail.com / kiran.pendri@escientia.com

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

i. Outlets for discharge of effluents:

Outlet No.	Outlet Description	Max Daily Discharge KLD	Point of Disposal
1.	HTDS - Process -87.86 KLD + Washings -10.0 KLD Scrubber water – 15.0 KLD	112.86 KLD	The industry shall send the pretreated effluent to MEE of CETP, Atchutapuram through APEMC for treatment
2.	LTDS DM & Water plant rejects – 10.0 KLD + Boiler blow down – 7.0 KLD + Cooling tower blow down – 18.0 KLD .	48.0 KLD	The industry shall send the pretreated effluent to CETP, Atchutapuram through APEMC for treatment and disposal
3	Domestic & Canteen – 13.0 KLD	13.0 KLD	The over flow from the septic tank shall be sent to the CETP, Atchutapuram along with LTDS effluent through APEMC.

ii. Emissions from chimneys:

Chimney No.	Description of Chimney	Quantity of Emissions at peak flow
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		(m ³ /hr)
1.	Attached to 3.5 TPH Oil fired Boiler	--
2.	Attached to 2.0 TPH Oil fired Boiler (Standby)	
3.	Attached to 2 X 1500 KVA DG Sets	---
4.	Process emissions	--

iii. **HAZARDOUS WASTE AUTHORISATION (FORM – II) [See Rule 6 (2)]:**

M/s. Escientia Advanced Sciences Pvt., Ltd., Plot No.11, 11 A, 12 & 12 A, APSEZ, Atchutapuram & Rambilli (M), Anakapalli District is hereby granted an authorization to operate a facility for collection, reception, storage, treatment, transport and disposal of Hazardous Wastes namely:

• **HAZARDOUS WASTES WITH DISPOSAL OPTION**

S. No	Name of the Hazardous waste	Stream	Quantity	Disposal Option
1.	Process organic residue	28.1 of Schedule – I	2840 Kg/day	Shall be routed through APEMC to pre-processors / cement industries for co-processing / TSDF.
2.	Spent carbon	28.3 of Schedule – I	162 Kg/day	
3.	Process inorganic residue	28.1 of Schedule – I	864 Kg/day	Shall be routed through APEMC to TSDF for secured land filling.
4.	ETP Sludge	35.3 of Schedule – I	10 Kg/day	

• **HAZARDOUS WASTES WITH RECYCLE OPTION**

S. No	Name of the Hazardous waste	Stream	Quantity	Disposal Option
1.	Discarded containers / barrels/liners contaminated with hazardous wastes or chemicals	33.1 of Sch-I	500 nos/year	Shall be routed through APEMC to TSDF for detoxification and disposal (or) After complete detoxification, to authorized agencies / recyclers.
2.	Waste / used spent oil	5.1 of Schedule – I	6 KL/Ann um	Shall be disposed to authorized recyclers through APEMC
3.	Spent solvents	28.6 of	97.85	Shall be recovered within the

		Schedule – I	KL/day	premises in their SRS unit / disposed to authorized SRS units through APEMC
4.	Spent catalyst	28.6 of Schedule – I	160 Kg/day	Shall be disposed to authorized recyclers / return to suppliers through APEMC.
5.	Mixed solvents	28.6 of Schedule – I	10.87 KL/day	Shall be disposed to authorized SRS units / Cement industries for co- processing through APEMC.

• **NON- HAZARDOUS WASTE/ OTHER WASTE:**

Sl. No.	Name of the Waste	Quantity	Method of disposal
1.	Lead Acid Batteries	50 Nos/month	Authorized recyclers through APEMC
2.	E – waste	2000 Kg/year	Authorized collection centers / recyclers / dismantler / disposal facility through APEMC
3.	Used tube lights	100 nos/month	
4.	Paper, cotton waste & packing material i.e., wood, carton, ropes etc.,	2 TPM	Sale to outside agencies / recyclers
5.	Ply wood boxes, tins	2 TPM	
6.	Coal Ash	2 TPM	TSDF to use as stabilizing agent / Brick manufacturers

iv. **This consent order is valid to produce the following Change of Product Mix products with quantities with indicated below only:**

S. No.	Name of the Products	Quantity in Kg/day	No of Stages	Starting raw material	Quantity (Kg/day)
		Phase I			
1.	Atazanavir Sulphate	300	4	(2S)-2-amino-3,3-dimethylbutanoic acid	179.9
2.	Darunavir Ethanolate	300	4	DNV – II – intermediate	372.4
3.	Donepezil Hydrochloride	300	2	5,6 Dimethoxy-1-inadanone	261.7
4.	Febuxostat	300	2	Ethyl-2-(3-cyano-4-isobutoxyphenyl)-4-methyl-5-thiazolecarboxylate	463.8
5.	Fexofenadine Hydrochloride	300	6	2-([4-(4-chloro-1-oxobutyl)phenyl]-2-methylpropanoic acid (BW-08)	361.6
6.	Glipizide	300	4	5-methyl-2-pyrazine carboxylic	262.5

				acid (5-MPCA)	
7.	Lanzoprazole	300	4	2-Chloro-3-methyl-4-(2,2,2-trifluoroethoxy) Pyridine HCl	461.7
8.	Levetiracetam	400	2	(2S)-2-aminobutanamide HCL	412
9.	R & D/Custom Synthesis Products	100	Various	Various	----
	Total	2600			

By products

Sl. No.	Products	By product	Quantity in Kg/day
			Phase I
1.	Atazanavir sulphate	Triethylamine HCl	312.7
2.	Glipizide	Triethylamine HCl	141.0

The industry shall submit disposal (sale) details of the above by-products every month to the Regional Office & Zonal Office, Visakhapatnam. In case the by-products cannot be sold in the market due to any reasons and same shall be treated as waste and disposed as per the norms.

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

This combined order of consent to operate & Hazardous Waste Authorization shall be valid for a period ending with the **31st Day of December, 2028.**

B SREEDHAR IAS, MS(BS), O/o MEMBER SECRETARY-APPCB

To

**M/s. Escientia Advanced Sciences Pvt., Ltd.,
Plot No.11, 11 A, 12 & 12 A,
APSEZ, Atchutapuram & Rambilli (M),
Anakapalli District**

Copy to:

1. The JCEE, Zonal Office, **Visakhapatnam** for information and necessary action.
2. The EE, Regional Office, **Visakhapatnam** for information and necessary action.

SCHEDULE-A

1. Any up-set condition in any industrial plant / activity of the industry, which result in, increased effluent / emission discharge and/ or violation of standards stipulated in this order shall be informed to this Board, under intimation to the Collector and District Magistrate and take immediate action to bring down the discharge / emission below the limits.
2. The industry should carryout analysis of waste water discharges or emissions through chimneys for the parameters mentioned in this order on quarterly basis and submit to the Board.

3. Notwithstanding anything contained in this consent order, the Board hereby reserves the right and powers to review / revoke any and/or all the conditions imposed herein above and to make such variations as deemed fit for the purpose of the Acts by the Board.
4. The industry shall ensure that there shall not be any change in the process technology, source & composition of raw materials and scope of working without prior approval from the Board.
5. The applicant shall submit Environment statement in Form V before 30th September every year as per Rule No.14 of E(P) Rules, 1986 & amendments thereof.
6. The applicant should make applications through Online for renewal of Consent (under Water and Air Acts) and Authorization under HWM Rules at least 120 days before the date of expiry of this order, along with prescribed fee under Water and Air Acts and detailed compliance of CFO conditions for obtaining Consent & HW Authorization of the Board.
7. The industry should immediately submit the revised application for consent to this Board in the event of any change in the raw material used, processes employed, quantity of trade effluents & quantity of emissions. Any change in the management shall be informed to the Board. The person authorized should not let out the premises / lend / sell / transfer their industrial premises without obtaining prior permission of the State Pollution Control Board.
8. Any person aggrieved by an order made by the State Board under Section 25, Section 26, Section 27 of Water Act, 1974 or Section 21 of Air Act, 1981 may within thirty days from the date on which the order is communicated to him, prefer an appeal as per Andhra Pradesh Water Rules, 1976 and Air Rules 1982, to Appellate authority constituted under Section 28 of the Water(Prevention and Control of Pollution) Act, 1974 and Section 31 of the Air(Prevention and Control of Pollution) Act, 1981.
9. The industry shall be liable to pay Environmental Compensation / Other Environmental Taxes, if any environmental damage caused to the surroundings, as fixed by the Collector & District Magistrate or any other competent authority as per the Rules in vogue.
10. The industry may explore the possibility of tapping the solar energy for their energy requirements.
11. The industry should educate the workers and nearby public of possible accidents and remedial measures.

SCHEDULE-B

The issue of CTO&HWA (Renewal) to the industry was placed in the Consent Management Committee meeting held on 29.12.2023. The committee recommended to inclusion of non-hazardous waste as per industry request. The industry shall comply with the following conditions:

1. The industry shall connect the pH meters to APCB website by 29.02.2024;
2. The industry shall provide vent condensers to solvent storage tanks by 30.06.2024;
3. The industry shall connect the VOC meter with data logger to APPCB website by 29.02.2024;
4. The industry shall develop 22% of green belt with native species of the total area by 31.03.2023.

WATER POLLUTION:

5. The source of water is APIIC. The following is the permitted water consumption:

Sl.No.	Purpose	Quantity (KLD)
1.	Process	94.75
2.	Washings	10.0
3.	Scrubber	15.0
4.	Boiler Feed	45.0
5.	DM Plant / Softener rejects	10.0
6.	Cooling tower	18.0 + 127.0 (recirculation)
7.	Domestic	15.0
8.	Gardening	13.0 (recycled water)
	Total	347.75 (207.75 fresh water + 140 recycled)

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

6. The LTDS effluents sent to CETP, AETL shall not contain constituents in excess of the tolerance limits mentioned below,

Outlet	Parameter	Concentration in mg/l
2*	pH	6.50 – 8.50
	Temperature °C	< 45°C
	TDS	12,000 mg/l
	TSS	600 mg/l
	BOD	3,000 mg/l
	COD	8,000 mg/l
	Oil and Grease	20 mg/l
	Chromium Hexavalent (as Cr+6)	2 mg/l
	Chromium (total) (as Cr)	2 mg/l
	Ammonical Nitrogen (as N)	30 mg/l
	Cyanide (as CN)	0.20 mg/l
	Lead (as Pb)	1 mg/l
	Nickel (as Ni)	3 mg/l
	Zinc (as Zn)	15 mg/l
	Arsenic (as As)	0.20 mg/l
Mercury (as Hg)	0.01 mg/l	

(*The industry shall segregate the HTDS and LTDS effluent streams and the effluents which are not meeting the above standards shall be treated as HTDS effluents and shall be sent CETP of AETL for evaporation.).

7. The industry shall maintain Electro Magnetic flow meters with totalisers for water consumption, effluent generation mentioned in the Order.
8. The LTDS and HTDS effluents shall be stored in above ground level collection tanks separately.
9. The industry shall maintain HDPE tanks / tank in tank in the effluent collection tank (both locations at block and common collection point). The effluent shall be connected to the HDPE tanks / Tank in Tank and from the HDPE tanks / Tank in Tank, effluent shall be pumped to the ETP. Free space shall be maintained around the HDPE tanks /

- Tank in Tank to observe leakages if any.
10. Effluents shall not be discharged onland or any water bodies or aquifers or outside under any circumstances. Floor washings shall be admitted into effluent collection. system only and shall not be allowed to find their way into storm water drains or open areas.
 11. The industry shall provide containers detoxification facility. Container & Container liners shall be detoxified at the specified covered platform with dyke walls and the wash wastewater shall be routed to low TDS collection tank.
 12. The industry shall maintain web camera and flow meters provided for HTDS & LTDS pumped to CETP, AETL, properly and same connected to CPCB & APPCB servers, as per CPCB directions dt. 05.02.2014 / 02.03.2015.
 13. Rain water shall not be allowed to mix with either trade or domestic effluents. Industry shall maintain storm water drains, properly.
 14. The industry shall maintain dry condition outside drains in un-rainy season.

AIR POLLUTION:

15. The emissions shall not contain constituents in excess of the prescribed limits mentioned below:

Chimney No.	Parameter	Emission Standards (mg/Nm ³)
1 & 2	Particulate Matter	100
4	HCl	35
	NH ₃	30
	Sulphuric acid mist	50
	Chlorine	15
Tank farm vents	HCl	35
	NH ₃	30
	Chlorine	15
	Benzene	5
	Toluene	100
	Acetonitrile	1000
	Dichloromethane	200
	Xylene	100
	Acetone	2000

16. The industry shall comply with ambient air quality standards of PM₁₀ (Particulate Matter size less than 10 micro grams) - 100 micro gram/ m³; PM_{2.5} (Particulate Matter size less than 2.5 micro grams) - 60 mg/ m³; SO₂ - 80 micro gram/ m³; NO_x - 80 micro gram/m³, outside the factory premises at the periphery of the industry. Standards for other parameters as mentioned in the National Ambient Air Quality Standards CPCB Notification No.B-29016/20/90/PCI-I, dated 18.11.2009.
Noise Levels: Day time (6 AM to 10 PM) - 75 dB (A)
Night time (10 PM to 6 AM) - 70 dB (A)

17. The industry shall comply with emission limits for DG sets of capacity upto 800 KW as per the Notification G.S.R. 804(E), dated 03.11.2022 under the Environment

(Protection) Act Rules. In case of DG sets of capacity more than 800 KW shall comply with emission limits as per the Notification G.S.R.489 (E), dated 09.07.2002 at serial no.96, under the Environment (Protection) Act, 1986.

18. The industry shall provide a sampling port with removable dummy of not less than 15 cm diameter in the stack at a distance of 8 times the diameter of the stack from the nearest constraint such as bends etc. A platform with suitable ladder shall be provided below 1 meter of sampling port to accommodate three persons with instruments. A 15 AMP 250 V plug point shall be provided on the platform.
19. The industry shall operate the multi stage scrubbers for scrubbing of process emissions at all emission sources. The industry shall maintain online pH meters to the scrubbers. Scrubbed liquid shall be recycled as far as possible and finally sent to CETP of Pharmacy for further treatment.
20. The evaporation losses in solvents shall be controlled by taking the following measures:
 - i. Chilled brine circulation to effectively reduce the solvent losses into the atmosphere.
 - ii. Transfer of solvents by using pumps and closed conveyance instead of manual handling.
 - iii. Closed centrifuges are used due to which solvent losses are reduced drastically.
 - iv. The reactor vents connected with primary & secondary condensers to catch the solvent vapours.
 - v. All the solvent storage tanks are connected with vent condensers to prevent solvent vapours.
21. The industry shall not use odour causing substances such as Mercaptan or cause odour nuisance in the surroundings.

GENERAL:

22. The industry shall not manufacture new products and not exceed the consented capacity without CTE/CTO of the Board.
23. The effluent discharged and emissions shall comply with the tolerance limits mentioned in MoEF notification dated 09.07.2009 prescribed for Pharmaceutical (Manufacturing and Formulation) industry and G.S.R. 541(E) dt. 06.08.2021 for Bulk Drug and Formulation (Pharmaceutical).
24. The drums containing chemicals / solvents shall be stored under a roof on elevated platform with a provision to collect leakages / spillages in the collection pit.
25. The industry shall maintain separate shed for storage of Hazardous waste with dyke wall and leachate collection system.
26. The industry shall maintain the following records and the same shall be made available to the inspecting officers of the Board:
 - a. Daily production details.
 - b. Quantity of Effluents generated, treated, recycled/reused and disposed to CETP.
 - c. Log Books for pollution control systems.
 - d. Characteristics of effluents and emissions.
 - e. Hazardous/non hazardous solid waste generated and disposed.
 - f. Inspection book.
 - g. Manifest copies of effluents / hazardous waste.
27. The industry shall provide hood on the top of the effluent storage tanks and vent connected to the scrubber
28. The industry should maintain good housekeeping within the plant premises.
29. The industry shall comply with the SoP issued by CPCB for Solvent Recovery units

- dated 22.03.2021. The total cumulative losses of solvents shall not be more than 5% of the solvent on annual basis from storage inventory.
- 30.The industry shall comply with SoPs issued by CPCB time to time for all the wastes.
- 31.The industry shall maintain valid PLI policy which includes Environmental Relief Fund (ERF) for individual unit and submit copy to RO, Visakhapatnam on yearly base.
- 32.The industry shall comply with the Regulation of Persistent Organic Pollutants Rules,2018 notified by the MOEF&CC Notification vide G.S.R. 207 (E) dated 30.05.2018. As per the notification, the following 7 chemicals are prohibited to manufacturer, trade, use, import and export:
- i. Chlordecone,
 - ii. Hexabromobiphenyl,
 - iii.Hexabromodiphenyl ether and heptabromodiphenyl ether (commercial octa-BDE),
 - iv. Tetrabromodiphenyl ether and pentabromodiphenyl ether (commercial penta-BDE),
 - v. Pentachlorobenzene,
 - vi. Hexabromocyclododecane and
 - vii.Hexachlorobutadine.
- 33.The industry shall install digital display boards at publicly visible places at the main gate indicating the products manufactured Vs permitted quantities, Treated effluent concentrations Vs discharge standards, Stack emission & AAQ concentrations Vs standards, hazardous waste generation, disposed, stock Vs permitted quantities and validity of CTO; and exhibit the CTO order at a prominent place in the factory premises, as per Hon'ble Supreme Court order.
- 34.The industry shall submit Half yearly compliance reports to all the stipulated conditions in Environmental Clearance (EC), Consent to Establishment (CTE) and Consent to Operation (CTO) through website i.e., <https://pcb.ap.gov.in> by 1st of January and 1st July of every year. The first half yearly compliance reports shall be furnished by the industry and second half yearly compliance reports shall be the audited through MoEF&CC recognized and National Accreditation Board for Laboratory Testing (NABL) accredited third party.
- 35.The conditions stipulated are without prejudice to the rights and contentions of this Board in any Hon'ble Court of Law.
- 36.Any other directions / circulars / notices / guidelines issued by CPCB, MoEF&CC and APPCB shall be followed from time to time.
- 37.The Board reserves its right to modify above conditions or stipulate any further conditions and to take action including revoke of this order in the interest of protection of public health and environment.

Special conditions:

- 38.The industry shall submit a copy of the NOC issued by the Andhra Pradesh State Disaster Response and Fire Service Dept., (APSDRFSD) at concerned Regional Office, APPCB.
- 39.The industry shall maintain valid PESO.
- 40.The industry shall prepare a safety report and carry out an independent safety audit report of the respective industrial activities including chemical storages / isolated storages by an expert not associated with such industrial activity as required under Rule 10 of MSIHC Rules, 1989 and get it approved by the Factories Dept., and submit

the compliance along with copy of the safety report, safety audit report and safety certificate at concerned Regional Office, APPCB.

41. The industry shall extend training to the working personnel for the prevention of accidents and necessary antidotes to ensure safety, as per the MSIHC Rules, 1989.
42. The industry shall carry out calibration of safety equipment and leak detection systems at regular intervals and shall certify the same with the Factories Department. That certified copy shall be submitted to the APPCB, Regional Office
43. The industry shall install fluorescent Wind Vane at the highest point in the industry premises.
44. The industry shall submit Risk analysis and risk assessment covering worst scenario clearly describing impact within the industry premises and outside the industry premises and emergency response system.
45. The industry shall submit the copy of the safety audit report and On-Site / Off Site Emergency Plans as applicable after being certified by the Factories Department to the APPCB, Regional Office from time to time, if the storage quantity of hazardous chemicals is equal to or, in excess of the threshold quantities specified in schedule 2 & 3 of MSIHC Rules, 1989.

SCHEDULE – C

[See rule 6(2)]

[CONDITIONS OF AUTHORISATION FOR OCCUPIER OR OPERATOR HANDLING HAZARDOUS WASTES]

1. The authorised person shall comply with the provisions of the Environment (Protection) Act, 1986, and the rules made there under.
2. The authorisation shall be produced for inspection at the request of an officer authorised by the State Pollution Control Board.
3. The person authorised shall not rent, lend, sell, transfer or otherwise transport the hazardous and other wastes except what is permitted through this authorisation.
4. Any unauthorised change in personnel, equipment or working conditions as mentioned in the application by the person authorised shall constitute a breach of his authorisation.
5. The person authorised shall implement Emergency Response Procedure (ERP) for which this authorisation 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 authorised 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 Waste and Penalty”.
7. It is the duty of the authorised person to take prior permission of the State Pollution Control Board to close down the facility.
8. The industry shall enter an agreement with the Cement industries for disposal of incinerable waste or shall dispose to Alternative Fuel Raw material facility (AFRF) OR to TSDF for co-incineration.
9. The industry shall comply with the provisions of HWM Rules, 2016 in terms of interstate transport of Hazardous Waste and manifest document prescribed Under Rule 18 and 19 of the HWM Rules, 2016.
10. The industry shall not store hazardous waste for more than 90 days as per the Hazardous and Other Wastes (Management & Transboundary Movement) Rules, 2016.
11. The industry shall store Used / Waste Oil and Used Lead Acid Batteries in a secured

- way in their premises till its disposal to the manufacturers / dealers on buyback basis.
- 12.The industry shall transport the hazardous waste to cement industries only through vehicle fitted with GPS tracking system.
 - 13.The industry shall maintain 7 copy manifest system for transportation of waste generated and a copy shall be submitted to concerned Regional Office of APPCB. The driver who transports Hazardous Waste should be well acquainted about the procedure to be followed in case of an emergency during transit. The transporter should carry a Transport Emergency (TREM) Card.
 - 14.The industry shall maintain proper records for Hazardous and Other Wastes stated in Authorisation in Form-3 i.e., quantity of Incinerable waste, land disposal waste, recyclable waste etc., and file annual returns in Form-4 as per Rule 20 (2) of the Hazardous and Other Wastes (Management & Transboundary Movement) Rules, 2016.
 - 15.The industry shall route the all the hazardous wastes through M/s. APEMC.

B SREEDHAR IAS, MS(BS), O/o MEMBER SECRETARY-APPCB

To

**M/s. Escientia Advanced Sciences Pvt., Ltd.,
Plot No.11, 11 A, 12 & 12 A,
APSEZ, Atchutapuram & Rambilli (M),
Anakapalli District**



ANDHRA PRADESH POLLUTION CONTROL BOARD

Paryavaran Bhavan, APIIC Colony Road,
Gurunanak Colony,
Autonagar, Vijayawada- 520007.
Website: www.pcb.ap.gov.in



CONSENT TO ESTABLISH ORDER

Order No.327/APPCB/CFE/RO-VSP/HO/2014

Dt: 23/04/2024

Sub: APPCB – CTE - **M/s. Escientia Advanced Sciences Pvt., Ltd., Plot No.11, 11 A, 12 & 12 A, APSEZ, Atchutapuram & Rambilli (M), Anakapalli District** - Consent to Establish (CTE) of the Board for **Change of Product Mix** under Sec.25 of Water (P & C of P) Act, 1974 and Under Sec.21 of Air (P&C of P) Act, 1981 - Issued - Reg.

- Ref:
1. CTO order dt.09.01.2024.
 2. Industry's CTE(CPM) application received through APOCMMS on 11.03.2024.
 3. Z.O inspection report dt.08.04.2024.
 4. CTE Committee meeting held on 12.04.2024.
 5. Industry's Ir.dt.12.04.2024.

1. **M/s. Escientia Advanced Sciences Pvt., Ltd.**, vide reference 2nd cited, submitted an application to the Board seeking Consent to Establish (CTE) for **CHANGE OF PRODUCT MIX** to produce the following products with installed capacities as mentioned below, with a project cost of Rs.261.80Cr.

As per CTO Order dt.09.01.2024:

S. No.	Name of the Products	Quantity (Kg/day) Phase I
1.	Atazanavir Sulphate	300
2.	Darunavir Ethanolate	300
3.	Donepezil Hydrochloride	300
4.	Febuxostat	300
5.	Fexofenadine Hydrochloride	300
6.	Glipizide	300
7.	Lanzoprazole	300
8.	Levetiracetam	400
9.	R & D/Custom Synthesis Products	100
	Total	2600 (Kg/day)

By products:

S. No.	Products	By product	Quantity (Kg/day) Phase I
1.	Atazanavir sulphate	Triethylamine HCl	312.7
2.	Glipizide	Triethylamine HCl	141.0
		Total	453.7

After CTE (CPM):

S. No.	Name of the Products	Quantity (Kg/day)	No of Stages	Starting raw material	Quantity (Kg/day)
1.	Darunavir Ethanolate	300	4	DNV – II – intermediate	372.4
2.	Donepezil Hydrochloride	300	2	5,6 Dimethoxy-1-inadanone	261.7
3.	Febuxostat	300	2	Ethyl-2-(3-cyano-4-isobutoxyphenyl)-4-methyl-5-thiazolecarboxylate	463.8
4.	Fexofenadine Hydrochloride	300	6	2-([4-(4-chloro-1-oxobutyl)phenyl]-2-methylpropanoic acid (BW-08)	361.6
5.	Glipizide	300	4	5-methyl-2-pyrazine carboxylic acid (5-MPCA)	262.5
6.	Lanzoprazole	300	4	2-Chloro-3-methyl-4-(2,2,2-trifluoroethoxy) Pyridine HCl	461.7
7.	Levetiracetam	400	2	(2S)-2-aminobutanamide HCL	412
8.	Rimegepant sulphate	210.0	4	(2S)-2-amino-3,3- dimethyl butanoic acid	65.7
9.	Zavegepant Hydrochloride	90.0	2	1-Benzyl Piperidine-4-Carbaldehyde Adduct	94.50
10.	R & D/Custom Synthesis Products	100			
	Total	2600 (Kg/day)			

By products:

S. No.	Products	By product	Quantity (Kg/day) Phase I
1.	Rimegepant Sulphate	Triethylamine HCl	312.6
2.	Glipizide	Triethylamine HCl	141.0
		Total	453.6

2. As per the application, the above activity is to be located in the existing premises located at Plot No.11, 11 A, 12 & 12 A, APSEZ, Atchutapuram & Rambilli (M), Anakapalli District, in an area of 40 acres.

3. The above site was inspected by the Senior Environmental Engineer, Zonal Office: Visakhapatnam & Environmental Engineer, Regional Office: Visakhapatnam, A.P Pollution Control Board on 03.04.2024 and observed that the site is surrounded by

North : Road
South : M/s Laurus Labs unit II
East : M/s. Vasant Chemicals Pvt Ltd.,
West : M/s. Sundaram Alloys Ltd.,

4. The Board, after careful scrutiny of the application, verification report of Zonal Officer, and recommendations of the CTE Committee, hereby issues **CONSENT TO ESTABLISH FOR**

CHANGE OF PRODUCT MIX to the project under Section 25 of Water (Prevention & Control of Pollution) Act 1974 and Section 21 of Air (Prevention & Control of Pollution) Act, 1981 and the rules made there under. **This order is issued to manufacture the products as mentioned at para (1) only.**

5. This Consent order issued is subject to the conditions mentioned in the Annexure.
6. This order is issued from pollution control point of view only. Zoning and other regulations are not considered.
7. **This order is valid for period of 7 years from the date of issue.**

Encl: Annexure

B SREEDHAR IAS, MS(BS), O/o MEMBER SECRETARY-APPCB

To
M/s. Escientia Advanced Sciences Pvt., Ltd.,
Plot No.11, 11 A, 12 & 12 A, APSEZ,
Atchutapuram & Rambilli (M), Anakapalli District
Email: Kiran.reddy.pendri@gmail.com

Copy to: 1. The JCEE, Z.O: Visakhapatnam for information and necessary action.
2. The EE, R.O: Visakhapatnam for information and necessary action.

Annexure

1. The proponent shall obtain Consent to Operate (CTO) from APPCB, as required Under Sec.25/26 of the Water (P&C of P) Act, 1974 and under sec. 21/22 of the Air (P&C of P) Act, 1981, before commencement of the trial runs.
2. The applicant shall provide separate energy meters for Effluent Treatment Plant (ETP) and Air pollution Control equipments to record energy consumed. An alternative electric power source sufficient to operate all pollution control systems shall be provided.
3. The industry shall construct separate storm water drains and provide rain water harvesting structures. No effluents shall be discharged in to the storm water drains.

Water:

4. **The source of water is APIIC and the maximum permitted water consumption is as following:**

S. No.	Purpose	Quantity as per CTO Order dt.09.01.2024 (KLD)	Quantity after CTE (CPM) (KLD)
1.	Process	94.75	82.38
2.	Washings	10.0	10.0
3.	Scrubber	15.0	15.0
4.	Boiler Feed	45.0	45.0
5.	DM Plant / Softener rejects	10.0	10.0
6.	Cooling tower	18.0 + 127.0 (recirculation)	145
7.	Domestic	15.0	15.0
8.	Gardening	13.0 (recycled water)	13.0
	Total	347.75 (207.75 fresh water + 140 recycled)	335.38

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

5. **The maximum waste water generation shall not exceed the following:**

S. No	Source	Quantity as per CTO Order dt.09.01.2024 (KLD)			Quantity after CTE (CPM) (KLD)		
		HTDS	LTDS	TOTAL	HTDS	LTDS	TOTAL
1.	Process	87.86	--	87.86	87.84	--	87.84
2.	Washings	10.00	--	10	10.00	--	10
3.	Boiler blowdown	--	7.0	7	--	7.0	7
4.	Cooling Tower blowdown	--	18.0	18	--	18.0	18
5.	DM Plant regeneration	--	10.00	10	--	10.00	10
6.	Scrubber	15.00	--	15	15.00	--	15

7.	Domestic	--	13.00	13	--	13.00	13
	Total	112.86	48	160.86	112.84	48	160.84

Treatment & disposal:

Source of effluent	Treatment	Mode of final disposal
HTDS & HCOD effluent	Equalization tank & Neutralization	To M/s. AETL (CETP of Atchutapuram) for further treatment
LTDS effluent including utilities blow down	Equalization tank & Neutralization	To M/s. AETL (CETP of Atchutapuram) for further treatment and disposal.
Domestic waste water	Septic tank	Overflow to the CETP along with LTDS effluent

After CTE (CPM): No change

6. Effluents shall not be discharged on land or into any water bodies or aquifers under any circumstances.
7. The industry shall provide magnetic flow meters with totalisers at the outlet of the unit.
8. The industry shall properly operate and maintain online real time monitoring system along with web camera facilities and shall ensure that it is connected to APPCB / CPCB websites as per CPCB directions.
9. Floor washing shall be admitted into the effluent collection system only and shall not be allowed to find their way in storm drains or open areas. All pipe valves, sewers, drains shall be leak proof.
10. **The LTDS and HTDS effluents shall be stored in above ground level collection tanks separately. The industry shall provide hoods over the effluent storage tanks, and the vents shall be connected to scrubbers.**
11. The industry shall provide tank in tank system for effluent collection at production blocks. Free board shall be maintained in the tanks to prevent spillages.
12. The industry shall construct rain water runoff tank for collection and storage of first flush storm water. The industry shall maintain dry condition outside drains in un-rainy season.

Air:

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

As per CTO Order dt.09.01.2024:

S. No.	Details of Stack	Stack 1	Stack 2	Stacks 3 & 4
a.	Attached to:	Oil fired Boiler	Oil fired Boiler	DG Set
b.	Capacity	3.5 TPH	2.0 TPH (standby)	2 X 1500 KVA
c.	Fuel form:	HSD	HSD	HSD
d.	Stack Height	Common stack of height 42 m		30 m each
e.	Control Equipment	---	---	Acoustic enclosures and silences
f.	Conc. of particulate matter	100 mg/Nm ³		--

After CTE (CPM): Not proposed any Boiler / DG Set

14. A sampling port with removable dummy of not less than 15 cm diameter shall be provided in the stack at a distance of 8 times the diameter of the stack from the nearest constraint such as bends etc. A platform with suitable ladder shall be provided below 1 meter of sampling port to accommodate three persons with instruments. A 15 AMP 250 V plug point shall be provided on the platform.
15. The industry shall properly operate and maintain the monitoring system to all the stacks / vents in the plant. Regular monitoring shall be carried out and report shall be submitted to the Regional officer.
16. The industry shall properly operate and maintain multi-stage scrubbers to the process vents to control the process emissions. The industry shall ensure that online pH measuring facility with auto recording system is connected to the scrubbers.
17. The industry shall properly operate and maintain VOC monitoring system with auto recording facility.
18. The industry shall implement adequate measures to control all fugitive emissions from the plant.
19. The proponent shall ensure compliance of the National Ambient Air quality standards notified by MoEF, Gol vide notification No. GSR. 826 (E), dated. 16.11.2009 during construction and regular operational phase of the project at the periphery.

The generator shall be installed in a closed area with a silencer and suitable noise absorption systems. The ambient noise level shall not exceed 75 dB(A) during day time and 70 dB(A) during night time.
20. The proponent shall not use or generate odour causing substances or Mercaptans and cause odour nuisance in the surroundings.
21. The industry shall send the used / spent solvents to the recyclers (or) process them at their own solvent recovery facility within the premises.
22. The evaporation losses in solvents shall be controlled by taking the following measures:

- i. Chilled brine circulation shall be carried out to effectively reduce the solvent losses into the atmosphere.
- ii. Transfer of solvents shall be done by using pumps instead of manual handling.
- iii. Closed centrifuges shall be used to reduce solvent losses.
- iv. All the solvent storage tanks shall be connected with vent condensers to prevent solvent vapours.
- v. The reactor vents shall be connected with primary & secondary condensers to prevent escaping of solvent vapour emissions into atmosphere.

Solid / Hazardous waste:

23. The industry shall comply with the following for disposal of Solid waste:

S. No	Name of the Hazardous waste	Quantity after CTE (CPM)	Disposal Option
1.	Process organic residue	2778.9 Kg/day	Shall be routed through APEMC to preprocessors / cement industries for coprocessing / TSDF
2.	Spent carbon	178.9 Kg/day	
3.	Process inorganic residue	891.10 Kg/day	Shall be routed through APEMC to TSDF for secured land filling.
4.	ETP Sludge	10Kg/day	
5.	Spent Mixed Solvents (colored)	10 KLD	Shall be routed through M/s. APEMC so as to send to preprocessors / Cement industries for co-processing (as utilizable waste)
6.	Filtration bags	500 Kgs/Mont h	
7.	Discarded containers/ barrels/liners contaminated with hazardous wastes or chemicals	500 nos/mont h	Shall be routed through APEMC to TSDF for detoxification and disposal (or) After complete detoxification, to authorized agencies / recyclers
8.	Waste / used spent oil	6KL/Annum	Shall be disposed to authorized recyclers through APEMC
9.	Spent solvents	97.85KL/day	Shall be recovered within the premises in their SRS unit / disposed to authorized SRS units through APEMC
10.	Spent catalyst	176.9 Kg/day	Shall be disposed to authorized recyclers / return to suppliers through APEMC
11.	Mixed solvents	10.87KL/day	Shall be disposed to authorized SRS units / Cement industries for co-processing through APEMC
12.	Lead Acid Batteries	50 Nos/mont h	Shall be routed through APEMC to dealers on buy back system
13.	E – waste	2000 Kg/year	Authorized collection centers / recyclers / dismantler / disposal facility

14.	Used tube lights	100 nos/mont h	through APEMC
15.	Paper, cotton waste & packing material i.e., wood, carton, ropes etc.,	2TPM	Sale to outside agencies / recyclers
16.	Ply wood boxes, tins	2TPM	
17.	Coal Ash	---	TSDf to use as stabilizing agent / Brick manufacturers
18.	Thermo coal waste	100 kgs/mont h	Shall be routed through M/s. APEMC, so as to send to TSDf, Parawada for incineration. (as Incinerable waste)
19.	Pharma dust from clean rooms, Pharma rooms, AHUs, and floor Sweeping	100 kgs/mont h	
20.	Discarded resins	2000 Kgs/mont h	
21.	Insulation waste a) Nitrile Rubber	1000 kgs/mont h	
22.	Discarded personal protective equipment (General waste)	100 kgs/day	
23.	Off specification & discarded products / raw materials/ intermediates / lab chemicals	250 kgs/day	
24.	HEPA filters / oil filters / paint tins	100 kgs/day	
25.	Insulation waste - Glass wool	500 kgs/mont h	Shall be routed through M/s. APEMCL so as to send to (as Landfill waste)
26.	Laboratory vials	100 kgs/mont h	
27.	Spill contaminant Waste	5 kg/day	
28.	container liners	2000 kgs/mont h	
29.	Empty glass bottles	500 Nos/mont h	Shall be routed through M/s. APEMC so as to dispose to outside agencies after detoxification
30.	STP sludge	2 kg/day	
			Shall be routed through APEMC TSDf, Parawada for secured land filling.

24. The proponent shall place the chemical drums and / or any drums in a shed provided with concrete platform only. The Platform shall be provided with sufficient dyke wall and effluent collection system. The industry shall provide containers

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

25. The following rules and regulations notified by the MoEF&CC, GoI shall be implemented.

- a) Regulation of Persistent Organic Pollutants Rules, 2018.
- b) Hazardous waste and other wastes (Management and Transboundary Movement) Rules, 2016.
- c) Plastic Waste Management Rules, 2016.
- d) Manufacture, Storage and Import of Hazardous Chemicals Rules, 1989
- e) Fly Ash Notification, 2016.
- f) Batteries (Management & Handling) Rules, 2010.
- g) E-Waste (Management) Rules, 2016.
- h) Construction and Demolition waste Management Rules, 2016.
- i) Solid Waste Management Rules, 2016.
- j) The Public Liability Insurance Act, 1991 and its amendments thereof.

Other Conditions:

26. **The industry shall not to use Furnace Oil as fuel for the Boilers, shall be used LSD/HSD.**

27. "The industry shall comply with the industry specific standards with respect to emissions tank farm vents stipulated by the MoEF&CC, GoI, New Delhi vide Notification GSR541(E), dt.06.08.2021."

S. No.	Details of process emissions	Emission Control system	Emission Standard
1.	HCl	Multi stage scrubbers in series.	35 mg/Nm ³
2.	NH ₃		30 mg/Nm ³
3.	Chlorine		15 mg/Nm ³
4.	Benzene		5 mg/Nm ³
5.	Toluene		100 mg/Nm ³
6.	Acetonitrile		1000 mg/Nm ³
7.	Dichloromethane		200 mg/Nm ³
8.	Xylene		100 mg/Nm ³
9.	Acetone		2000 mg/Nm ³

28. The industry shall display online data outside the main factory gate on quantity and nature of hazardous chemicals being used in the plant, water & air emissions and solid waste generated within the factory premises, as per Hon'ble Supreme Court order.

29. **The industry shall prepare a safety report and carry out an independent safety audit report of the respective industrial activities including chemical storages / isolated storages by an expert not associated with such industrial activity as required under Rule 10 of MSIHC Rules, 1989 and get it approved**

by the Factories Dept., and submit the compliance along with copy of the safety report, safety audit report and safety certificate at concerned Regional Office, APPCB.

30. The industry shall submit a copy of the NOC issued by the Andhra Pradesh State Disaster Response and Fire Service Dept., (APSDRFSD) at concerned Regional Office, APPCB.
31. The industry shall submit risk assessment report covering worst scenario clearly describing impact within the industry premises and outside the industry premises and emergency response system.
32. The industry shall obtain PESO clearance & policy under PLI Act before applying for CTO of the Board.
33. The industry shall inventorize the storage quantities of hazardous chemicals (raw materials), products, as per the hazard nature of reactivity / toxicity / flammability / explosive stored/handling in the premises as defined in the Management of Storage, Import of Hazardous Chemicals (MSIHC) Rules, 1989 and the details shall be furnished to the Factories Department and to the Regional Office, APPCB on monthly basis duly certifying the same.
34. The industry shall identify major accident hazard chemicals & list out the hazardous chemicals endangered to human health & environment and the details shall be furnished to the Factories Department and to the Regional Office, APPCB time to time duly certifying the same by the industry. Further the industry shall extend training to the working personnels while handling hazardous chemicals for prevention of accidents and necessary antidotes to ensure the safety, as per the MSIHC Rules, 1989.
35. The industry shall carryout calibration of safety equipments and leak detection systems at regular intervals and shall certify the same with the Factories Department. That certified copy shall be submitted to the APPCB, Regional Office. The industry shall install fluorescent Wind Vane at the highest point in the industry premises.
36. **The industry shall comply with the Technical suggestions at Chapter No. 7.3 & 7.4 for Hazardous Chemical handling industries by High Power Committee (HPC) of Govt. of Andhra Pradesh. The HPC report is available at www.ap.gov.in.**
37. The industry shall utilize DG power for captive consumption only & power shall not be supplied to grid and shall follow the amendments issued by MoEF & CC/CPCB from time to time on DG sets in respect of conditions & standards.
38. Thick green belt shall be maintained all along the boundary & vacant spaces with tall growing trees with good canopy and it shall not be less than 22% of the total area.
39. **The industry shall submit compliance to the conditions stipulated in the CTE orders to the concerned Regional Officer of APPCB every six months and**

shall upload the same at APPCB website viz.,
https://pcb.ap.gov.in/UI/Submission_Compliance_of_EC_CTE_CTO_Direction.aspx

40. The industry shall submit the information regarding usage of Ozone Depleting Substance once in six months to the Regional Office and Zonal Office of the Board.
41. Concealing the factual data or submission of false information / fabricated data and failure to comply with any of the conditions mentioned in this order attracts action under the provisions of relevant pollution control Acts.
42. Notwithstanding anything contained in this conditional letter or consent, the Board hereby reserves its right and power Under Sec. 27(2) of Water (Prevention and Control of Pollution) Act, 1974 and Under Sec.21(4) of Air (Prevention and Control of Pollution) Act, 1981 to revoke the order, to review any or all the conditions imposed herein and to make such modifications as deemed fit and stipulate any additional conditions.
43. Any person aggrieved by an order made by the State Board under Section 25, Section 26, Section 27 of Water Act, 1974 or Section 21 of Air Act, 1981 may within thirty days from the date on which the order is communicated to him, prefer an appeal as per Andhra Pradesh Water Rules, 1976 and Air Rules,1982, to such authority (hereinafter referred to as the Appellate Authority) constituted under Section 28 of Water (Prevention and Control of Pollution)Act,1974 and Section 31 of the Air (Prevention and Control of Pollution) Act, 1981.

B SREEDHAR IAS, MS(BS), O/o MEMBER SECRETARY-APPCB

To

**M/s. Escientia Advanced Sciences Pvt., Ltd.,
Plot No.11, 11 A, 12 & 12 A, APSEZ,
Atchutapuram & Rambilli (M), Anakapalli District.**



ANDHRA PRADESH POLLUTION CONTROL BOARD
Dr. YSR Paryavaran Bhavan, APIIC Colony Road,
Gurunanak Colony, Autonagar, Vijayawada- 520007
Phone. No.0866-2463200, Website : <https://pcb.ap.gov.in/>



RED CATEGORY

CONSENT TO OPERATE & HAZARDOUS WASTE AUTHORIZATION ORDER

Consent Order No: APPCB/VSP/VSP/418/HO/CTO/2024

Date: 25/05/2024

CONSENT is hereby granted for Operation under section 25/26 of the Water (Prevention & Control of Pollution) Act, 1974 and under section 21/22 of Air (Prevention & Control of Pollution) Act 1981 and amendments thereof and Authorization under Rule 6 of the Hazardous & Other Wastes (Management and Transboundary, Movement) Rules, 2016 and the rules and orders made there under (hereinafter referred to as 'the Acts', 'the Rules') to:

M/s. Escientia Advanced Sciences Pvt., Ltd., (Change of Product Mix)

Plot No.11, 11 A, 12 & 12 A, APSEZ,
Atchutapuram & Rambilli (M),
Anakapalli District
Email: Kiran.reddy.pendri@gmail.com

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

i. Outlets for discharge of effluents:

Outlet No.	Outlet Description	Max Daily Discharge KLD	Point of Disposal
1.	HTDS & HCOD Effluents Process -87.84 KLD + Washings -10.0 KLD Scrubber water – 15.0 KLD	112.84	The industry shall send the pre-treated effluent to MEE of CETP, Atchutapuram through APEMC for treatment.
2.	LTDS DM & Water plant rejects – 10.0 KLD + Boiler blow down – 7.0 KLD + Cooling tower blow down – 18.0 KLD	35.0	The industry shall send the pre-treated effluent to CETP, Atchutapuram through APEMC for final treatment and disposal.
3.	Domestic	13.0	The over flow from the septic tank shall be sent to the CETP, Atchutapuram along with LTDS effluent through APEMC.
	Total	160.84 KLD	

ii. Emissions from chimneys:

Chimney No.	Description of Chimney	Quantity of Emissions at peak flow
1.	Attached to 3.5 TPH Oil fired Boiler	---
2.	Attached to 2.0 TPH Oil fired Boiler	---

	(standby)	
3.	Attached to 2 X 1500 KVA DG Set	---
4.	Process Emissions	---

iii. Hazardous Waste Authorization (Form – II) [See Rule 6 (2)]:

M/s. Escientia Advanced Sciences Pvt., Ltd., Plot No.11, 11 A, 12 & 12 A, APSEZ, Atchutapuram & Rambilli (M), Anakapalli District is hereby granted an authorization to operate a facility for collection, reception, storage, treatment, transport and disposal of Hazardous Wastes namely:

• **Hazardous Wastes with Disposal Option:**

S. No	Name of the Hazardous waste	Stream	Quantity	Disposal Option
1.	Process organic residue	28.1 of Schedule-I	2778.9 Kg/day	Shall be routed through APEMC to preprocessors / cement industries for co-processing / TSDF.
2.	Spent carbon	28.3 of Schedule-I	178.9 Kg/day	
3.	Process inorganic residue	28.1 of Schedule-I	891.10 Kg/day	Shall be routed through APEMC to TSDF for secured land filling.
4.	ETP Sludge	35.3 of Schedule-I	10 Kg/day	
5.	Spent Mixed Solvents (colored)	28.6 of Schedule-I	10 KLD	Shall be routed through M/s. APEMC so as to send to pre-processors / Cement industries for co-processing (as utilizable waste).
6.	Filtration bags	33.1 of Schedule-I	500 Kgs/Month	

• **Hazardous Wastes with Recycle Option:**

S. No	Name of the Hazardous waste	Stream	Quantity	Disposal Option
1.	Discarded containers/ barrels/liners contaminated with hazardous wastes or chemicals	33.1 of Schedule-I	500 nos/month	Shall be routed through APEMC to TSDF for detoxification and disposal (or) After complete detoxification, to authorized agencies/ recyclers.
2.	Waste / used spent oil	5.1 of Schedule-I	6 KL/Annunum	Shall be disposed to authorized recyclers through APEMC.
3.	Spent solvents	28.6 of Schedule-I	97.85 KL/day	Shall be recovered within the premises in their SRS unit/ disposed to authorized SRS units through APEMC.
4.	Spent catalyst	28.2 of Schedule-I	176.9 Kg/day	Shall be return to suppliers.

5.	Mixed solvents	28.6 of Schedule-I	10.87 KL/day	Shall be disposed to authorized SRS units / Cement industries for co- processing through APEMC.
6.	Thermo coal waste	33.2 of Schedule-I	100 kgs/month	Shall be routed through M/s. APEMC, so as to send to TSDF, Parawada for incineration. (as Incinerable waste) .
7.	Pharma dust from clean rooms, Pharma rooms, AHUs, and floor Sweeping	33.2 of Schedule-I	100 kgs/month	
8.	Discarded resins	33.2 of Schedule-I	2000 Kgs/month	
9.	Insulation waste a) Nitrile Rubber	33.2 of Schedule-I	500 kgs/month	
10.	Discarded personal protective equipment (General waste)	33.2 of Schedule-I	100 kgs/day	
11.	Off specification & discarded products / raw materials/ intermediates / lab chemicals	28.4 of Schedule-I	250 kgs/day		Shall be routed through M/s. APEMCL so as to send to pre-processors / Cement industries for co-processing (as utilizable waste) & Incinerable waste.
12.	HEPA filters / oil filters / paint tins	33.2 of Schedule-I	100 kgs/day	Shall be routed through M/s. APEMCL so as to send to (as Landfill waste).
13.	Insulation waste - Glass wool	33.2 of Schedule-I	500 kgs/month	
14.	Laboratory vials	--	100 kgs/month	
15.	Spill contaminant Waste	33.2 of Schedule-I	5 kg/day	
16.	container liners	33.1 of Schedule-I	2000 kgs/month	Shall be routed through M/s. APEMC so as to dispose to outside agencies after detoxification.
17.	Empty glass bottles	--	500 Nos/month	
18.	Used Lead Acid Batteries	17.4 of Schedule-1	50 Nos/month	Shall be returned to dealers on buy back policy / authorized recyclers through APEMC as per Battery Waste Management Rules, 2022.

This consent order is valid for manufacture the following products along with quantities indicated only:

S.No.	Name of the Products	Quantity in Kg/day	No of Stages	Starting raw material	Quantity (Kg/day)
1.	Darunavir Ethanolate	300	4	DNV – II – intermediate	372.4
2.	Donepezil Hydrochloride	300	2	5,6 Dimethoxy-1-inadanone	261.7
3.	Febuxostat	300	2	Ethyl-2-(3-cyano-4-isobutoxyphenyl)-4-methyl-5-thiazolecarboxylate	463.8
4.	Fexofenadine Hydrochloride	300	6	2-([4-(4-chloro-1-oxobutyl)phenyl]-2-methylpropanoic acid (BW-08)	361.6
5.	Glipizide	300	4	5-methyl-2-pyrazine carboxylic acid (5-MPCA)	262.5
6.	Lanzoprazole	300	4	2-Chloro-3-methyl-4-(2,2,2-trifluoroethoxy) Pyridine HCl	461.7
7.	Levetiracetam	400	2	(2S)-2-aminobutanamide HCL	412
8.	Rimegepant sulphate	210.0	4	(2S)-2-amino-3,3- dimethyl butanoic acid	65.7
9.	Zavegepant Hydrochloride	90.0	2	1-Benzyl Piperidine-4-Carbaldehyde Adduct	94.50
10.	R & D/Custom Synthesis Products	100			
	Total	2600			

By-Products:

Sl. No.	Products	By product	Quantity in Kg/day
			Phase I
1.	Rimegepant Sulphate	Triethylamine HCl*	312.6
2.	Glipizide	Triethylamine HCl*	141.0
		Total	453.6

* The industry shall reuse the Tri-ethyl-amine HCl within the industry.

The industry shall submit disposal (sale) details of the above by-products every month to the Regional Office, Visakhapatnam & Zonal Office, Visakhapatnam. In case the by-products cannot be sold in the market due to any reasons and same shall be treated as waste and disposed as per the norms.

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

This combined order of consent to operate & Hazardous Waste Authorization shall be valid for a period ending with the **31st day of December, 2028.**

B SREEDHAR IAS, MS(BS), O/o MEMBER SECRETARY-APPCB

To

**M/s. Escientia Advanced Sciences Pvt., Ltd.,
Plot No.11, 11 A, 12 & 12 A, APSEZ,
Atchutapuram & Rambilli (M),
Anakapalli District.
Email: Kiran.reddy.pendri@gmail.com**

Copy to:

1. The JCEE, Zonal Office, **Visakhapatnam** for information and necessary action.
2. The EE, Regional Office, **Visakhapatnam** for information and necessary action.

SCHEDULE-A

1. Any up-set condition in any industrial plant / activity of the industry, which result in, increased effluent / emission discharge and/ or violation of standards stipulated in this order shall be informed to this Board, under intimation to the Collector and District Magistrate and take immediate action to bring down the discharge / emission below the limits.
2. The industry should carryout analysis of waste water discharges or emissions through chimneys for the parameters mentioned in this order on quarterly basis and submit to the Board.
3. Notwithstanding anything contained in this consent order, the Board hereby reserves the right and powers to review / revoke any and/or all the conditions imposed herein above and to make such variations as deemed fit for the purpose of the Acts by the Board.
4. The industry shall ensure that there shall not be any change in the process technology, source & composition of raw materials and scope of working without prior approval from the Board.
5. The applicant shall submit Environment statement in Form V before 30th September every year as per Rule No.14 of E(P) Rules, 1986 & amendments thereof.
6. The applicant should make applications through Online for renewal of Consent (under Water and Air Acts) and Authorization under HWM Rules at least 120 days before the date of expiry of this order, along with prescribed fee under Water and Air Acts and detailed compliance of CFO conditions for obtaining Consent & HW Authorization of the Board.
7. The industry should immediately submit the revised application for consent to this Board in the event of any change in the raw material used, processes employed, quantity of trade effluents & quantity of emissions. Any change in the management shall be informed to the Board. The person authorized should not let out the premises / lend / sell / transfer their industrial premises without obtaining prior permission of the State Pollution Control Board.
8. Any person aggrieved by an order made by the State Board under Section 25, Section 26, Section 27 of Water Act, 1974 or Section 21 of Air Act, 1981 may within thirty days from the date on which the order is communicated to him, prefer an appeal as per Andhra Pradesh Water Rules, 1976 and Air Rules 1982, to Appellate authority

constituted under Section 28 of the Water (Prevention and Control of Pollution) Act, 1974 and Section 31 of the Air(Prevention and Control of Pollution) Act, 1981.

9. The industry shall be liable to pay Environmental Compensation / Other Environmental Taxes, if any environmental damage caused to the surroundings, as fixed by the Collector & District Magistrate or any other competent authority as per the Rules in vogue.
10. The industry may explore the possibility of tapping the solar energy for their energy requirements.
11. The industry should educate the workers and nearby public of possible accidents and remedial measures.

SCHEDULE-B

The issue of CTO&HWA (CPM) to the industry was placed in the Consent Management Committee meeting held on 16.05.2024. The industry shall comply with the following conditions.

1. The industry shall provide vent condensers to solvent storage tanks, by 30.06.2024.
2. The industry shall provide hood with scrubber on the top of the effluent storage tanks by, 31.07.2024.
3. The industry shall reuse the Tri-ethyl-amine HCl within the industry.
4. The industry shall not produce prohibited drugs in the R&D unit.

Water Pollution:

5. The source of water is **APIIC Supply**. The industry shall take steps to reduce water consumption to the extent possible and consumption shall NOT exceed the quantities mentioned below:

S. No.	Purpose	Quantity (KLD)
1.	Process	82.38
2.	Washings	10.0
3.	Scrubber	15.0
4.	Boiler Feed	45.0
5.	DM Plant / Softener rejects	10.0
6.	Cooling tower	145
7.	Domestic	15.0
8.	Gardening	13.0
	Total	335.38

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

6. The LTDS effluents sent to CETP, shall not contain constituents in excess of the tolerance limits mentioned below, as per their MoU:

Outlet	Parameters	Concentration in mg/l
2	pH	6.50 – 8.50
	Temperature °C	< 45 ⁰ C
	TDS	12,000 mg/l

TSS	600 mg/l
BOD	3,000 mg/l
COD	8,000 mg/l
Oil and Grease	20 mg/l
Chromium Hexavalent (as Cr ⁺⁶)	2 mg/l
Chromium (total) as Cr	2 mg/l
Ammonical Nitrogen (as N)	30 mg/l
Cynide (as CN)	0.20 mg/l
Lead (as Pb)	1 mg/l
Nickel (as Ni)	3 mg/l
Zinc (as Zn)	15 mg/l
Arsenic (as As)	0.20 mg/l
Mercury (as Hg)	0.01 mg/l

***The industry shall segregate the HTDS and LTDS effluent streams and the effluents which are not meeting the above standards shall be treated as HTDS effluents and shall be sent CETP of AETL for evaporation.**

7. The industry shall maintain Electro Magnetic flow meters with totalisers for water consumption, effluent generation mentioned in this Order.
8. The industry shall maintain HDPE tanks / tank in tank in the effluent collection tank (both locations at block and common collection point). Free space shall be maintained around the HDPE tanks / Tank in Tank to observe leakages if any.
9. The industry shall maintain proper manifest system for effluent transported to CETP and maintain the records and submit the details of quantity of High TDS and Low TDS effluents sent to CETP of AETL every month to the RO, Visakhapatnam.
10. The industry shall properly operate and maintain online real time monitoring system along with web camera facilities and shall ensure that it is connected to APPCB / CPCB websites as per CPCB directions dt. 05.02.2014 / 02.03.2015.
11. Effluents shall not be discharged on land or any water bodies or aquifers or outside under any circumstances.
12. Floor washings shall be admitted into effluent collection system only and shall not be allowed to find their way into storm water drains or open areas. All pipe valves, sewers, drains shall be leak proof.
13. The LTDS and HTDS effluents shall be stored in above ground level collection tanks separately. The industry shall provide hoods over the effluent storage tanks, and the vents shall be connected to scrubbers.
14. The industry shall provide containers detoxification facility. Container & Container liners shall be detoxified at the specified covered platform with dyke walls and the wash wastewater shall be routed to low TDS collection tank after characterization.
15. The industry shall provide tank in tank system for effluent collection at production blocks. Free board shall be maintained in the tanks to prevent spillages.
16. Storm water shall not be allowed to mix with scrubber water and / or floor washings. Storm water shall be channelized through separate drains passing through a HDPE lined pit having capacity of 10 minutes (hourly average) of rainfall.
17. The industry shall maintain rainwater runoff tank with pump for collection and storage of first flush contaminated storm water and the same shall be sent to CETP for further treatment.
18. The industry shall maintain dry condition outside drains in non-rainy season.

Air Pollution:

19.The emissions shall not contain constituents in excess of the prescribed limits mentioned below:

Chimney No.	Parameter	Emission Standards (mg/Nm ³)
1 & 2	Particulate matter	100
4	HCl	35
	NH ₃	30
	Sulphuric acid mist	50
	Chlorine	15
Tank farm vents	HCl	35
	NH ₃	30
	Chlorine	15
	Benzene	5
	Toluene	100
	Acetonitrile	1000
	Dichloromethane	200
	Xylene	100
Acetone	2000	

20.The industry shall comply with ambient air quality standards of PM10(Particulate Matter size less than 10mm) - 100 mg/ m³; PM2.5(Particulate Matter size less than 2.5mm) -60 mg/ m³; SO₂ - 80 mg/ m³; NO_x - 80 mg/m³, outside the factory premises at the periphery of the industry. Standards for other parameters as mentioned in the National Ambient Air Quality Standards CPCB Notification No.B-29016/20/90/PCI-I, dated 18.11.2009

Noise Levels: Day time (6 AM to 10 PM) - 75 dB (A)

Night time (10 PM to 6 AM) - 70 dB (A).

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

22.The industry shall comply with emission limits for DG sets of capacity upto 800 KW as per the Notification G.S.R.804 (E), dated 03.11.2022 under the Environment (Protection) Act Rules. In case of DG sets of capacity more than 800 KW shall comply with emission limits as per the Notification G.S.R.489 (E), dated 09.07.2002 at serial no.96, under the Environment (Protection) Act, 1986.

23.The industry shall comply with the noise limits for DG sets (upto 1000 KVA) as per G.S.R.520 (E), dated 01.07.2003 and G.S.R.448(E), dated 12.07.2004 under the Environment (Protection) Act Rules.

24.The industry shall properly operate the multi stage scrubbers for scrubbing of process emissions. The industry shall maintain pH meters for scrubbers and connect to APPCB website. Scrubbed liquid shall be recycled as far as possible and finally sent to CETP for further treatment.

25.The industry shall ensure that online pH measuring facility with auto recording system is connected to the scrubbers.

26. The industry shall implement adequate measures to control all fugitive emissions from the plant.
27. The industry shall send the used / spent solvents to the recyclers (or) process them at their own solvent recovery facility within the premises.
28. The evaporation losses in solvents shall be controlled by taking the following measures:
 - i. Chilled brine circulation to effectively reduce the solvent losses into the atmosphere.
 - ii. Transfer of solvents by using pumps and closed conveyance instead of manual handling.
 - iii. Closed centrifuges are used due to which solvent losses are reduced drastically.
 - iv. The reactor vents connected with primary & secondary condensers to catch the solvent vapours.
 - v. All the solvent storage tanks are connected with vent condensers to prevent solvent vapours.
29. The industry shall not use odour causing substances such as Mercaptan or cause odour nuisance in the surroundings.
30. The industry shall maintain VOC meter with auto recording facility and same connected to APPCB website.

General:

31. The industry shall not manufacture new products and not exceed the consented capacity without CTE/CTO of the Board.
32. The effluent discharged and emissions shall comply with the tolerance limits mentioned in MoEF notification dated 09.07.2009 prescribed for Pharmaceutical (Manufacturing and Formulation) industry and G.S.R. 541(E) dt. 06.08.2021 for Bulk Drug and Formulation (Pharmaceutical).
33. The drums containing chemicals / solvents shall be stored under a roof on elevated platform with a provision to collect leakages / spillages in the collection pit.
34. The industry shall store hazardous waste in closed sheds with dyke wall leachate collection sump.
35. The industry shall not dispose any non-hazardous waste outside the industry premises. The industry shall dispose other non-hazardous wastes as per the disposal option specified below:

S. No	Name of the Non-Hazardous waste	Quantity	Method of Disposal
1.	E – waste	2000 Kg/year	Authorized collection centers / recyclers / dismantler / disposal facility.
2.	Used tube lights	100 nos/month	
3.	Paper, cotton waste & packing material i.e., wood, carton, ropes etc.,	2TPM	Sale to outside agencies / recyclers.
4.	Ply wood boxes, tins	2TPM	
5.	Coal Ash	---	TSDf to use as stabilizing agent / Brick manufacturers.

36. The industry shall provide hood on the top of the effluent storage tanks and vent connected to scrubber.
37. The following rules and regulations notified by the MoEF& CC, GoI shall be implemented.
 - a. Hazardous waste and other wastes (Management and Transboundary Movement) Rules, 2016.
 - b. Manufacture, Storage and Import of Hazardous Chemicals Rules, 1989.
 - c. Fly Ash Notification, 2016.
 - d. Batteries (Management & Handling) Rules, 2010.
 - e. E-Waste (Management) Rules, 2016.
 - f. Construction and Demolition waste Management Rules, 2016.
 - g. Bio-medical Waste Management Rules, 2016
38. The industry shall maintain the following records and the same shall be made available to the inspecting officers of the Board:
 - a. Daily production details.
 - b. Quantity of Effluents generated, treated, recycled/reused and disposed to CETP.
 - c. Log Books for pollution control systems.
 - d. Characteristics of effluents and emissions.
 - e. Hazardous/non-hazardous solid waste generated and disposed.
 - f. Inspection book.
 - g. Manifest copies of effluents / hazardous waste.
39. The industry shall maintain good housekeeping within the plant premises.
40. The industry shall comply with the SoP issued by CPCB for Solvent Recovery units dated 22.03.2021. The total cumulative losses of solvents shall not be more than 5% of the solvent on annual basis from storage inventory.
41. Green belt of adequate width and density shall be maintained along the boundary of the industry with minimum area of 22% of total area.
42. The industry shall comply with SoPs issued by CPCB time to time for all the wastes.
43. The industry shall maintain valid PLI policy which includes Environmental Relief Fund (ERF) and submit copy to RO, Visakhapatnam on yearly base.
44. The industry shall comply with the Regulation of Persistent Organic Pollutants Rules, 2018 notified by the MOEF&CC Notification vide G.S.R. 207 (E) dated 30.05.2018. As per the notification, the following 7 chemicals are prohibited to manufacturer, trade, use, import and export:
45. The industry shall comply with the Regulation of Persistent Organic Pollutants Rules, 2018 notified by the MOEF&CC Notification vide G.S.R. 207 (E) dated 30.05.2018. As per the notification, the following 7 chemicals are prohibited to manufacturer, trade, use, import and export:
 - i. Chlordecone,
 - ii. Hexabromobiphenyl,
 - iii. Hexabromodiphenyl ether and heptabromodiphenyl ether (commercial octa-BDE),
 - iv. Tetrabromodiphenyl ether and pentabromodiphenyl ether (commercial penta-BDE),
 - v. Pentachlorobenzene,
 - vi. Hexabromocyclododecane and
 - vii. Hexachlorobutadine.
46. The industry shall submit the information regarding usage of Ozone Depleting Substance once in six months to the Board.

47. The industry shall maintain digital display boards at publicly visible places at the main gate indicating the products manufactured Vs permitted quantities, treated effluent concentrations Vs discharge standards, stack emission & AAQ concentrations Vs standards, hazardous waste generation, disposed, stock Vs permitted quantities and validity of CTO; and exhibit the CTO order at a prominent place in the factory premises, as per Hon'ble Supreme Court order.
48. The industry shall submit Half yearly compliance reports to all the stipulated conditions in Environmental Clearance (EC), Consent to Establishment (CTE) and Consent to Operation (CTO) through website i.e., <https://pcb.ap.gov.in> by 1st of January and 1st July of every year. The first half yearly compliance reports shall be furnished by the industry and second half yearly compliance reports shall be the audited through MoEF&CC recognized and National Accreditation Board for Laboratory Testing (NABL) accredited third party.
49. The conditions stipulated are without prejudice to the rights and contentions of this Board in any Hon'ble Court of Law.
50. Any other directions / circulars / notices / guidelines issued by CPCB, MoEF&CC and APPCB shall be followed from time to time.
51. The industry shall comply with the conditions stipulated in the CTE order dated 23.04.2024.
52. The Board reserves its right to modify above conditions or stipulate any further conditions and to take action including revoke of this order in the interest of protection of public health and environment.

Special conditions:

52. The industry shall not to use Furnace Oil as fuel for the Boilers, shall be used LSD/HSD.
53. The industry shall operate with valid NOC issued by the Andhra Pradesh State Disaster Response and Fire Service Dept., (APSDRFSD) at concerned Regional Office, APPCB.
54. The industry shall operate with valid PESO permission.
55. The industry shall comply with the technical suggestions at Chapter No. 7.3 & 7.4 for Hazardous Chemical handling industries by High Power Committee (HPC) of Govt. of Andhra Pradesh. The HPC report is available at www.ap.gov.in.
56. The industry shall prepare a safety report and carry out an independent safety audit report of the respective industrial activities including chemical storages / isolated storages by an expert not associated with such industrial activity as required under Rule 10 of MSIHC Rules, 1989 and get it approved by the Factories Dept., and submit the compliance along with copy of the safety report, safety audit report and safety certificate at concerned Regional Office, APPCB.
57. The industry shall extend training to the working personnel for the prevention of accidents and necessary antidotes to ensure safety, as per the MSIHC Rules, 1989.
58. The industry shall carryout calibration of safety equipment and leak detection systems at regular intervals and shall certify the same with the Factories Department. That certified copy shall be submitted to the APPCB, Regional Office.
59. The industry shall install fluorescent Wind Vane at the highest point in the industry premises.
60. The industry shall submit Risk analysis and risk assessment covering worst scenario clearly describing impact within the industry premises and outside the industry premises and emergency response system.
61. The industry shall submit the copy of the safety audit report and On-Site / Off Site

Emergency Plans as applicable after being certified by the Factories Department to the APPCB, Regional Office from time to time, if the storage quantity of hazardous chemicals is equal to or, in excess of the threshold quantities specified in schedule 2 & 3 of MSIHC Rules, 1989.

SCHEDULE – C

[See rule 6(2)]

**[CONDITIONS OF AUTHORIZATION FOR OCCUPIER OR OPERATOR
HANDLING HAZARDOUS WASTES]**

1. The authorized person 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 State Pollution Control Board.
3. The person authorized shall not rent, lend, sell, transfer or otherwise transport the Hazardous and other wastes except what is permitted through this authorization.
4. Any unauthorized change in personnel, equipment or working conditions as mentioned in the application by the person authorized shall constitute a breach of his 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 Waste and Penalty”.
7. It is the duty of the authorized person to take prior permission of the State Pollution Control Board to close down the facility.
8. An application for the renewal of an authorization shall be made as laid down under these Rules.
9. 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.
10. Annual return shall be filed by June 30th for the period ensuring 31st March of the year.
11. The authorized person shall not store hazardous waste for more than 90 days as per the Hazardous & Other Wastes (Management and Transboundary Movement) Rules, 2016.
12. The authorized person shall store Used /Waste Oil and Used Lead Acid Batteries in a secured way in their premises till its disposal to the manufacturers / dealers on buy back basis.
13. The authorized person shall maintain 7 copy manifest system for transportation of waste generated and a copy shall be submitted to concerned Regional Office of APPCB. The driver who transports Hazardous Waste should be well acquainted about the procedure to be followed in case of an emergency during transit. The transporter should carry a Transport Emergency (TREM) Card.
14. The authorized person shall maintain proper records for Hazardous & other wastes stated in Authorization in Form-3 i.e., quantity of Incinerable waste, land disposal waste, recyclable waste etc., and file annual returns in Form- 4 as per Rule 6 (5) of the Hazardous & Other Wastes (Management & Transboundary Movement) Rules, 2016

and amendments thereof by June 30th for the period ensuring 31st March of the year.
15.The authorized person shall submit the condition wise compliance report of the conditions stipulated in Schedule A, B &C of this Order on half yearly basis to Board office and concerned Regional office.

B SREEDHAR IAS, MS(BS), O/o MEMBER SECRETARY-APPCB

To
M/s. Escientia Advanced Sciences Pvt., Ltd.,
Plot No.11, 11 A, 12 & 12 A, APSEZ,
Atchutapuram & Rambilli (M),
Anakapalli District
Email: Kiran.reddy.pendri@gmail.com

Date: 01.11.2023

EASPL/DCIF/THIRD PARTY HEALTH & SAFETY AUDIT/COMP/01**To**Deputy Chief Inspector of Factories
Visakhapatnam.**Respected Sir,****Subject: Submission of Third-Party Health & Safety Audit Report and Compliance Status.**

With reference to the above subject, herewith we are submitting the third-party health & safety audit report and compliance status.

Thanking You

Yours faithfully

For ESCIENTIA ADVANCED SCIENCES PRIVATE LIMITED
01/11/2023
AUTHORIZED SIGNATORY

ESCIENTIA ADVANCED SCIENCES PRIVATE LIMITED
VISAKHAPATNAM

EXTERNAL HEALTH & SAFETY AUDIT COMPLIANCE REPORT

SOURCE(S) FOR CAPA: : Third Party Health & Safety Assessment By Proactioneering Consultants

S. NO.	LOCATION/ AREA	CATEGORY	DESCRIPTION OF FINDINGS	CORRECTIVE ACTION TAKEN	DATE OF AUDIT : 05-07-2023	
					STATUS	COMPLETION / TARGETED COMPLETION DATE
1		Recommendations	Found the construction works are in progress for plant extension activities, recommended to have the contract workmen undergo construction safety	The site has a contractor safety management procedure and all the construction works have undergone induction and job-specific training.	Closed	NA
2		Recommendations	Recommended to have the Retractable fall arrested for the purpose of fall protection provided for all height works in the construction site	The Retractable fall arrestor will be procured for the purpose of fall protection for all height works .	Open	30.03.2024
3		Recommendations	Recommended to provide safety nets for all construction openings	Provided safety nets for all construction openings during construction activities	Closed	NA
4		Recommendations	Recommended to have the HSE policy revised by the Top management as existing policy was prepared in year 2017	The HSE policy was revised and effective on 21-Sep-2023 by the Top management.	Closed	NA
5		Recommendations	Found the lifelines are provided for the pipelines without the walkway, recommended to provide suitable safe approach	The lifelines are provided for the pipelines with the walkway and a suitable safe approach	Closed	NA
6			Recommended to provide the first aid box at the process and storage areas	Provided the first aid box at the process and storage areas	Closed	NA
7		Recommendations	Found the helmets in use are more than 7 years since manufacturing, recommended to replace with valid shelf life	The helmets were replaced with a valid shelf-life.	Closed	NA
8	Health & Safety		Recommended to get the rescue winch examined and certified by competent person periodically.	The rescue winch will be examined and certified by a competent person periodically.	Closed	NA
9		Recommendations	Recommended to identify possible worst-case scenarios within plant and operations, Practice the Mock drills in accordance to the worst cases during Holidays and Night working times, maintain the record and observations addressed during the mock drills	Identified possible worst-case scenarios within plant and operations, will be Practised the Mock drills following the worst cases during Holidays and Night working times, maintain the record and observations address during the mock drills.	Open	30.03.2024
10		Recommendations	Recommended to update the OSEP mentioning the plant worst case scenarios, ERT members, Mock drill procedure	OSEP updated on the plant worst case scenarios, ERT members & Mock drill procedure.	Closed	NA
11		Recommendations	Recommended to update the HARA report to include the distance from heat radiation and dispersions from solvent tanks to operate the deluge valve and emergency control	HARA report will be updated and include the distance from heat radiation and dispersions from solvent tanks to operate the deluge valve and emergency control	Open	30.06.2024
12		Recommendations	Recommended to provide Dress code or easy identification for the First Aiders and ERT members with in the employees	Provided Identification labels on safety helmet for easy identification for the First Aiders and ERT members within the employees	Closed	NA
13		Recommendations	Arrange SCBA near-by to cater any emergency at Liquid nitrogen tank area	SCBA is provided nearby to cater for any emergency at the Liquid Nitrogen tank area.	Closed	NA
14		Recommendations	Display liquid nitrogen safety awareness boards in local language	Displayed liquid nitrogen safety awareness boards in the local language	Closed	NA



S. NO.	LOCATION/ AREA	CATEGORY	DESCRIPTION OF FINDINGS	CORRECTIVE ACTION TAKEN	STATUS	COMPLETION / TARGETED COMPLETION DATE
15		Recommendations	Recommended to check the capacity of the priming tank at fire hydrant pump house and replace with required volume with respect to pump suction header	Checked the capacity of the priming tank at the fire hydrant pump house and replaced it with the required volume concerning the pump suction header.	Closed	NA
16	Health & Safety	Recommendations	Recommended to provide fire fighting equipment at tanker sampling area	Firefighting equipments provided at tanker sampling point area	Closed	NA
17		Recommendations	Recommended to fix the wall mounted Fire extinguishers at standard height of 750 mm	All wall mounted fire extinguishers fixed with standard height of 750mm.	Closed	NA
18		Recommendations	Recommended to provide pressure indicators for the Hydrant line in the plant area	Pressure indicator will be provided for the Hydrant line in the plant area	Open	30.03.2024
19		Recommendations	Found the process area team skills are lacking for responding in emergency, recommended to provide effective training and mock drills	Provided training on onsite emergency plan & mitigation to all Manufacturing working personnel.	Closed	NA
20		Recommendations	In production block at Hydrogen manifold area not arranged hydrogen leak detect sensor, recommended to be provided Hydrogen leak detect sensor at Hydrogen manifold and cylinder storage area.	The Hydrogen manifold area & Hydrogen gas cylinders storage area hydrogen leak detection sensor will be provided	Open	30.03.2024
21	Manufacturing	Recommendations	In production block at hydrogen manifold area not arranged fire suppression system, recommended to be provided fire suppression system at above manifold area.	The hydrogen manifold area fire suppression system will be provided for fire mitigation at the above manifold area.	Open	30.06.2024
22		Recommendations	Recommended to provide the Personal tester to ensure working personal are free from static charge while entering the hydrogenation block	The Personal tester will be procured to ensure working personnel are free from static charge while entering the hydrogenation block	Open	30.03.2024
23		Recommendations	Recommended to provide the awareness training and mock drills to improve the levels on various emergencies and mitigation in the Hydrogenation block	Provided the awareness training and mock drills on various emergencies and mitigation in the Hydrogenation block	Closed	NA
24		Recommendations	Hydrogen safety awareness boards are recommended to be displayed in local language	Hydrogen safety awareness boards displayed in local language at hydrogenator area.	Closed	NA
25		Recommendations	Recommended to provide exhaust fans at main PCC, MCC, ETP MCC & Production block electrical panels area for appropriate ventilation.	Exhaust fans will be provided at main PCC, MCC, ETP MCC & Production block electrical panels area for appropriate ventilation.	Open	30.03.2024
26		Recommendations	Recommended to have all the Earth pits checked by third party once in a year and maintain the values displayed near the earth pit.	Earth pits performance checked by third party once in a year and maintain the values displayed near the earth pit.	Closed	NA
27	Electrical	Recommendations	Recommended to get the Arc flash study performed for all Electrical installation in the plant.	Arc flash study will be performed for all Electrical installation in the plant.	Closed	NA
28		Recommendations	Recommended to depute one 33KV permit holder and wireman permit holder for each shift at plant	33KV permit holder and wireman permit holder will be deputed for each shift at plant	Open	30.06.2024
29		Recommendations	Entry restriction board to be displayed and list of authorized persons to be arranged 33KV substation	Entry restriction board will be displayed and list of authorized persons to be arranged 33KV substation	Closed	NA



S. NO.	LOCATION/ AREA	CATEGORY	DESCRIPTION OF FINDINGS	CORRECTIVE ACTION TAKEN	STATUS	COMPLETION / TARGETED COMPLETION DATE
30		Recommendations	Recommended to provide fall protection system for tanker's sampling and unloading facility	Fall protection system provided for tankers sampling and unloading facility	Closed	NA
31		Recommendations	Recommended to place non sparking tools for the tanker unloading activity	Non- Sparking tools provided for tankers loading activity at CCDE tank farm area.	Closed	NA
32		Recommendations	Found common dyke was provided for 6 nos qty at solvents storage area, recommended to provide inner partition for the dyke to control the spread of fire during such emergency	Provided dyke wall with 110% capacity of solvent storage tanks and provided dedicated mobile pump to transfer the leakage solvent in case of any emergency.	Closed	NA
33		Recommendations	Recommended to provide foam flooding provision for the solvent storage tanks	Foam Flooding system will be provided for the solvent storage tanks	Open	30.06.2024
34	Warehouse	Recommendations	Recommended to provide detection system at Ammonia and Dry HCL cylinder storage facilities	HCL & Ammonia detectors will be provided at gas cylinders storage area.	Open	30.06.2024
35		Recommendations	Recommended to provide emergency pit at cylinder storage	Emergency pit provided at gas cylinders storage area.	Closed	NA
36		Recommendations	Recommended to segregate and store at concealed storage area for water reactant chemicals	All the water reactive chemicals properly segregated and stored in concealed storage area.	Closed	NA
37		Recommendations	Recommended to provide individual exhaust ventilation for the hazardous chemical store rooms	Exhaust fans to be provided for the hazardous chemical store rooms	Closed	NA
38		Recommendations	Recommended to provide drip pallets at all drum storage areas with sufficient numbers for handling the spillages or damaged drums	All the solvent drums stored in secondary containment pallet.	Closed	NA
39		Recommendations	Recommended for periodical training and assessment to be implemented for forklift operators	Provided periodical training to fork lift operators.	Closed	NA
40		Recommendations	In QC Lab chemical storage room found large quantity of lab chemicals are stored which is not a safe practices, recommended to reduce the material and to be kept based on requirement	QC Lab chemicals properly segregated and stored in dedicated storage cabinets with secondary containment trays.	Closed	NA
41	QC	Recommendations	Recommended to improve the awareness and firefighting skills of the team, the audit team while interacting with the QC personnel found the skills were lacking	Training provided to all QC personnel on fire fighting equipments operation and usage.	Closed	NA
42	Fabrication Yard	Recommendations	House keeping to be improved	Instructed all supervisors to maintain the good house keeping in fabrication yard and improved house keeping.	Closed	NA
43		Recommendations	Cable gland to be properly fitted	Inspection conducted for electrical fittings and all cable glands fitted properly.	Closed	NA
44	Security	Recommendations	Recommended to display First aiders list on duty with emergency contact number at security	Displayed First aiders list on duty with emergency contact number at security	Closed	NA





Escientia Advanced Sciences Private Limited
Plot No. 11, 11A, 12 & 12A, APSEZ, Atchutapuram,
Anakapalli - 531 011, Andhra Pradesh, INDIA.
Telephone : +91 8924 665000
Facsimile : +91 8924 665299
Website : www.escientia.com

Date: 05-03-2024

To,
The Environmental Engineer,
A.P Pollution Control Board,
Regional Office,
Visakhapatnam.

**Sub: New CTO Condition compliances (No: APPCB/VSP/VSP/327/HO/CTO/2018
Dated: 09/01/2024)**

Dear Sir,

Submission of Annual safety audit report, Fire NOC, On-site Emergency Plan, HARA Report, Safe Handling of hazardous chemicals Training sheets and provided fluorescent Wind sacks.

In View of statutory requirements, we have Submitted the below reports to Factories department and further, as required by APPCB here with, we are enclosing the acknowledgements of the same reports as evidence.

1. Valid Fire NOC Issued by the Andhra Pradesh state disaster response and fire service dept.
2. The industry shall maintain valid PESO.
3. Annual safety Audit report by third party-2023 and its compliance
4. The industry shall extend training to the working personnel for the prevention of accidents and necessary antidotes to ensure safety, as per the MSIHC Rules, 1989.
5. install fluorescent Wind sack at the highest point in the industry premises.
6. The industry shall submit Risk analysis and risk assessment covering worst scenario clearly describing impact within the industry premises and outside the industry premises and emergency response system.
7. On-site & Off-site Emergency plan

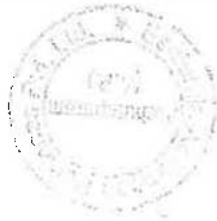
Hence you are requested to acknowledge receipt of the report.

Thanking you

Yours Faithfully

For **ESCIENTIA ADVANCED SCIENCES PRIVATE LIMITED.**


05/03/2024
AUTHORIZED SIGNATOR



05th March 2024

To:
The Deputy Chief Inspector of Factories,
Factories Department
D.No:50-50-38/8, Gurucharan Marg.
Visakhapatnam-13.

Dear Sir,

Subject: Submission of Calibration Certificates for leak detection (LEL/Oxygen/VOC detectors) available in Advanced Sciences Private Limited, Atchutapuram, Anakapalli--- Reg.

Ref: Special condition number 42 in CTO order no: APPCB/VSP/VSP/327/HO/CTO/2018
Dt:09.01.2024.

Dear Sir,

This is bringing to your kind information that here with we are submitting the list of detectors & calibration certificates for leak detection system (LEL/Oxygen/VOC detectors) which are available in Advanced Sciences Private Limited, Atchutapuram, Anakapalli.

Hence you are requested to acknowledge receipt of the report.

Thanking you

Yours Faithfully

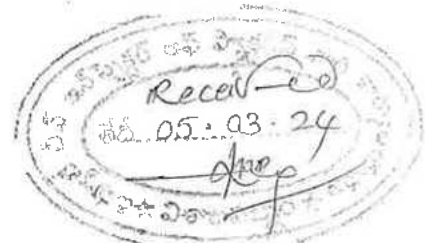
For **ESCIENTIA ADVANCED SCIENCES PRIVATE LIMITED.**


05/03/2024
AUTHORIZED SIGNATORY

**Enclosure:**

Annexure-01 List of Detectors with calibration reports.

Annexure-02 CTO copy.



05th March 2024

To:
Environmental Engineer,
Regional Office,
A.P Pollution Control Board,
Visakhapatnam.

Dear Sir,

Subject: Submission of Calibration Certificates for leak detection (LEL/Oxygen/VOC detectors) available in Advanced Sciences Private Limited, Atchutapuram, Anakapalli--- Reg.

Ref: Special condition number 42 in CTO order no: APPCB/VSP/VSP/327/HO/CTO/2018 Dt:09.01.2024.

Dear Sir,

This is bringing to your kind information that here with we are submitting the list of detectors & calibration certificates for leak detection system (LEL/Oxygen/VOC detectors) which are available in Advanced Sciences Private Limited, Atchutapuram, Anakapalli, to the Factories Department dated on 05.03.2024 and acknowledge received.

The same acknowledgement copy, we are submitting to your good selves as part of special condition number 42 in CTO order no: APPCB/VSP/VSP/327/HO/CTO/2018 Dt:09.01.2024.

Hence you are requested to acknowledge receipt of the report.

Thanking you

Yours Faithfully

For **ESCIENTIA ADVANCED SCIENCES PRIVATE LIMITED.**
05/03/2024
AUTHORIZED SIGNATORY**Enclosure:**

Annexure-01 List of Detectors with calibration

Annexure-02 CTO copy.





COLOUR CODING OF PIPELINES

ESD055/01

Effective Date:

STANDARD OPERATING PROCEDURE

1. PURPOSE

- 1.1 To describe the procedure for colour coding of Equipment & structural and pipelines.

References (e.g. Industry, Professional, Customer):
NA

2. SCOPE

- 2.1 **Organization:** This SOP (Standard Operating Procedure) shall be applicable to all departments of Escientia Advanced Sciences Private Limited, Atchutapuram, Anakapalli District, Andhra Pradesh, India.

3. DEFINITIONS AND ABBREVIATIONS

- 3.1 QAD: Quality assurance department.
 3.2 ESD: Engineering Services Department
 3.3 PRD: Production Department
 3.4 WHD: Warehouse Department
 3.5 EHS: Environment, Health and Safety
 3.6 SOP: Standard operating procedure.

4. ESCIENTIA QUALITY MANAGEMENT SYSTEM

- 4.1 **People:** Affected functions for distribution and training

DEPARTMENT	DOCUMENT DISTRIBUTED / TRAINED BY
ESD, PRD, WHD, EHS, QAD	Distributed by: QAD
	Trained by: ESD

	Prepared by	Reviewed by	Approved by
Name	K Kartheek	D Vasudeva Raju	M V Krishna Kishore
Department	Engineering Services	Engineering Services	Quality Assurance
Signature			
Date			
Format No.: QAD001/F01/04			Effective date: 27.01.2023

Effective Date:

STANDARD OPERATING PROCEDURE

4.1.1 The ESD representative shall be responsible for the colour coding of the pipelines & equipments.

4.1.2 Head - ESD or designee shall be responsible to ensure effective implementation & compliance to this SOP.

4.2 **Documents:** Reference documents:

Document Connection	Document Title	Document Number
Input	Preparation, review, approval, revision, issue and retrieval of standard operating procedure	QAD001
Output	NA	NA

4.3 **Systems:** Supporting Systems:

System Name	Access
N/A	N/A

4.4 **Metrics:** Key Performance Indicator for this Process:

Measurement	Criteria
N/A	N/A

Approved by			
Name	Department	Signature	Date
M V Krishna Kishore	Quality Assurance		
Format No.: QAD001/F01/04		Effective date: 27.01.2023	

Effective Date:

STANDARD OPERATING PROCEDURE**5. PROCEDURE:****5.1 Colour Coding for Equipments & Structural as Follows:**

S.No.	Content	Colour
1	Framework, columns, beams, and pipe supports (Unless galvanised)	Light Grey
2	Stairs, Platforms, Floor Plates, Kick Plates (Unless galvanised)	Light Grey
3	Ladder, Ladder Cages, Handrails (Unless galvanised)	Black with yellow bands

5.2 Colour codes for piping

S.No.	Content	Ground Colour	First colour band	Second Colour Band
1.	Cooling tower water	Sea green	French blue	--
2.	Soft water	Sea green	Light brown	--
3.	Drinking water	Sea green	French blue	Signal red
4.	Process water	Sea green	Light orange	--
5.	Fire hydrant / sprinkler water line	Fire red	--	--
6.	Compressed air	Sky blue	--	--
7.	Nitrogen	Canary yellow	Black	--
8.	General Vacuum	White	--	--
9.	High Vacuum	White	Dark violet	--
10.	Drainage	Black	--	--
11.	High speed diesel fuel	Light Brown	--	--

Approved by			
Name	Department	Signature	Date
M V Krishna Kishore	Quality Assurance		

Effective Date:

STANDARD OPERATING PROCEDURE

- 5.3 Ground colour shall be applied throughout the entire length of pipeline
- 5.4 Wherever the ground colour is not applied throughout the entire length, it shall be applied near valves, junctions, joints, service appliances, bulkhead, walls, etc.
- 5.5 Minimum size of band width ~ 25mm shall be provided for utility pipe lines and solvent storage tank pipe lines where ever applicable.

6. RECORD RETENTION REQUIREMENT

- 6.1 This section describes the minimum requirement for the retention of records, where the records are retained and the duration for which the records shall be maintained.

S.No.	Record	Retention Period	Storage Location	Protection	Disposition
1.	NA	NA	NA	NA	NA

7. ATTACHMENTS/APPENDICES

NA

8. CHANGE HISTORY

Version Number	Effective Date	Next Review Date	Reason for Revision
00	20.11.2017	19.11.2023	New SOP Reference CC No.: CC/GL/ESD/17/013
01			1.SOP revised to in line with standard operating procedure format "QAD001/F01/04" Reference CC No.: CC/GL/ESD/23/029

END OF THE DOCUMENT

Approved by			
Name	Department	Signature	Date
M V Krishna Kishore	Quality Assurance		
Format No.: QAD001/F01/04		Effective date: 27.01.2023	

FIRE PROTECTION SYSTEM
LIST OF DETECTORS AVAILABLE IN API BUILDING

S.No	Instrument ID	Type of Detector	Location	Least Count	Instrument Range		Alarm Limit	
					Min	Max	Low Limit	High Limit
1	EHS/OA-016	Oxygen	Large scale production area 2, Dryer room 2	0.1	0%	25%	19.50%	23.50%
2	EHS/OA-017	Oxygen	Large scale production area 2, Dryer room 4	0.1	0%	25%	19.50%	23.50%
3	EHS/OA-018	Oxygen	Large scale production area 2, Centrifuge room	0.1	0%	25%	19.50%	23.50%
4	EHS/OA-019	Oxygen	Large scale crystallization area 2, Dryer room 1	0.1	0%	25%	19.50%	23.50%
5	EHS/OA-020	Oxygen	Large scale production area 3, Dryer room 1	0.1	0%	25%	19.50%	23.50%
6	EHS/OA-021	Oxygen	Large scale production area 3, Dryer room 2	0.1	0%	25%	19.50%	23.50%
7	EHS/OA-022	Oxygen	Large scale production area 3, Dryer room 3	0.1	0%	25%	19.50%	23.50%
8	EHS/OA-023	Oxygen	Large scale production area 3, Centrifuge room 1	0.1	0%	25%	19.50%	23.50%
9	EHS/OA-024	Oxygen	Large scale production area 3, Centrifuge and Dryer room	0.1	0%	25%	19.50%	23.50%
10	EHS/LEL-007	LEL	Large scale production area 2, Centrifuge room 1	1	0%	100%	20%	40%
11	EHS/LEL-008	LEL	Large scale crystallization area 2, Dryer room 1	1	0%	100%	20%	40%
12	EHS/LEL-009	LEL	First floor, Hydrogenation area	1	0%	100%	20%	40%
13	EHS/LEL-010	LEL	Large scale production area 3, Centrifuge room 1	1	0%	100%	20%	40%
14	EHS/LEL-011	LEL	Large scale production area 3, Centrifuge and Dryer room	1	0%	100%	20%	40%

FIRE PROTECTION SYSTEM
LIST OF DETECTORS AVAILABLE IN API BUILDING

S.No	Instrument ID	Type of Detector	Location	Least Count	Instrument Range		Alarm Limit	
					Min	Max	Low Limit	High Limit
15	EHS/LEL-012	LEL	Large scale production area 2, Solvent transfer area	1	0%	100%	20%	40%
16	EHS/LEL-013	LEL	Large scale production area 3, Solvent transfer area	1	0%	100%	20%	40%
17	EHS/OA-001-01	Oxygen	Large scale production area 1	0.1	0%	30%	19.50%	23.50%
18	EHS/OA-002-01	Oxygen	Medium Scale Production Block, reactor area	0.1	0%	30%	19.50%	23.50%
19	EHS/OA-003-01	Oxygen	Medium Scale Production Block, Dryer room	0.1	0%	30%	19.50%	23.50%
20	EHS/OA-004-01	Oxygen	Medium Scale Production Block, Filtration & dryer room	0.1	0%	30%	19.50%	23.50%
21	EHS/OA-005-01	Oxygen	Large scale production 1	0.1	0%	30%	19.50%	23.50%
22	EHS/OA-006-01	Oxygen	Large Scale Production Block, 1 st Floor Dryer room	0.1	0%	30%	19.50%	23.50%
23	EHS/OA-007-01	Oxygen	Large Scale Production Block 1 st floor centrifuge room	0.1	0%	30%	19.50%	23.50%
24	EHS/OA-008-01	Oxygen	Large Scale Production Block 1 st floor column room	0.1	0%	30%	19.50%	23.50%
25	EHS/OA-009-01	Oxygen	Large Scale Crystallization Room-1	0.1	0%	30%	19.50%	23.50%
26	EHS/OA-010-01	Oxygen	Crystallization area ANFD room	0.1	0%	30%	19.50%	23.50%
27	EHS/OA-011-01	Oxygen	Highly potent area	0.1	0%	30%	19.50%	23.50%
28	EHS/OA-012-01	Oxygen	Large scale powder processing area blending room	0.1	0%	30%	19.50%	23.50%

FIRE PROTECTION SYSTEM LIST OF DETECTORS AVAILABLE IN API BUILDING								
S.No	Instrument ID	Type of Detector	Location	Least Count	Instrument Range		Alarm Limit	
					Min	Max	Low Limit	High Limit
29	EHS/OA-013-01	Oxygen	<i>Small scale powder processing area</i>	0.1	0%	30%	19.50%	23.50%
30	EHS/OA-014-01	Oxygen	<i>Small scale Production Area</i>	0.1	0%	30%	19.50%	23.50%
31	EHS/OA-015-01	Oxygen	<i>PD lab, Process lab</i>	0.1	0%	30%	19.50%	23.50%
32	EHS/LEL-001-01	LEL	Large Scale Production 1	1	0%	100%	20%	40%
33	EHS/LEL-002-01	LEL	Large Scale Production Area-1	1	0%	100%	20%	40%
34	EHS/LEL-003-01	LEL	Medium Scale Production Area	1	0%	100%	20%	40%
35	EHS/LEL-004-01	LEL	Medium Scale Production Area	1	0%	100%	20%	40%
36	EHS/LEL-005-01	LEL	Highly Potent Area	1	0%	100%	20%	40%
37	EHS/LEL-006-01	LEL	Large Scale Production	1	0%	100%	20%	40%
38	EHS/LEL-016-01	LEL	Large Scale Production	1	0%	100%	20%	40%

Annexure 14

HAZARD ANALYSIS AND RISK ASSESSMENT(HARA) REPORT

FOR

ESCIENTIA ADVANCED SCIENCES PRIVATE LIMITED

Plot No. 11, 11A, 12 & 12A,

AP SEZ, Atchutapuram, Vishakapatnam,

Andhra Pradesh 531011



M/s GLOBAL EHS SOLUTIONS

**D.NO: LIG - 525, Ground floor, Vinayaka Nagar, UDA Colony, Near
Timpany school, Pedagantyada (PO), Visakhapatnam Andhra Pradesh,
INDIA- 530044**

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PREAMBLE

This HARA study at site was conducted by Global EHS Solutions, Visakhapatnam, as entrusted by the Management in May 2022 and report is prepared after study of the manufacturing process of existing products. Plant and equipment earmarked in production block, safety equipment integrated to the reactors, Hazardous properties of the chemicals used in the reaction, safety protocols developed to assess the degree of hazards associated with manufacturing activity and the mitigation measures under practice and those proposed to be followed to assess the inherent hazards and their mitigation level etc., were evaluated during the study. As an outcome of the study besides the existing safe practices followed, few more practices are recommended for to take up as appropriate.

The consultancy organization sincerely thanks for the co-operation received from one and all contacted during the factory visit and evaluation of systems

The statement of facts were made almost based on the objective evidence captured during the audit, Omissions and misinterpretations expressed in this report, if any are purely inadvertent and un-intentional.

1.0 INTRODUCTION

M/S ESCIENTIA ADVANCED SCIENCES PRIVATE LIMITED is a pharmaceutical manufacturing company. Its manufacturing unit has been setup at Visakhapatnam District, Andhra Pradesh. This base is situated in the area of same pharma industries has been set up. The plant facilities are in advanced stage of construction and installation of equipment. It is engaged in the manufacturer of Active pharmaceutical Ingredients (APIs). Different chemicals are handled would be and used for the manufacture of the different API products.

The organization initiated a process for carrying out a Hazard Analysis and Risk Assessment Study for the existing products to identify possible Hazards with reference to the products & to evaluate risks so as to take appropriate safety measures or to implement alternative design solutions by the Management to mitigate or control the risks or to reduce associated risks to an acceptable level and improve reliability w.r.t safety of the plant operations.



2.0 NEED FOR HARA

As per rules 10 to 13 under manufacture, Storage and Import of Hazardous Chemicals Rules, 1989 of Environment (Protection) Act, 1986, the Occupier of the Industry using hazardous chemicals in its manufacturing activity should submit report on Hazard Analysis and Risk Assessment to the Director of Factories or Chief Inspector of Factories appointed under the factories Act, 1948 towards an objective evaluation of Safety related to Industrial activity and measures taken and to identify what further measures are required to operate the plant in a safety manner. Hence, the organization initiated a process for carrying out a Hazard Analysis and Risk Assessment Study for the products to identify possible Hazards with

respect to the products & to evaluate risks for taking appropriate safety measures or alternative design solutions by the Management to mitigate or control the risks or to reduce associated risks to an acceptable level and improve reliability with respect to safety of the plant operations.

Safety Consultant of M/s Global EHS Solutions, Vishakapatnam has been appointed as the consultancy Organization by the company for carrying out HARA Studies of the existing products. The consultant visited the plant, discussed with the Plant Management, Head-EHS, Warehouse In charge and Production Block In charges and prepared this HARA study report based on the information provided by the Management regarding the manufacturing process, by products, reaction conditions, safety measures etc. The study reflects the logical analysis based on the information provided by the organization only. Manufacturing Process, Material Balance for each proposed product is presented by the respective Production In-Charge and Plant Head for identification of the Process Hazards. Production, Safety & Process support and inputs were also taken in reviewing the design safety issue.

3.0 OBJECTIVES OF HARA STUDY

The principal Objective of this study is to evaluate the potential hazards due to the plant operations of M/s Escientia Advanced Sciences Pvt Ltd, (Unit: Plot No.11, 11A, 12 and 12A, APSEZ, Atchutapuram, 531 011, Andhra Pradesh 531011) Hazard Analysis and Risk Assessment (HARA) is carried out to identify hazardous chemicals, Hazardous Operations in the process & storage and quantifying the hazards and consequences.

- The report includes a description of the hazards arising out of the activity together with an account of the controls that are in operation
- Identification and assessment of major accident hazard potential in the plant operations
- Identification of major failure scenarios
- Consequence analysis of the scenarios with respect to areas affected by Fire or Explosion, etc.
- The HARA Report also includes the existing safety measures already taken by the Organization and the proposed safety measures required to operate the Plant in a safe manner.
- As per the rules 10 to 13 under Manufacture, Storage and Import of Hazardous Chemicals (MSIHC) Rules, 1989 as amended in year 2000, made under Environment (Protection) Act, 1986, the Occupier of the industry using hazardous chemicals in its manufacturing activity is obliged to submit report on Hazard Analysis and Risk Assessment to the authorities.

4.0 SCOPE OF HARA STUDY

The Scope of the Hazard Analysis and Risk Assessment (HARA) studies is applicable to the existing products are being currently manufacturing at ESCIENTIA ADVANCED SCIENCES PRIVATE LIMITED, Plot No. 11, 11A, 12 & 12A Atchutapuram, Andhra Pradesh, India, PIN 531011.

5.0 METHODOLOGY OF HARA STUDY

Study of manufacturing process, hazards related to operations, plant and equipment, chemicals in use are carried out along with the company team members comprising Plant Head, Engg Head, EHS, Warehouse In-charge, production Block In-charges and Safety consultant of consultancy organization M/s Global EHS Solutions.

A site visit to plants & facilities was also done. Further, discussions were held with the senior Management team regarding existing Safety Measures & proposed Safety Measures to be implemented.

6.0 PLANT FACILITIES

UTILITIES FACILITIES

- Fire Hydrant System
- Chiller Units
- MCC/PCC Panel Rooms
- Boiler House
- Air compressor room
- DG Set Room
- HT yard / Transformer Yard
- Cooling Towers

Details of Utilities

S. No.	Equipment ID	Name of the equipment	Name of the Block	Area	Material of Construction (MOC)	Capacity
1	B-5101	Boiler	Utility	Ground floor	CS	3500 Kg/hr, 10.54 Kg/cm ² (g)
2	FODT-5101	Furnace oil Day storage tank	Utility	Ground floor	MS	4500 Liters
3	FWDT-5101	Feed water storage tank	Utility	Ground floor	MS	10000 Liters
4	CH-5101	Boiler Chimney	Utility	Ground floor	MS	500mm Dia 42 meter Ht
5	FOST-5101	Furnace oil bulk storage tank	CCOE tank farm	Ground floor	MS	40000 Liters
6	FOTP-5101A	Furnace oil Unloading / transfer pump	CCOE tank farm	Ground floor	CS	10m ³ /hr 30 mlc

7	FOTP-5101B	Furnace oil Unloading / transfer pump	CCOE tank farm	Ground floor	CS	10m3/hr 30 mlc
8	HSDST-5101	HSD Bulk storage tank	CCOE tank farm	Ground floor	MS	20000 Liters
9	HSDTP-5101A	HSD unloading/transfer pump	CCOE tank farm	Ground floor	CS	10m3/hr 30 mlc
10	HSDTP-5101B	HSD unloading/transfer pump	CCOE tank farm	Ground floor	CS	10m3/hr 30 mlc
11	PRS-5101	Pressure reducing station	API Block-II	Ground floor	CS	5 TPH 10.54 to 3.5 Kg/cm2 (g)
12	CRS-5101	Condensate recovery system	API Block - II	Ground floor	CS	2000 kg/hr
13	HWS-5101	Hot water system for HVAC	Utility block	Ground floor	MS	70000kcal/hr
14	HWS-DA-5101	Deaerator for HVAC	Utility block	Ground floor	MS	80NB
15	HES-ET-5101	Expansion tank for HVAC	Utility block	Ground floor	MS	100Liter
16	HWP-5101A	Hot water circulation pump	Utility block	Ground floor	CS	10 m3/hr, 40 MLC
17	HWP-5101B	Hot water circulation pump	Utility block	Ground floor	CS	10 m3/hr, 40 MLC
18	HCHW-5101	Chilled water unit for HVAC	Utility block	Ground floor	CS	200 TR
19	HCHWP-5101	Primary chilled water pump	Utility block	Ground floor	CS	120 m3/hr, 20 MLC
20	HCHWP-5102	Primary chilled water pump	Utility block	Ground floor	CS	120 m3/hr, 20 MLC
21	HCHWS-5101	Secondary chilled water pump	Utility block	Ground floor	CS	120 m3/hr, 25 MLC
22	HCHWS-5102	Secondary chilled water pump	Utility block	Ground floor	CS	120 m3/hr, 25 MLC
23	DA-5101	Deaerator	Utility block	Ground floor	MS	150NB
24	ET-5101	Expansion tank	Utility block	Ground floor	MS	500Liter
25	CHW-5101	Chiller unit for process	Utility block	Ground floor	CS	200 TR
26	CHWP-5101	Primary circulation pump	Utility block	Ground floor	CS	120 m3/hr , 25 mlc
27	CHWP-5102	Primary circulation pump	Utility block	Ground floor	CS	120 m3/hr , 25 mlc
28	CHWT-5101	Hot and cold well tank	Utility block	Ground floor	MS	20000 Liters
29	CHWS-5101	Secondary circulation pump	Utility block	Ground floor	CI	60 m3/hr , 40 mlc

30	CHWS-5102	Secondary circulation pump	Utility block	Ground floor	CI	60 m3/hr , 40 mlc
31	CHWS-5103	Secondary circulation pump	Utility block	Ground floor	CI	60 m3/hr , 40 mlc
32	CHB-5101	Chilled brine system	Utility block	Ground floor	CS	60 TR (-20°C)
33	CHBP-5101	Primary circulation pump	Utility block	Ground floor	CI	50 m3/hr , 25 MLC
34	CHBP-5102	Primary circulation pump	Utility block	Ground floor	CI	50 m3/hr , 25 MLC
35	CHBT-5101	Hot/Cold well tank	Utility block	Ground floor	MS	15000 Liter
36	CHBS-5101	Secondary circulation pump	Utility block	Ground floor	CI	25 m3/hr, 40 MLC
37	CHBS-5102	Secondary circulation pump	Utility block	Ground floor	CI	25 m3/hr, 40 MLC
38	CT-5101	Cooling tower – Utility	Utility block	Terrace floor	FRP	800TR, ΔT 5°C
39	CTP-5101	Cooling water circulation pump	Utility block	Terrace floor	CI	151 m3/hr, 25 mlc
40	CTP-5102	Cooling water circulation pump	Utility block	Terrace floor	CI	151 m3/hr, 25 mlc
41	CTP-5103	Cooling water circulation pump	Utility block	Terrace floor	CI	151 m3/hr, 25 mlc
42	CTP-5104	Cooling water circulation pump	Utility block	Terrace floor	CI	151 m3/hr, 25 mlc
43	CTP-5105	Cooling water circulation pump	Utility block	Terrace floor	CI	151 m3/hr, 25 mlc
44	CT-3101	Cooling tower process	Utility block	Terrace floor	FRP	500TR, ΔT 5°C
45	CTP-3101	Cooling water circulation pump	Utility block	Terrace floor	CI	300 M ³ /Hr., 40 mlc
46	CTP-3102	Cooling water circulation pump	Utility block	Terrace floor	CI	300 M ³ /Hr., 40 mlc
47	NP-5101	Nitrogen plant	Utility block	Ground floor	CS	50 NM ³ /Hr. 99.5% Purity
48	NR-5101	Nitrogen receiver	Utility block	Ground floor	CS	20000 Liters
49	AC-5101	Air compressor for air jet mill	Utility block	Ground floor	CS	400 CFM '@ 10.0 kg/cm ² (g)
50	WAR-5101	Wet air receiver	Utility block	Ground floor	CS	2000 Liters
51	AD-5101	Air dryer	Utility block	Ground floor	CS	400 CFM '@ 10.0 kg/cm ² (g)
52	AR-5101	Dry air receiver	Utility block	Ground floor	CS	5000 Liters
53	AC-5102	Air compressor	Utility block	Ground floor	CS	300 CFM '@ 8.0 kg/cm ² (g)
54	WAR-5102	Wet air receiver	Utility block	Ground floor	CS	2000 Liters

55	AD-5102	Air dryer	Utility block	Ground floor	CS	300 CFM '@ 8.0 kg/cm2 (g)
56	DAR-5102	Dry air receiver	Utility block	Ground floor	CS	5000 Liters
57	DAST-5101	Dry air storage tanks for instruments / breathing air	API Block-II	Ground floor	CS	2000 Liters

Production equipment list

QUALITY CONTROL EQUIPMENT'S

Equipment
PH meter
Melting point apparatus:
Karl fisher titrator
Gas chromatograph (GC)
High pressure liquid chromatography (HPLC)
Hot air oven
TLC kit
TDS / Conductivity apparatus
Muffle Furnace
IR
Fume Hood
Scrubber
Refrigerator

PESO Tank & Flammable Liquid Tank Details

SOLVENTS AT TANK FORM						
S. No.	Equipment ID	Name of the equipment	Name of the Block	Area	Material of Construction (MOC)	Capacity
1	SST-101	solvent storage tank	CCOE Tankfarm	CCOE Tankfarm	SS 316L	40 KL
2	SSTP-101	solvent transfer pump	CCOE Tankfarm	CCOE Tankfarm	SS 316L	5 m3/hr, 40 mlc
3	SST-102	solvent storage tank	CCOE Tankfarm	CCOE Tankfarm	SS 304	40 KL
4	SSTP-102	solvent transfer pump	CCOE Tankfarm	CCOE Tankfarm	SS 304	5 m3/hr, 40 mlc
5	SST-103	solvent storage tank	CCOE Tankfarm	CCOE Tankfarm	SS 304	40 KL
6	SSTP-103	solvent transfer pump	CCOE Tankfarm	CCOE Tankfarm	SS 304	5 m3/hr, 40 mlc
7	SST-AODD-101	drum dispensing pump	CCOE Tankfarm	CCOE Tankfarm	WETED & NON WETTED PART: SS316	2 m3/hr, 20 mlc
8	ST-101	solvent storage tank	Non-CCOE tankfarm	Non-CCOE tankfarm	SS 316L	40 KL
9	STP-101	solvent transfer pump	Non-CCOE tankfarm	Non-CCOE tankfarm	SS 316L	5 m3/hr, 40 mlc
10	ST-102	solvent storage tank	Non-CCOE tankfarm	Non-CCOE tankfarm	SS 304	40 KL
11	STP-102	solvent transfer pump	Non-CCOE tankfarm	Non-CCOE tankfarm	SS 304	5 m3/hr, 40 mlc
12	ST-103	solvent storage tank	Non-CCOE tankfarm	Non-CCOE tankfarm	SS 304	40 KL
13	STP-103	solvent transfer pump	Non-CCOE tankfarm	Non-CCOE tankfarm	SS 304	5 m3/hr, 40 mlc
14	ST-AODD-101	drum dispensing pump	Non-CCOE tankfarm	Non-CCOE tankfarm	WETED & NON WETTED PART: SS316	2 m3/hr, 20 mlc

S. No.	Equipment ID	Name of the equipment	Name of the Block	Area	Material of Construction (MOC)	Capacity
1	B-5101	Boiler	Utility	Ground floor	CS	3500 Kg/hr, 10.54 Kg/cm ² (g)
2	FODT-5101	Furnace oil Day storage tank	Utility	Ground floor	MS	4500 Liters
3	FWDT-5101	Feed water storage tank	Utility	Ground floor	MS	10000 Liters
4	CH-5101	Boiler Chimney	Utility	Ground floor	MS	500mm Dia 42 meter Ht
5	FOST-5101	Furnace oil bulk storage tank	CCOE tank farm	Ground floor	MS	40000 Liters
6	FOTP-5101A	Furnace oil Unloading / transfer pump	CCOE tank farm	Ground floor	CS	10m ³ /hr 30 mlc
7	FOTP-5101B	Furnace oil Unloading / transfer pump	CCOE tank farm	Ground floor	CS	10m ³ /hr 30 mlc
8	HSDST-5101	HSD Bulk storage tank	CCOE tank farm	Ground floor	MS	20000 Liters
9	HSDTP-5101A	HSD unloading/transfer pump	CCOE tank farm	Ground floor	CS	10m ³ /hr 30 mlc
10	HSDTP-5101B	HSD unloading/transfer pump	CCOE tank farm	Ground floor	CS	10m ³ /hr 30 mlc
11	PRS-5101	Pressure reducing station	API Block-II	Ground floor	CS	5 TPH 10.54 to 3.5 Kg/cm ² (g)
12	CRS-5101	Condensate recovery system	API Block - II	Ground floor	CS	2000 kg/hr
13	HWS-5101	Hot water system for HVAC	Utility block	Ground floor	MS	70000kcal/hr
14	HWS-DA-5101	Deaerator for HVAC	Utility block	Ground floor	MS	80NB
15	HES-ET-5101	Expansion tank for HVAC	Utility block	Ground floor	MS	100Liter
16	HWP-5101A	Hot water circulation pump	Utility block	Ground floor	CS	10 m ³ /hr, 40 MLC
17	HWP-5101B	Hot water circulation pump	Utility block	Ground floor	CS	10 m ³ /hr, 40 MLC
18	HCHW-5101	Chilled water unit for HVAC	Utility block	Ground floor	CS	200 TR
19	HCHWP-5101	Primary chilled water pump	Utility block	Ground floor	CS	120 m ³ /hr, 20 MLC

20	HCHWP-5102	Primary chilled water pump	Utility block	Ground floor	CS	120 m3/hr, 20 MLC
21	HCHWS-5101	Secondary chilled water pump	Utility block	Ground floor	CS	120 m3/hr, 25 MLC
22	HCHWS-5102	Secondary chilled water pump	Utility block	Ground floor	CS	120 m3/hr, 25 MLC
23	DA-5101	Deaerator	Utility block	Ground floor	MS	150NB
24	ET-5101	Expansion tank	Utility block	Ground floor	MS	500Liter
25	CHW-5101	Chiller unit for process	Utility block	Ground floor	CS	200 TR
26	CHWP-5101	Primary circulation pump	Utility block	Ground floor	CS	120 m3/hr , 25 mlc
27	CHWP-5102	Primary circulation pump	Utility block	Ground floor	CS	120 m3/hr , 25 mlc
28	CHWT-5101	Hot and cold well tank	Utility block	Ground floor	MS	20000 Liters
29	CHWS-5101	Secondary circulation pump	Utility block	Ground floor	CI	60 m3/hr , 40 mlc
30	CHWS-5102	Secondary circulation pump	Utility block	Ground floor	CI	60 m3/hr , 40 mlc
31	CHWS-5103	Secondary circulation pump	Utility block	Ground floor	CI	60 m3/hr , 40 mlc
32	CHB-5101	Chilled brine system	Utility block	Ground floor	CS	60 TR (-20°C)
33	CHBP-5101	Primary circulation pump	Utility block	Ground floor	CI	50 m3/hr , 25 MLC
34	CHBP-5102	Primary circulation pump	Utility block	Ground floor	CI	50 m3/hr , 25 MLC
35	CHBT-5101	Hot/Cold well tank	Utility block	Ground floor	MS	15000 Liter
36	CHBS-5101	Secondary circulation pump	Utility block	Ground floor	CI	25 m3/hr, 40 MLC
37	CHBS-5102	Secondary circulation pump	Utility block	Ground floor	CI	25 m3/hr, 40 MLC
38	CT-5101	Cooling tower – Utility	Utility block	Terrace floor	FRP	800TR, ΔT 5°C
39	CTP-5101	Cooling water circulation pump	Utility block	Terrace floor	CI	151 m3/hr, 25 mlc
40	CTP-5102	Cooling water circulation pump	Utility block	Terrace floor	CI	151 m3/hr, 25 mlc
41	CTP-5103	Cooling water circulation pump	Utility block	Terrace floor	CI	151 m3/hr, 25 mlc
42	CTP-5104	Cooling water circulation pump	Utility block	Terrace floor	CI	151 m3/hr, 25 mlc
43	CTP-5105	Cooling water circulation pump	Utility block	Terrace floor	CI	151 m3/hr, 25 mlc
44	CT-3101	Cooling tower process	Utility block	Terrace floor	FRP	500TR, ΔT 5°C

45	CTP-3101	Cooling water circulation pump	Utility block	Terrace floor	CI	300 M ³ /Hr., 40 mlc
46	CTP-3102	Cooling water circulation pump	Utility block	Terrace floor	CI	300 M ³ /Hr., 40 mlc
47	NP-5101	Nitrogen plant	Utility block	Ground floor	CS	50 NM ³ /Hr. 99.5% Purity
48	NR-5101	Nitrogen receiver	Utility block	Ground floor	CS	20000 Liters
49	AC-5101	Air compressor for air jet mill	Utility block	Ground floor	CS	400 CFM '@ 10.0 kg/cm ² (g)
50	WAR-5101	Wet air receiver	Utility block	Ground floor	CS	2000 Liters
51	AD-5101	Air dryer	Utility block	Ground floor	CS	400 CFM '@ 10.0 kg/cm ² (g)
52	AR-5101	Dry air receiver	Utility block	Ground floor	CS	5000 Liters
53	AC-5102	Air compressor	Utility block	Ground floor	CS	300 CFM '@ 8.0 kg/cm ² (g)
54	WAR-5102	Wet air receiver	Utility block	Ground floor	CS	2000 Liters
55	AD-5102	Air dryer	Utility block	Ground floor	CS	300 CFM '@ 8.0 kg/cm ² (g)
56	DAR-5102	Dry air receiver	Utility block	Ground floor	CS	5000 Liters
57	DAST-5101	Dry air storage tanks for instruments / breathing air	API Block-II	Ground floor	CS	2000 Liters

Gas Cylinders (Zero Air, Hydrogen, Helium & Nitrogen etc.) Storage area

S. No	Name of the cylinder	Total Qty (No's)	Storage Location
1	Nitrogen	20	Cylinder shed
2	Hydrogen	2	Cylinder shed
3	GC Nitrogen (Laboratory Purpose)	5	Cylinder shed
4	GC Hydrogen (Laboratory Purpose)	5	Cylinder shed
5	GC Zero Air (Laboratory Purpose)	5	Cylinder shed
6	Refrigerant gas	2	Cylinder shed

List of Hazardous Liquid Raw Materials / Chemicals / Solvents**WASTE WATER TREATMENT FACILITY**

PH adjustment tanks

Available Emergency and Safety Facilities at site

Life-saving equipment like SCBA, Emergency Eyewash and body showers are provided. First-Aid Fire extinguishers, Fixed Automated sprinklers, Fire Proximity Suit, Fire Retardant Suit, First-Aid boxes, Stretchers, AED, and Ambulance are available.

List of Emergency Eyewash and Body Wash Shower is enclosed in ANNEXURE.

DETAILS OF FIRE FIGHTING AND SAFETY EQUIPMENT

- Total fire extinguishers installed - 114 Nos.
- Wind socks- 3 Nos.
- Emergency Assembly point- 1No.
- Hose Reel – 11 Nos
- Multi-purpose nozzle – 1 no
- Foam monitor – 4 Nos
- Aqueous Film Forming Foam (AFFF) - 1600 liters (8 x 200 lts)

FIRE HYDRANT SYSTEM:

- Electrical Driven Main Pump – 410 m³/hour
- Jockey Pump – 15 m³/hour
- Diesel Driven Pump – 410 m³/hour

SPRINKLER SYSTEM:

- Electrical Driven Main Pump – 273 m³/hour
- Jockey Pump – 10 m³/hour

DETAILS OF FIRST AID BOXES are enclosed in ANNEXURE.

- Total first aid boxes- 10 Nos.

7.0 LIST OF PRODUCTS

The following existing & proposed new products are considered for HARA Studies:

PHASE I		PHASE II	
1.	Atazanavir Sulphate	1.	Abacavir Sulphate
2.	Darunavir Ethanolate	2.	Atorvastatin Calcium
3.	Donepezil Hydrochloride	3.	Clopidogrel Bisulfate
4.	Febuxostat	4.	Duloxetine Hydrochloride
5.	Fexofenadine Hydrochloride	5.	Efavirenz
6.	Glipizide	6.	Emtricitabine
7.	Lanzoprazole	7.	Festerodine Fumerate
8.	Levetiracetam	8.	Lopinavir
9.	R & D / Custom Synthesis Products	9.	Pioglitazone Hydrochloride
		10.	Rabeprazole Sodium
		11.	Raltegravir Potassium
		12.	Ranolazine
		13.	Ritonavir
		14.	Telmisartan
		15.	Tenofovir disproxil Fumarate
		16.	R & D / Custom Synthesis Products

8.0 PROCESS DESCRIPTION OF EACH PRODUCT & FLOW DIAGRAMS

The Process manufacturing involves Hazardous raw material & hazardous reactions, hazardous dust products.

9.0 HAZARD ANALYSIS

HAZARD: Potentially dangerous condition, which is triggered by an event, called the cause of the hazard.

HAZARD ANALYSIS: Identify all possible hazards potentially created by a product, process or application.

The Hazard Analysis Process consists of the following steps:

- Identification and description of the identified hazards and accident events which could lead to undesirable consequences.
- A relative ranking of the risk of each hazard and accident event sequence using FEI (Fire

Explosion Index).

- A qualitative estimate of the risks in regard to consequences and probability and consequence of each undesirable event

Hazard Identification and Risk Assessment

Risk is defined as the product of the frequency (probability, likelihood) of an event occurring and its consequence (severity, impact, injury / fatality rate). Risk assessment is often an iterative process that involves the major steps:

1. Define a worst-case scenario (WCS) in terms of its likelihood and consequence
2. Develop line of defence appropriate to the risk
3. Evaluate the risk reduction/elimination afforded by the line(s) of defence
4. Decide if risk reduction is sufficient and complete the project if sufficient
5. Decide if additional risk reduction can be achieved – perform additional risk reduction and return to step 3
6. Decide to not perform the process if further risk reduction is not feasible. This iterative process of hazard identification and risk assessment is designed to reduce risk to an acceptable level. Achieving the required level of risk reduction completes the review process. Alternatively, if the risk cannot be reduced using the available resources the process should be terminated.

HAZARD IDENTIFICATION: Preliminary Hazard Identification is used to identify typical and often relatively apparent hazards and damage events in a system.

The following are such hazards considered for detailed study

- a. Hazards Related to Unit Operations
- b. Health, Fire & Explosion and Reactivity& Chemical Hazards of Hazardous Raw Materials
- c. Chemical Storage Hazards
- d. Equipment Related Hazards Other Hazards

9.1 HAZARDS RELATED TO UNIT OPERATIONS

The various unit operations often involve hazardous material handling under hazardous operating conditions, adopting hazardous reactions. The general safety considerations for such unit operations have to be taken into consideration of phase changes, catalysts used, reaction kinetics, and equilibrium and heat effects.

The following are the Unit Operations and associated hazards.

S. No	Unit Operation	Hazards
9.1.1	Transfer of flammable solvents pumping, vacuum Transfer or manual transfer to reactors, receivers or containers	a). Spills during transfer containment failure b). Fires due to static charges & ingress of air c). Exposure to toxic & harmful vapors
9.1.2	Extraction of layer with flammable solvents or Toxic Solvents	a). Solvent evaporation, leaking of vapor and igniting. B). Air entry with flammable mixture may result in explosion. C). Exposure to Toxic vapor during extraction& layer separation
9.1.3	Heat Transfer during Reaction	If the temperature increases beyond the set limit, then the Hot reaction mass may bump through the reactor openings or vents resulting in loss of material confinement Runaway reaction due to high exothermicity
9.1.4	Mixing & Agitation	Industrial Processes require mixing of all combination of gas, liquid and solids. While material properties present primary hazard in most of these operations, hazards due to dust explosions etc. Flammable / explosive mixtures and static electricity are important.
9.1.5	Filtration	a. Choking of filter resulting in over pressurization and loss of containment of filtrate b. Vibration of centrifuge basket due to uneven cake settling in centrifuge- may result into fire and accident c. Fire due to static charges & ingress of air
9.1.6	Mechanical Separations	a. Fire hazards are quite common in mechanical separators and are related to the combustibility of materials handled the potential for intermixing of fuel and oxidant inside or outside of the equipment's and the probability of ignition of any resulting flammable mixture. Some of the typical hazards associated with the commercially important mechanical separations are highlighted below: b. Filtration: They seldom present major fire

		<p>problems as filter cakes are generally handled wet in aqueous media. However, if the liquid phase is combustible, fire hazard possibility exists. If the flash point of the liquid phase is low, it can pose additional hazard problems</p> <ul style="list-style-type: none"> c. Centrifugal separators often handle volatile flammable liquids and unless special precautions are taken, are almost certain to contain a flammable mixture at one stage or other in the operational cycle. d. The probability of ignition of the flammable mixture is also quite high. Main sources of ignition are mechanical friction, hot surfaces and static electricity. A centrifuge rotates at high speed and a mechanical fault, leading to a spark, or a hot surface, can cause ignition. e. The movement of the slurry in an operating centrifuge favors the generation of static electricity, particularly if the liquid has high resistivity. Alternatively, if the centrifuge is stopped and opened, a static electricity hazard may occur from an operator who has too high an insulation to earth f. Mechanical hazards can also occur on account of the high kinetic energy of the rotating centrifuge bowl. They are caused by basket imbalance, incorrect assembly & corrosion and bearing failures.
9.1.7	Distillation	<ul style="list-style-type: none"> a. Ingress of air while breaking vacuum, resulting in fire & explosion b. Ingress of Air into System while vacuum distillation because of gasket failure/human error resulting in fire & Explosion c. impurity/ un reacted raw material/ by product getting decomposed at higher temperature than the set point resulting in explosion d. Static charges generation during collection and transfer of distilled solvent, resulting into fire e. Cooling failure may result into loss of solvent and may cause fire

		<p>f. Batch Distillation presents a hazard in that they contain more inventories of flammable liquid, boiling usually under pressure. There are number of situations which may lead to loss of containment of solvents.</p> <p>g. The conditions of operation of the equipment associated with the distillation column, particularly the re-boiler and the bottoms pump, are severe so that failure is more probable.</p> <p>h. If cooling at the condenser is lost, the column may suffer over pressure. On the other hand, loss of steam at the re-boiler can cause under pressure in the column. Interlocks on utility failure needs to be provided for safe shut down of columns</p> <p>i. Another hazard is over pressure due to heat radiation from external fire</p> <p>j. Thermal Behavior of Distillation mass very important and if not understood, then here is possible runaway, leads fire & explosion. For this thermal data shall be generated and accordingly interlocks for temperature/pressure shall be arranged</p>
9.1.8	High Vacuum Distillation	<p>If the temperature increases beyond the limit, then the hot reaction mass may bump through the reactor openings, resulting in loss of material confinement and may cause a severe incident/accident in addition to affecting the product quality and yield.</p> <p>Thermal Behavior of Distillation mass very important and if not understood, then here is possible runaway, leads fire & explosion. For this thermal data shall be generated and accordingly</p>

		<p>interlocks for temperature/pressure/vacuum failure shall be arranged</p> <p>Mechanical integrity of system is very important for High vacuum/vacuum distillation to avoid the air ingress in to system. If air ingress, LEL mixture will form in the system, further leads to fire and explosion.</p>
9.1.9	Drying	<ol style="list-style-type: none"> Overheating during drying may result into fire and explosion Air ingress and static charges during Fluid Bed Drying may result in explosion Fire & explosion due to static charges due to low ignition energy & thermal decomposition
9.1.10	Size Reduction	<ol style="list-style-type: none"> Fire and explosion hazards exist wherever necessity arises to grind combustibles & Products/ powders prone to static charges. They are proportional to the flammability of the concerned material and the fineness of the fuel particles Sparks can be generated in high speed grinding machinery such as milling machine if small metallic particles are present. Dust explosions are possible in high speed grinding operations handling fine solid particles & moreover low minimum ignition energy. The energy content of dust / air mixtures is higher than explosive gas- air mixtures. The particle size of the dust has a considerable influence on the explosion force. Even with a high energy ignition source, dusts cannot by themselves explode. Simultaneous presence of small amount of

		<p>flammable gases / vapors, even below their Lower Explosion Limits (LEL) can trigger explosions.</p> <p>d. Occupational hazards of fine dusts are of great concern and should be rigorously controlled in all mechanical installations to protect the health of plant personnel</p>
9.1.11	Milling & Sifting	Potential explosion hazard if the powder has very low minimum ignition energy, High bulk powder resistivity & high K^{st} value and powder is prone to generate static charges and Explosions.
9.1.12	Blending	<p>a. Fall hazard & caught in Hazard during Blending operation</p> <p>b. Static charges causing Fire Hazards</p> <p>c. Exposure to dust causing occupational health hazards</p>

9.2 HAZARDS RELATED TO UNIT PROCESSES:

Unit process hazards are not generic in nature and specific in nature, can be understand based on following parameters

Temperature of process (T_p),

Exothermic/Endothermic reaction,

If exothermic then,

Maximum temperature of Synthetic reaction (MTSR), Applicable to Semi batch reaction

Adiabatic temperature rise (ΔT_{ad}), Applicable to Batch reaction

Time to Maximum Rate under adiabatic conditions (TMR_{ad} and TD_{24}),

Time to Maximum Rate under adiabatic conditions (TMR_{ad} and TD_8),

Thermal Decomposition Onset Temperature (T_{on})

Gas evaluation,

Type of Gas- Toxic / Non-Toxic & Flammable/Non Flammable,

Based on above parameters reaction is categorized as Low, medium, high & critical risk. Further based on existing safety layer of protection and addition controls are discussed.

In case of gas evaluation, based on gas property suitable safe mechanism of safe disposal/venting shall be provided.

Safety valve sizing shall be adequately designed, so that when there is demand, it has to be function

Reaction Risk/Criticality classification:

GENERAL WORK ACTIVITYWISE HAZARD ANALYSIS AND RISK ASSESSMENT

Activity - Based Risk Assessment								
1. Hazard Identification				2. Risk Evaluation				3. Risk Control
1a.	1b.	1c.	1d.	2a.	2b.	2c.	2d.	3a.
No	Work Activity	Hazard	Possible Accident/ ill Health & Persons- at- Risk	Existing Risk Control (If any)	Severit y	Likel y- hood	Risk Level	Additional Risk Control
1	Receiving the required raw - material, chemicals, equipment and storing in respective places and vessels	1 Failure of Material handling equipment, tools and tackles. 2. Truck failures and operators failure Falling object	Physical strains Back pain Injury at feet, chemical spillages and chemical/ solvent fire accidents.	Check the transport Trucks, equipment and tools before use. Use PPE and follow SOPs for all operations. Safety procedures to check SDS (formerly known as MSDS), the vehicle condition, driver license, earthing system and spark arrestors are in place.	Minor to serious	Daily	Mediu m Risk	
2	Checking the material/ road trucks	counting the bags and tankers and keeping them in tidy manner	no physical handling or chemical handling	Attend only trained persons.	Minor.	Daily	Low Risk	Regular supervision.
3	Chemicals/ Solvents material handling	Keeping the material in stores and tanks, material	Bodily Injury, fire hazard, chemical spillage.	Trained in fire safety, safe manual handling. And using PPE Safety shoes. Hand	Minor	Daily	Mediu m Risk	Regular safety observations

		handling Physical strains Falling object		gloves and eye protection				
4.	Operation of Effluent treatment plant.	Keeping the material in stores, maintaining ETP flows and material handling	Bodily Injury, fire hazard, chemical spillage.	Trained in fire safety, safe manual handling. And using PPE Safety shoes. Hand gloves and eye protection	Minor	Daily	Low risk	Regular supervision.
5.	Operation of steam Boiler.	Furnace oil handling and firing, boiler operation and maintenance	Bodily injury, heat and hot material/ hot surface contact.	Trained and certified personnel are engage. Required PPE are used and	Minor	Daily	Medium	Regular supervision.
6	Fabrication works.	Metal cutting and grinding machine hazards	Bodily injury, electrical shock	Trained in safe manual handling. PPE Safety shoes. Hand gloves and eye protection	Minor	Daily	Low Risk	Permit to work to be checked regularly.
7	Civil works/ painting / height works.	Fire hazard, Physical strains Falling object, painting fumes, dust hazards, housekeepin	Bodily Injury fire hazard, health hazards due to paint fumes.	PPE nose mask, goggles Safety shoes. Hand gloves and training in use of fire extinguishers	Minor	Daily	Medium Risk	Regular checking as per work permits.

		g and ventilation						
8	vehicle driving	Vehicle driving accident, driving fatigue.	Personal accidents and injuries, vehicle failures, due to driver fatigue, restlessness, no driver skills, awareness on road conditions, atmospheric conditions and on road vehicle driving safety	Trained and licensed in safe driving, defensive driving and awareness on road vehicle driving safety and atmospheric conditions.	Minor	Daily	Medium Risk	TREM CARDS to be carried with chemical carriers.

Common Activities in manufacturing description in brief and their risk assessment (qualitative) :**Raw materials receipt, storage and dispensing:**

Receipt & storage - All solid raw materials/containers/drums will be received in warehouse by manual handling and stored by using hand operated trolleys/stacker machine. All liquid barrels/drums will be unloaded by using forklift and will be stored in the dedicated drum storage area. Bulk quantity of solvent will be unloaded in the dedicated tanks directly from the tanker Lorries.

Dispensing – All solid raw materials will be dispensed inside the Laminar Air Flow Booth. All liquid raw materials will be dispensed under Fume hood from the drums or pumped directly from the storage tanks in a closed loop.

Charging/Transferring of raw materials (liquid & Solid):

Solid raw materials will be charged through Powder Handling System and liquid raw materials / solvents will be charged/transferred through closed loop pipelines using electrical pumps/AODD pumps.

Heating and cooling operation:

Heating and cooling operation will be carried out by using single fluid system which contains utility connections both steam and cooling water in the dedicated pipelines (Temperature range is -20 to 142 deg. C).

Distillation:

Solvent will be distilled based on the process conditions by the Primary and Secondary condensers to reduce evaporation loss and distillate will be collected in the dedicated receivers in a closed loop.

Filtration:

Product mass will be filtered in the closed loop Peeler Centrifuges in the inert atmosphere and ML will be collected in the dedicated receivers.

Drying:

Filtered mass will be dried in the closed condition by using Vacuum Tray Driers/ANFD/RCVD at the inert atmosphere.

Unloading of Product:

Product will be unloaded from the centrifuges/driers to the containers under telescopic/fixed local exhaust ventilation (dust collectors).

Size reduction:

Product particle size will be reduced by using micronizer/multi-mill/Co-mill/air jetmill in closed/semi-closed condition under telescopic/fixed local exhaust ventilation (dust collectors).

Packaging:

Finished product will be packed in the controlled atmosphere in the containers/drums and stored in the Finished goods storage area.

All process								Location: PB	
Activity - Based Risk Assessment									
1. Hazard Identification				2. Risk Evaluation				3. Risk Control	
1a.	1b.	1c.	1d.	2a.	2b.	2c.	2d.	3a.	3b.
No	Work Activity	Hazard	Possible Accident/ Ill Health & Persons-at- Risk	Existing Risk Control (If any)	Severity	Likely-hood	Risk Level	Additional Risk Control	Any specific recommendations
1	Dispensing of solid raw materials	Exposure to chemical, contact with chemical, struck against, caught between, fall of object, strain.	Health illness, minor cut / laceration injury, Muscle/body pain	Hand operated Trolley available for material shifting. Laminar air flow booth available to reduce exposure to chemicals, all required PPE, SOP available to ensure the sequence of operation safely.	Minor	Occasional	Low Risk	...	...
2	Dispensing of acid/alkali (liquid) raw materials from drums using barrel pump/AOD pump	Exposure to chemical, contact with chemical, struck against, caught between, fall of object, strain.	Health illness, minor cut / laceration injury, chemical burn injury, Muscle/body pain, dangerous occurrence due to large spillage.	Battery operated fork lift/ hand operated trolley available for material shifting. Fume hood available to reduce exposure, all required PPE, SCBA, SOP available to ensure the sequence of operation safely, spill control kit available to contain and collect spillage	Minor	Occasional	Low Risk	...	...

3	Dispensing of solvents from drums using barrel pump/AOD pump	Exposure to chemical, contact with chemical, struck against, caught between, fall of object, strain, fire due to static charge / ignition source	Health illness, minor cut/ laceration injury, Muscle/body pain, Fire & explosion.	Battery operated fork lift/ hand operated trolley available for material shifting. Fume hood available to reduce exposure, earthing, earth rods and bonding, conductive and anti-static hoses, all required PPE, SCBA, SOP available to ensure the sequence of operation safely, fire extinguisher available	Major	Occasional	Medium	...	...
4	Dispensing/ transferring of solvents from bulk storage tanks using electrical pump	Caught between, struck against, strain, fire due to static charge / ignition source	minor cut/ laceration injury, Muscle/body pain, Fire & explosion	Earthing and bonding, conductive gaskets & pipelines, anti-static hoses, all required PPE, SCBA, SOP available to ensure the sequence of operation safely, fire extinguisher, Medium velocity sprinkler system available	Major	Occasional	High	...	...
5.	Charging of solid raw materials into reactor through Powder Transferring system (closed loop)	Struck against, fall of object, caught between, Exposure to chemical, contact with chemical, dust explosion due to static charge	Health illness, minor cut/ laceration injury, Muscle/body pain, fire & explosion	Nitrogen blanketing, SRV & rupture disk connected to dump tank, Earthing and bonding, conductive gaskets & pipelines, anti-static hoses, all required PPE, SCBA, SOP available to ensure the sequence of operation safely, fire extinguisher, automatic sprinkler system available	Major	Occasional	High	...	...

6	Charging of solvents from the drums into the reactor by using AOD pump	<p>Static Generation</p> <p>Contact with</p> <p>Caught between</p> <p>Struck against</p> <p>Strain</p> <p>Exposure/emission</p>	<p>Fire due to static electricity, injury or irritation due to chemical contact or exposure, minor laceration or cut injury due to material or drum handling, body or muscle pain due to strain.</p>	<p>Hand operated Trolley available for material shifting. Telescopic ventilation hood available to reduce exposure to chemicals, all required PPE, SOP available to ensure the sequence of operation safely. Anti-static hoses and conductive pipelines, earthing and bonding available to reduce static generation.</p>	Major	Occasional	Low		
7	Charging/ transferring of solvents from the storage tank into the reactor by using electrical pump	<p>Static Generation</p> <p>Struck against</p> <p>Strain</p>	<p>Fire due to static electricity, minor laceration or cut injury due to valve operation, body or muscle pain due to strain.</p>	<p>Ex-proof electrical motor and switches, conductive pipelines and gaskets, earthing and bonding available to reduce static generation. All required PPE, SOP available to ensure the sequence of operation safely.</p>	Major	Occasional	Low		

8	Heating / Cooling of reaction mass	Contact with	Irritation or injury due to contact with hot or cold equipment, excess emission or exposure due to fire/explosion of equipment by excess pressure.	All utility lines are insulated, reactor vent is provided with Rupture disk and Safety Relief Valve and the same is connected to dump tank. All required PPE and SOP available to ensure the sequence of operation safely.	Major	Occasional	Low		
9	Distillation of solvent from the reactor	Contact with Exposure/emission Static Generation	Irritation or injury due to contact with hot equipment, emission or exposure due to condenser failure, fire due to static generation.	All utility lines are insulated, reactor is provided with primary and secondary condensers to reduce evaporation loss, conductive pipelines and gaskets provided to prevent static generation. All required PPE and SOP available to ensure the sequence of operation safely.	Major	Occasional	Low		

10	Filtration of reaction mass using peeler centrifuge	Struck against Static Generation	Minor laceration or cut injury, fire due to static electricity.	Conductive pipelines and gaskets provided to prevent static generation, maintaining nitrogen atmosphere to break out the fire. All required PPE and SOP available to ensure the sequence of operation safely.	Major	Occasional	Low		
11	Drying of wet product/mass in the ANFD	Static Generation Struck against	Minor laceration or cut injury, dust explosion due to static electricity.	Conductive pipelines & gaskets provided to prevent static generation, maintaining nitrogen atmosphere to break out the fire. All required PPE and SOP available to ensure the sequence of operation safely.	Major	Occasional	Low		
12	Drying of wet product/mass in the RCVD	Struck against	Minor laceration or cut injury, dust explosion due to static electricity.	Conductive pipelines and gaskets provided to prevent static generation, maintaining nitrogen atmosphere to break out the fire. All required PPE and	Major	Occasional	Low		

		Static Generation		SOP available to ensure the sequence of operation safely.					
13	Drying of wet product/mass in the VTD	Static Generation Strain Contact with Caught between Exposure/emission Struck against	Fire/dust explosion due to static electricity, injury or irritation due to chemical contact or exposure, minor laceration or cut injury due to material or drum handling, body or muscle pain due to strain.	Hand operated Trolley available for material shifting. All required PPE, Breathing Air, SOP available to ensure the sequence of operation safely. Dip rods, earthing and bonding available to reduce static generation.	Major	Occasional	Low		
14	Unloading of wet / dry product/mass from the centrifuge/driers	Contact with Caught between Exposure/emission	Fire/dust explosion due to static electricity, injury or irritation due to chemical contact or exposure, minor laceration or cut injury due to material or drum handling, body or	Hand operated Trolley available for material shifting. Dust collectors available to reduce exposure to chemicals, all required PPE, Breathing air, SOP available to ensure the sequence of operation safely. Dip rods, earthing and bonding	Major	Occasional	Low		

		Static Generation Strain Struck against	muscle pain due to strain.	available to reduce static generation.					
15	Size reduction of dried product into micronizer / vibro sifter / Air Jet mill / multi-mill	Contact with Caught between Exposure/emission Fall of object Static Generation Strain Struck against	Fire/dust explosion due to static electricity, injury or irritation due to chemical contact or exposure, minor laceration or cut injury due to material or drum handling, body or muscle pain due to strain.	Hand operated Trolley available for material shifting. Dust collectors available to reduce exposure to chemicals, all required PPE, Breathing air, SOP available to ensure the sequence of operation safely. Dip rods, earthing and bonding available to reduce static generation.	Major	Occasional	Low		
16	Packaging and storage of finished product	Caught between Fall of object Strain Struck against	minor laceration or cut injury due to material or drum handling, body or muscle pain due to strain.	Hand operated Trolley available for material shifting. all required PPE, SOP available to ensure the sequence of operation safely.	Minor	Occasional	Low		

Risk Estimation matrix

Injuries / incidents / Emergencies			Health illnesses		
Likelihood of an Occurrence	Rating	Impact/Severity	Likelihood of an Occurrence	Rating	Impact / Severity
Happens rarely	1	First aid injury/Lost time injury resume within 48 hrs (Two days). Near Misses – No impact.	Happens rarely	1	First aid treatment due to occupational illness.
Happens once in 6 to 12 months.	2	Lost time injury more than two days to 90 days. Incidents – Minor impact	Happens monthly	2	Hospitalization up to 48 hrs due to occupational illness.
Happens once in 3 to 6 months.	3	Lost time injury more than 90 days with temporary disablement. Major incident – Localized emergency	Happens weekly	3	Hospitalisation more than 48 hrs due occupation ill ness.
Happens once in a month or more frequency	4	Lost time injury with loss of part of body/Permanent disablement/Fatal. Catastrophic – On-site Emergency.	Happens everyday	4	Damage to human organs due to occupational illness.

RISK LEVEL EVALUATION MATRIX

Impact / severity (I)	4	8	12	16
	3	6	9	12
	2	4	6	8
	1	2	3	4
	Frequency / Likelihood of an occurrence (F)			

Risk Level = Low (1 – 2), Medium (3 – 4), High (6 – 9), Extreme (12 -16)

9.3 HEALTH, FIRE & EXPLOSION, REACTIVITY & CHEMICAL HAZARDS OF HAZARDOUS RAW MATERIALS

MSDS Copies attached

9.4 CHEMICAL STORAGE HAZARDS

The chemicals involved in the processing of 9 products are corrosive, flammable, toxic, water reactive, fuming and irritant. Spills and containment failures from containers, storage tanks, pipe leaks, flange leaks, pump glands etc. may take place. Over flows can occur during transfer of these chemicals by pumps or by pneumatic pressure. Hence, there is possibility of Fire & Toxic Release.

Bulk chemicals are drawn by pump to holding tank/ receiving tanks/ measuring tanks and there from, the chemicals are transferred by gravity to reactors. Hence, there is a possibility of large scale spills resulting into Fire & Toxic Release in work place.

9.5 EQUIPMENT RELATED HAZARDS

BOILER

Boilers, being fired pressure vessels, there are high potential for explosions and may result in loss of life and property. The common causes of boiler explosions are faulty design, usage of substandard or incorrect equipment or operational upsets and errors, improper maintenance and failure of safety devices. Boiler startups, shutdowns are the situations having hazard potential. While, burns, fire hazards are the normal hazards connected with any hot work or related operations, there are boiler-specific hazards and they are as follows:

- Furnace back pressure b. Fuel-air explosions
- Tube failure leading to explosion
- Accidental failure of rotating components

CENTRIFUGES

Centrifuges often handle volatile flammable liquids and unless special precautions are taken, are almost certain to contain a flammable mixture at some stage in the operational cycle.

The probability of ignition of the flammable mixture is quite high. Main sources of ignition are mechanical friction, hot surfaces and static electricity. A centrifuge rotates at high speed and a mechanical fault, leading to a spark, or a hot surface, can cause ignition.

The movement of the slurry in an operating centrifuge favors the generation of static electricity, particularly if the liquid has high resistivity. Alternatively, if the centrifuge is stopped and open, a static electricity hazard may occur from an operator who has too high an insulation to earth. As per IS Standard IS4092-1 (1992), Centrifuge shall be provided with

Nitrogen blanketing system and O₂ concentration inside of centrifuge shall be maintained below 2%. Relaxation time minimum of 15 minutes shall be provided before unloading by operator and same shall be validated.

If there is a toxic hazard, the centrifuge system should be enclosed as far as practicable. Local exhaust ventilation should be provided. Alternatively, it is possible to extract from the casing and operate under a negative pressure, provided that the liquid is not flammable.

Other measures which may be required include provision of a forced air supply or of breathing equipment for the operator.

Spark generation if the centrifuge is not having static & electrical earthing, and due to friction. Solvent vapors spreading around the centrifuge, if the ML's are not collected in closed system. Accumulation of solvent vapors if there is no local/general exhaust system. Centrifuge area LEL shall be monitored and alerted at LEL

DRYERS

The product (filtered or centrifuged) is spread on trays and is loaded in tray dryers. Indirect steam application and heating is done. Since Low Pressure or Hot water circulation system with auto cut off steam is used, the temperature of the operation may not exceed 60 to 70 deg. C. However, the solvents evaporate and escape from the vent. Depending upon the inlet steam condition, over heating of product can take place. Therefore, thermostats are often fitted to the dryers. The solvent vapors (if they are hydrocarbons) can escape into room area and may lead to fire accidents or may form explosive mixture with air and may lead to explosions. The probability becomes more if the vent is let off in the work area with the chances of sparks or naked fires.

Tray Dryers & Vacuum Tray Dryers present distinct hazard of forming explosive mixture and static charge accumulation.

9.6 OTHER HAZARDS MECHANICAL HAZARDS

Different type of mechanical equipment is in use in the plant. Reaction vessels are fitted with stirrers, agitators driven by reduction gearing and motors. Pumps are in use for transfer of liquid chemicals. Centrifuges are used for separation.

Utility equipment like Diesel Generators, Air Compressors, and Brine/ Chilled Water Plant etc. has mechanical equipment.

Most important hazard in such equipment is due to rotating components which may cause traumatic injuries. In case of centrifuges, improper erection of equipment and balancing may result in damage to bearing,

breakage and violent throw-offs which may have secondary effects of fires etc. Over pressurization of pressure systems is another mechanical hazard associated with the operations.

ELECTRICAL HAZARDS

Electrical equipment in flammable atmosphere is an important hazard in bulk drugs manufacture. Hazard Area Classification for the selection & installation of right type, class & group of electrical equipment play important role. Electrical equipment are also selected based on the type of flammable gases being used in the area.

Further, due to operating conditions, wet conditions in floors and around equipment may prevail. This may result in electrical shocks etc. from exposed or un-insulated electrical conductor terminals. Sparks from electrical equipment may result in fire accidents.

MAINTENANCE HAZARDS

Maintenance operations are critical in process industry and more so in a batch operation industry. Each time, between the batches or change-over of campaign or products, the maintenance works are taken up and cleaning operations are carried out. There is need to enter reactor vessels and cleaning. Deleterious atmosphere during such entries is a known hazard. Cleaning of different tanks & reactors is again hazardous operation due to the presence of toxic/ hazardous gas/ vapour/ solid present in pockets not easily accessible. Persons engaged in maintenance operations may gain contact with hazardous chemicals which may be toxic or skin sensitizer or irritant etc.

CORROSIVE HAZARDS

Corrosion hazards are likely to be encountered in the storage areas and reactor areas. Corrosion may slowly lead to structural failures. Here structural failures include pipe supports, pipes, columns of the reactors and production blocks, storage tanks walls and storage tank supports, columns of scrubbers, distillation columns etc. Hence, stability evaluation of structural supports/ civil foundations etc. need to be done based on the nature of corrosive atmosphere or changes / modifications in the civil structures

10.0 CONTAINMENT FAILURE HAZARDS

- Any structural failures often lead to containment failures. Containment failures are related to Storage tanks, columns and reactor supports etc.
- Flammable Solvents such as Hexane, Toluene, Methanol, Acetone, Ethanol etc. are being

stored in underground tanks.

- Liquid Raw Materials and Hazardous Chemicals as per the list of hazardous chemicals are being stored in RM warehouse.
- Hydrochloric Acid, Acetic Acid Caustic soda Lye, Methylene chloride, Chloroform, Sodium methoxide Solution 30%, Hexane is stored in aboveground storage tank.
- Solid hazardous chemicals & Raw Materials are stored in containers in RM Warehouse.
- Liquid hazardous chemicals & Raw Materials are stored in containers in RM Warehouse.
- Spill hazards are associated with unloading of acid and solvents, sampling and pumping operations from road tankers to aboveground storage tanks. Overflowing from the tanks or overfilling of the tanks is another reason for spills.
- Receiving tanks, charging tanks & storage tanks in production blocks can fail due to vacuum during drawl operation. This may lead to buckling of the storage tanks and spread of corrosive & flammable solvent all over.
- Most of the times, dilute solution of Acids & Alkalies etc. also being prepared either in open containers or in reactors in the production blocks which may cause containment failure during transfer by vacuum to receivers or receiving tanks or charging tanks or by using AOD Pump or centrifugal pump. Probability of gasket failure on flange joints of acid & alkalis pumping lines cannot be ruled out.
- The following could be few situations in the site, where flammable solvents, hazardous chemicals or raw materials or acids or alkalis can get released:
- Spillage of flammable solvents during transfer from road tankers to storage tanks may cause spreading and catching fire hazard.
- Spillage of flammable solvents from Storage Tanks due to leakage of tanks or while drawing of solvents to production block which may cause spreading and catching fire hazard.
- Failure of Receiving Tanks (RT) , Charging Tanks (CT) or Receivers, Intermediate storage tanks or failure of level gauges, pipes etc. leading to containment failure of solvents, Hazardous Chemicals and flammable materials in work places
- Emission of solvent vapors from condensers due to overheating of reaction mass or failure of condensation mechanism or failure of utilities to condensers
- Reaction mass getting overheated and bumping of mass of reaction due to chilling system failure, agitation failure or failing to control temperature or uncontrolled addition of reactants.
- Spillage of Acids & alkaline materials or other hazardous chemicals during transfer from carboys or drums to reactor or receives or RT or CT due to containment failure or damaged

containers

- Spillage of Acids & Alkalies during addition in plant area during preparation of dilute solutions.
- Overflow of receiving tanks or Charging tanks or addition flask during transferring solvents from day tanks to Charge Tanks or receivers or also during collection of distillates in receivers.
- While unloading solvent from road tanker into underground tanks, hosepipe failure can result into containment failure and solvents flow out, till someone detects and stops the valve to the road tanker.
- Discharge valves of one of the compartment of road tanker can fail and result in escape of solvent on to ground & may cause fire hazard.
- Contents of reactor are discharged inadvertently or containment failure due to valve defects.
- Over-heating of contents of reactor& emission from vents resulting in fire accidents.
- Due to external ignition sources, spills of flammable solvent in plant area, catching fire and resulting in involvement of entire inventory in reactor area/distillation column and measuring/day tanks.
- Solvent vapors accumulation around the reactor, if there are any leaks, this may result into fire.
- Pressure buildup within the reactor due to any of the process parameter deviation or variation or due to system malfunctioning.
- Failure of Containers of flammable, toxic raw materials, corrosive chemicals in warehouse.

Pressure vessels Safety relief Details:

Pressure vessels are provided with safety relief valves

11.0 EXISTENCE OF MORE THAN ONE TYPE OF HAZARD AT A TIME

There is very remote probability of occurrence of more than one type of emergency cited above, simultaneously at a time in the plant. The probability of such simultaneous occurrence of emergencies, in practical terms is, insignificant.

12.0 RISK ASSESSMENT (Quantitative)

Vasanth Chemicals Pvt Limited, intends to conduct the Risk Assessment hereby mentioned as Risk assessment study for their storage facilities at Plot No 10A, Western Sector, APSEZ, Atchutapuram, Vishakapatnam, Andhra Pradesh. M/s GLOBAL EHS SOLUTIONS was approached for providing Risk Assessment consultancy service for the project. Accordingly, engineers from M/s GLOBAL EHS SOLUTIONS carried out the site visit on 10th of Jun, 2022. The site visit was carried out to understand

the layout, the location of the storage facilities, to understand the process and to get the data which is required for executing for the project. The potential scenarios were modelled for analysing significant consequences such as fire, explosion and toxic dispersion. The consequences and risk levels of the scenarios are assessed using well known and industrially accepted software package ALOHA and applied Manual Calculation as per Guidelines for quantitative risk assessment (purple hand book), CCPS (QRA GUIDELINES FOR DEVELOPING QUANTITATIVE SAFETY RISK CRITERIA).

RISK: Hazard that is associated with a severity and a probability of occurrence.

RISK ASSESSMENT: It is the next step after the collection of potential hazards. Risk in this context is the probability and severity of the hazard becoming reality.

Risk Assessment follows Hazard Analysis. It involves identification and assessment of risks to the plant, personnel and neighboring population. For this, failure probability, credible accident scenario is essential. Thereby, the Risk assessment examines the probability of occurrence of credible worst case scenarios and determines the potential adverse effects on plant, personnel & community through consideration of various direct and indirect impacts resulting from the occurrence of a hazard. In the absence of extensive historical data, probabilities and impacts are subjective assessments drawn from interview information, rational observations and experience.

OVERVIEW OF RISK ASSESSMENT

Risk Assessment is proven valuable as a management tool in assessing the overall safety performance of the chemical process Industry. Although management systems such as engineering codes, checklists, and reviews by experienced engineers have provided substantial safety assurances, major incidents involving numerous casualties, injuries and significant damage can occur – as illustrated by recent world-scale catastrophes. Risk Assessment techniques provide advanced quantitative means to supplement other hazard identification, analysis, assessment, and control and management methods to identify the potential for such incidents and to evaluate control strategies.

The underlying basis of risk Assessment is simple in concept. It offers methods to answer the following four questions:

1. What can go wrong?
2. What are the causes?
3. What are the consequences?
4. How likely is it?

RISK CONCEPT:

Risk in general is defined as a “measure of potential economic loss or human injury in terms of the probability of the loss or injury occurring and magnitude of the loss or injury if it occurs”. Risk thus comprises of two variables:

- Magnitude of consequences and;
- The probability of occurrence.

The results of risk Assessment are often reproduced as Individual and groups risks and are defined as below.

Individual Risk is the “probability of death occurring as a result of accidents at a plant, installation or a transport route expressed as a function of the distance from such an activity”. It is the frequency at which an individual or an individual within a group may be expected to sustain a given level of harm (typically death) from the realization of specific hazards. Such a risk actually exists only when a person is permanently at that spot (out of doors).

The exposure of an individual is related to:

- The likelihood of occurrence of an event involving a release;
- Ignition of hydrocarbon;
- The vulnerability of the person to the event;
- The proportion of time the person will be exposed to the event

This study tries to quantify the risks to rank them accordingly based on their severity and probability. The report should be used to understand the significance of existing control measures and to follow the measures continuously. Wherever possible the additional risk control measures should be adopted to bring down the risk levels.

The second definition of risk involves the concept of the summation of risk from events involving many fatalities within specific population groups. This definition is focused on the risk to society rather than to a specific individual and is termed **Societal Risk**. In relation to the process operations we can identify specific groups of people who work on or live close to the installation; for example, communities living or working close to the plant.

RISK ASSESSMENT PROCEDURE

Hazard identification and risk assessment involves a series of steps as follows:

Step 1: Identification of the Hazard

Hazard identification is a critical step in Risk Assessment. Many aids are available, including experience, engineering codes, checklists, detailed process knowledge, equipment failure experience, hazard index techniques, What-if Analysis, Hazard and Operability (HAZOP) Studies, Failure Mode and Effects Analysis (FMEA), and Preliminary Hazard Analysis (PHA). In this phase all potential incidents are identified and tabulated. Site visit and study of operations and documents like drawings, process write-up etc. are used for hazard identification.

Step 2: Assessment of the Risk

Consequence estimation is the methodology used to determine the potential for damage or injury from specific incidents. A single incident (e.g. rupture of a flammable liquid tank) can have many distinct incident outcomes (E.g. Jet fire, flash fire, pool fire etc.)

Likelihood assessment is the methodology used to estimate the frequency or probability of occurrence of an incident. Estimates may be obtained from historical incident data on failure frequencies or from failure sequence models, such as fault trees and event trees. In this study the historical data developed and those collected by **CPR18E – Committee for Prevention of Disasters, Netherlands (Edition: PGS 3, 2005)** are used.

Risks arising from the hazards are evaluated for its tolerability to personnel, the facility and the environment. The acceptability of the estimated risk must then be judged based upon criteria appropriate to the particular situation.

Step 3: Elimination or Reduction of the Risk

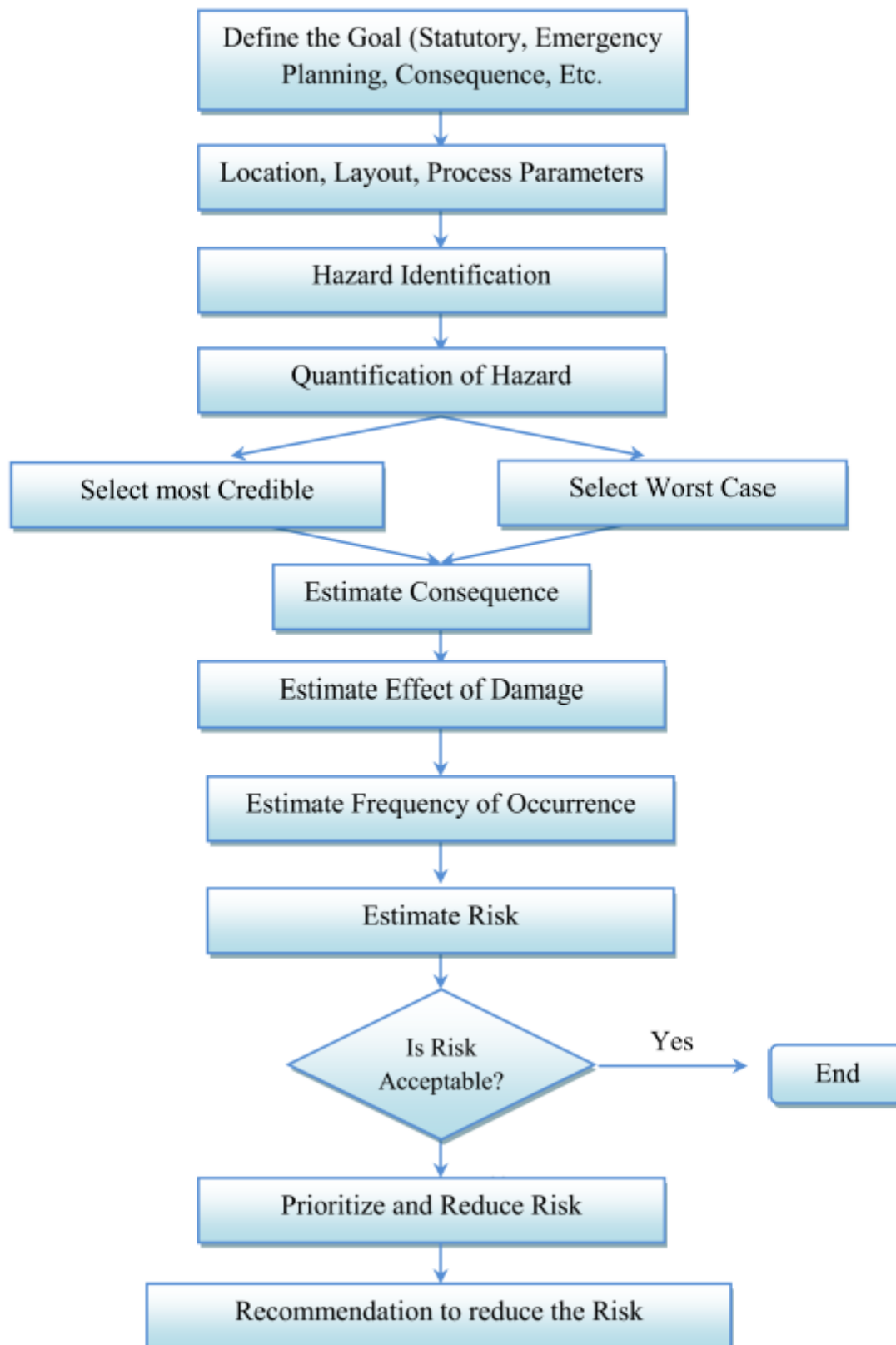
This involves identifying opportunities to reduce the likelihood and/or consequence of an accident where deemed to be necessary. Risk assessment combines the consequences and likelihood of all incident outcomes from all selected incidents to provide a measure of risk. The risk of all selected incidents is individually estimated and summed to give an overall measure of risk.

Risk-reduction measures include those to prevent incidents (i.e. reduce the likelihood of occurrence) to control incidents (i.e. limit the extent and duration of a hazardous event) and to mitigate the effects (i.e. reduce the consequences). Preventive measures, such as using inherently safer designs and ensuring asset integrity, should be used wherever practicable.

In many cases, the measures to control and mitigate hazards and risks are simple and obvious and involve modifications to conform to standard practice. The general hierarchy of risk reducing measures is:

- Prevention (by distance or design);
- Detection (E.g. fire and gas, Leak detection);
- Control (E.g. emergency shutdown and controlled depressurization);
- Mitigation (E.g. fire fighting and passive fire protection);
- Emergency response (In case safety barriers fail).

RISK ASSESSMENT METHODOLOGY



Acceptability of Risk is provided as per UK HSE as follows:

- **Unacceptable Risk** : Risk greater than 1.00E-04 per average year
- **ALARP Risk** : Between 1.00E-04 and 1.00E-06 per average year
- **Acceptable Risk** : Risk less than 1.00E-06 per average year

Unacceptable	ALARP	Acceptable

IDENTIFICATION OF HAZARDS AND RELEASE SCENARIOS

A technique commonly used to generate an incident list is to consider potential leaks and major releases from fractures of the storage equipment. In a facility, main hazards arise due to loss of containment during handling of flammable chemicals. The following data are collected to envisage scenarios.

- Composition of materials;
- Inventory of materials stored in storage tanks/tank trucks;
- Process Parameters (phase, temperature, pressure)

The loss of containment scenarios for the facility is identified and tabulated based on the above-mentioned data.

FACTORS FOR IDENTIFICATION OF HAZARDS

In any installation, main hazard arises due to loss of containment during handling of flammable chemicals. To formulate a structured approach to identification of hazards, an understanding of contributory factors is essential.

Inventory

Inventory analysis is commonly used in understanding the relative hazards and short listing of release scenarios. Inventory plays an important role in regard to the potential hazard. Larger the inventory of a vessel or a system, larger is the consequence. A practice commonly used to generate an incident list is to consider potential leaks and major releases from fractures of pipelines and vessels/tanks containing sizable inventories.

Parameters

Potential release for the material depends significantly on the operating conditions. This operating range is enough to release a large amount of material in case of a leak/rupture; therefore, the storage tank leaks and ruptures need to be considered in the risk assessment calculations.

Initiating Events

Both the complexity of study and the number of incident outcome cases are affected by the range of initiating events and incidents covered. This not only reflects the inclusion of accidents and/or non-accident-initiated events, but also the size of those events. For instance, studies may evaluate one or more of the following:

- Catastrophic failure from storage tanks
- Leak from the associated piping

HAZARD QUANTIFICATION

Depending on the considered LOC scenarios, the following outcomes are expected:

- Jet fires
- Pool Fire
- Flammable Gas Dispersion (Flash Fire)
- Vapour Cloud Explosion (VCE)

Jet fires

Jet fire occurs when a pressurized release (of a flammable gas or vapour) is ignited by any source. They tend to be localized in effect and are mainly of concern in establishing the potential for domino effects and employee safety zones rather than for community risks. The jet fire model is based on the radiant fraction of total combustion energy, which is assumed to arise from a point slowly along the jet flame path. The jet dispersion model gives the jet flame length.

Pool fires

This represents a situation when flammable liquid spillage forms a pool over a liquid or solid surface and gets ignited. Flammable liquids can be involved in pool fires where they are stored and transported in bulk quantities. Pool fires are associated with the difference between release of material and complete combustion of the material simultaneously. They are common when large quantity of flammable material is released within short time.

Flammable gas dispersion

Flammable vapour, after loss of containment, will normally spread in the direction of the wind. If it finds an ignition source before being dispersed to below its Lower Flammability Limit (LFL), a flash fire is likely to result and the flame may travel back to source of the release. Any person caught in a flash fire is likely to suffer fatal burn injuries. Typically, the burning zone is defined as 0.5LFL and LFL limit back to the release point, even though the vapour concentration might be above UFL.

Vapour Cloud Explosion (VCE)

Vapour cloud explosion is the result of flammable materials in the atmosphere, a subsequent dispersion phase, and after some delay occurrence of ignition of the vapour cloud. Obstacles in the path of vapour cloud or when the cloud finds a confined area, often create turbulence. The VCE will result in overpressures.

Toxic Impact

Accidental release of toxic material into atmosphere may result in dispersion. The extent of dispersion depends on properties of released toxic material and weather parameters and topographical conditions.

CONSEQUENCE CALCULATIONS

In consequence analysis, use is made of a number of calculation models to estimate the physical effects of an accident (spill of hazardous material) and to predict the damage (lethality, injury, material destruction) of the effects.

Accidental release of flammable liquids can result in severe consequences. Immediate ignition of the pressurized chemical will result in a jet flame. Delayed ignition of flammable vapors can result in blast overpressures covering large areas.

The calculations can roughly be divided in three major groups:

- a. Determination of the source strength parameters;
- b. Determination of the consequential effects;
- c. Determination of the damage or damage distances.

The basic physical effect models consist of the following.

SOURCE STRENGTH PARAMETERS

Calculation of the outflow of liquid, vapours out of a vessel/tank or a pipe, in case of rupture.

Calculation, in case of liquid outflow, of the instantaneous flash evaporation and of the dimensions of the remaining liquid pool.

Calculation of the evaporation rate, as a function of volatility of the material, pool dimensions and wind velocity.

Source strength equals pump capacities, etc. in some cases.

EFFECT OF DAMAGE

- Dispersion of gaseous material in the atmosphere as a function of source strength, relative density of the gas, weather conditions and topographical situation of the surrounding area.
- Intensity of heat radiation [in kW/ m²] due to a fire as a function of the distance to the source.
- Energy of vapour cloud explosions [in barg], as a function of the distance to the distance of the exploding cloud.
- Concentration of gaseous material in the atmosphere, due to the dispersion of evaporated chemical. The latter can be either explosive or toxic.

It may be obvious, that the types of models that must be used in a specific risk study strongly depend upon the type of material involved:

- Gas, vapor, liquid, solid?
- Inflammable, explosive, toxic, toxic combustion products?
- Stored at high/low temperatures or pressure?
- Controlled outflow (pump capacity) or catastrophic failure?
-

SELECTION OF DAMAGE CRITERIA

The damage criteria give the relation between the extents of the physical effects (exposure) and the effect of consequences. For assessing the effects on human beings' consequences are expressed in terms of injuries and the effects on equipment / property in terms of monetary loss.

The effect of consequences for explosion or fire can be categorized as:

- Damage caused by heat radiation on material and people
- Damage caused by explosion on structure and people

The knowledge about these relations depends strongly on the nature of the exposure. Following are the criteria selected for damage estimation:

Heat Radiation:

The effect of fire on a human being is in the form of burns. There are three categories of burn such as first degree, second degree and third-degree burns. The consequences caused by exposure to heat radiation are a function of:

- The radiation energy onto the human body [kW/m²];
- The exposure duration [sec];
- The protection of the skin tissue (clothed or naked body).

Reference: IS 15656 – Code of Practice for Hazard Identification and Risk Analysis

The actual results would be less severe due to the various assumptions made in the models arising out of the flame geometry, emissivity, angle of incidence, view factor and others. The radiation output of the flame would be dependent upon the fire size, extent of mixing with air and the flame temperature. Some fraction of the radiation is absorbed by carbon dioxide and water vapour in the intervening atmosphere. Finally, the incident flux at an observer location would depend upon the radiation view factor, which is a function of the distance from the flame surface, the observer's orientation and the flame geometry.

- The lethality of a jet fire and pool fire is assumed to be 100% for the people who are caught in the flame. Outside the flame area, the lethality depends on the heat radiation distances.

Impact on people & equipment due to thermal radiation effects

Thermal Radiation (kW/m ²)	Type of Impact	Probability of Fatality (%)
4.0	Sufficient to causes pain to personnel if unable to reach cover within 20s	1
12.5	Minimum energy required for melting of plastic	50
37.5	Sufficient to cause damage to the equipment	100

Overpressure Effects:

The explosion overpressures of interest are:

Damage due to Overpressures

Overpressure (bar)	Type of Impact	Probability of Fatality (%)
0.03	Shattering of glass leading to injury	1
0.1	Repairable damage to plant buildings and structure	50
0.35	Major damage to plant equipment and structure	100

Toxic Effects:

The fatality rate from toxic impact of chemicals will be considered for evaluating effect on humans in the event of release of these chemicals. In order to calculate the consequence impact of the toxic chemical, dispersion distances corresponding to the IDLH value of the respective chemical is generally used.

The fatality rate for the toxic impact is calculated from Probit equation:

$$Pr = A + B \{ \ln (C^N \times t) \}$$

Where,

Pr – Probit corresponding to probability of death

t – Exposure time (min)

C – Concentration (mg/m³)

A, B, N are constants describing the toxicity of the substance.

PROBABILITIES

POPULATION PROBABILITIES

It is necessary to know the population exposure to estimate the risk resulting from an incident. The exposed population is often defined using a population density. Population densities are an important part of a RA for several reasons. The most notable is that the density is typically used to determine the number of people affected by a given incident with a specific hazard area.

The following population considered :

Average Manpower 1 person 10 M² Area has been considered based on Manpower.

FAILURE / ACCIDENT PROBABILITIES

This step deals with determining how often – in terms of frequency per year – loss of containment events is likely to occur. The likelihood of occurrence of identified hazardous scenarios is assessed by reviewing the historical industry accident data.

Base failure frequencies used for the study

S.No	Equipment	Type of release	Base Failure Frequency
	Road Tanker	Leak	5.00E-07 (per unit per year)
		Rupture	1.00E-05 (per unit per year)
	Piping with nominal diameter < 75 mm	Leak	5.00E-06 per meter
		Rupture	1.00E-06 per meter
	Atmospheric Storage Tank	Leak	1.00E-04 (per unit per year)
		Rupture	5.00E-06 (per unit per year)
	Pressurized Storage Tank	Leak	1.00E-05 (per unit per year)
		Rupture	5.00E-07 (per unit per year)
	Loading/unloading hose	Leak	4.00E-05 per hour of usage
		Rupture	4.00E-06 per hour of usage

The failure data is taken from CPR 18E – Guidelines for Quantitative Risk Assessment, developed by the Committee for the Prevention of Disasters, Netherlands. Following is the failure frequency data used for the study.

WEATHER PROBABILITIES

As per CPR 18E there are 6 representative weather classes:

Pasquill stability classes

Stability Class	Definition
A	Very Unstable
B	Unstable

C	Slightly unstable
D	Neutral
E	Slightly stable
F	Stable

- Low wind speed corresponds with 1-2 m/s
- Medium wind speed corresponds with 3-5 m/s
- High wind speed corresponds with 8-9 m/s

Observations in the Pasquill stability classes C, C/D and D are allocated to stability class D. Wind speeds below 2.5 m/s, between 2.5 m/s and 6 m/s and above 6 m/s are allocated to the wind speed categories low, medium and high respectively. The wind speed in each weather class is equal to the average wind speed of the observations in the weather class.

For this study, as per the standard meteorological data available for the site, wind velocity varies between

Weather class used for the study

Wind Speed (m/s)	Stability Class	Description
1.5	F	Stable conditions and 1.5 m/s wind speed. This is typical of conditions where there is limited turbulence and, hence, limited dilution of dispersing clouds.
5	D	Neutral stability and 5 m/s wind speed. This is typical of moderately turbulent conditions.

In general, the largest effect distance for release of substances is found with stable weather.

Temperature and Relative Humidity

The weather data is referenced from IMD (Indian Meteorological Data)

Weather data for Vishakhapatnam

Representative Weather Station	Vishakhapatnam
Ambient Temperature	28
Atmospheric Pressure	0.99 atm
Relative Humidity	74%

Wind distribution probability

The following wind distribution will be used for the study.

Wind distribution

Direction	N	NE	E	SE	S	SW	W	NW
Direction Percentage per Annum								
Day	4	6	2	1	3	32	16	10
Night	1	4	21	10	22	29	5	3

Surface wind speed (at 10 m height)(m/s)	Day time insolation (sunlight intensity)			Night time cloud cover	
	Strong Moderate Slight	Strong Moderate Slight	Strong Moderate Slight	< 50 %	< 50 %
<2	A	A-B	B	F	F
2 - 3	A - B	B	C	E	F
3 - 4	B	B-C	C	D	E
4 - 6	C	C - D	D	D	D
>6	C	D	D	D	D

Accident effects

There are many methods to arrive at response dose curve for human exposure to accident effects. Here the dose refers to the intensity of accident outcome (air borne concentration of a toxic material, overpressure due to an explosion and radiation intensity due to fire), while response implies the human/property damage caused by the accident.

For single exposure probit (probit = probability unit) method is particularly suitable.

$$\text{Probit (Y)} = k_1 + k_2 \ln (V)$$

Causative factor represent the dose V.

Probit variable Y is computed from following equations

Probit correlations for exposure

Type of Injury or damage	Causative variable V	Probit parameter		
		k ₁	k ₂	n
Fire Burns death from fire t_e = effective time of exposure (seconds) I_e = effective radiation intensity received by target (w/m^2)	$t_e I_e^{4/3} / 10^4$	-14.9	-14.9	
Explosion Death from lung hamorrhage Eardrum ruptures Structural damage Glass breakage P_o = peak overpressure (N/m^2)	P_o P_o P_o P_o	-77.1 -15.6 -23.8 -18.1	-77.1 1.93 2.92 2.79	
Toxic release for n-Hexane C = concentration (ppm), T= time interval in minutes	$C^n T$	Not Available and considered as per toluene		

n = exponent factor (K1,K2 and n for Acetone not published)				
Toxic release for Toluene (From CCPS) C = concentration (ppm), T= time interval in minutes n = exponent factor (K1,K2 and n for Acetone not published)	C ⁿ T	-6.794	0.408	2.50
Toxic release for Methanol C = concentration (ppm), T= time interval in minutes n = exponent factor (K1,K2 and n for Acetone not published)	C ⁿ T	Not Available and considered as per toluene		
Toxic release for hexane C = concentration (ppm), T= time interval in minutes n = exponent factor (K1,K2 and n for Acetone not published)	C ⁿ T	Not Available and considered as per toluene		
Toxic release for Pet ether C = concentration (ppm), T= time interval in minutes n = exponent factor (K1,K2 and n for Acetone not published)	C ⁿ T	Not Available and considered as per toluene		
Toxic release for Acetone C = concentration (ppm), T= time interval in minutes n = exponent factor (K1,K2 and n for Acetone not published)	C ⁿ T	Not Available and considered as per toluene		

Substance	Cas No	A (C in mg/m ³)	A (C in ppmv)	B	N
Acrolein	107-02-8	-4.1	-3.22	1	1
Acrylonitrile	107-13-1	-8.6	-7.52	1	1.3
Allyl alcohol	107-18-6	-11.7	-9.86	1	2
Ammonia	7664-41-7	-15.6	-16.21	1	2
Arsine	7784-42-1	-11.2	-8.78	1.61	1.24
Azinphosmethyl	86-50-0	-4.8		1	2
Bromine	7726-95-6	-12.4	-8.54	1	2
Chlorine	7782-50-5	-6.35	-4.81	0.5	2.75
Ethyleneimine	151-56-4	-11.6	-10.36	1.77	1.13
Ethylene oxide	75-21-8	-6.8	-6.16	1	1
Phosphamidon	13171-21-6	-2.8		1	0.7
Phosphine	7803-51-2	-6.8	-6.03	1	2
Phosgene	75-44-5	-10.6	-7.69	2	1
Carbon monoxide	630-08-0	-7.4	-7.21	1	1
Methyl bromide	74-83-9	-7.3	-5.75	1	1.1
Methylisocyanate	624-83-9	-1.2	-0.57	1	0.7
Methylmercaptan	74-93-1	-17.8	-16.33	2.05	0.98
Parathion	56-38-2	-6.6		1	2
Nitrogen dioxide	10102-44-0	-18.6	-16.06	1	3.7
Tetraethyl lead	78-00-2	-9.8	-4.53	1	2
Hydrogen chloride	7647-01-0	-37.3	-35.62	3.69	1
Hydrogen cyanide	74-90-8	-9.8	-9.43	1	2.4
Hydrogen fluoride	7664-39-3	-8.4	-8.62	1	1.5
Hydrogen sulphide	7783-06-4	-11.5	-10.76	1	1.9
Sulphur dioxide	7446-09-5	-19.2	-16.76	1	2.4

(above table Sourced from BEVI V3)

Flammable substances - heat radiation

The probability of dying, Pr , of exposure to heat radiation (pool fire, flaring, fire ball) is given by the probit relationship:

$$Pr = -36.38 + 2.56 \ln \left(\int Q^{4/3} dt \right)$$

where

Pr probit associated with the probability of dying (-)

Q heat radiation at time t ($W m^2$)

t exposure time (s)

The minimum value of P_{lethal} that is still included in the calculation is equal to 0.01.

The calculation of fatality for the location-specific risk and the societal risk is specified in Table (sourced from BEVI V3)

Table 13 Probability of dying for flammable substances - flame zone and heat radiation

Area	Location-specific Risk	Societal risk Inside	Societal risk Outside
flame zone	1	1	1
heat radiation > 35 kW m ⁻²	1	1	1
heat radiation < 35 kW m ⁻²	P_{lethal}	0	$0.14 \times P_{lethal}$

Notes:

1. The flame zone for a flash fire is specified by the contour of the lowest explosion limit boundary. Outside the flame zone no fatality occurs for a flash fire.
2. The maximum exposure time to heat radiation is equal to 20 s.

Flammable substances – overpressure

The calculation for fatality for the location-specific risk and the societal risk as a result of a vapour cloud explosion is specified in Table

Table 14 Probability of dying for flammable substances - overpressure

Area	Location-specific Risk	Societal risk Inside	Societal risk Outside
overpressure ≥ 0.3 bar	1	1	1
$0.3 \text{ bar} > \text{overpressure} \geq 0.1$ bar	0	0.025	0
overpressure < 0.1 bar	0	0	0

RISK CALCULATION

This step involves calculating risk considering both severity of the consequences of an identified hazard and the probability of its occurrence

$$\text{Risk} = \text{Likelihood of Occurrences} \times \text{Severity of Consequences}$$

Where,

R = risk (loss or injury per year)

F = frequency (event per year)

C = consequence (loss or injury per event)

As per CCPS guidelines

$$Y = -14.9 + 2.56 \ln \left(\frac{tI^{4/3}}{10^4} \right)$$

RISK CALCULATION

This step involves calculating risk considering both severity of the consequences of an identified hazard and the probability of its occurrence

$$\text{Risk} = \text{Likelihood of Occurrences} \times \text{Severity of Consequences}$$

Risk Assessment

This step deals with comparing the calculated risk with the standard values. In India, there are no defined criteria for risk acceptance. Below table summarizes the risk criteria adopted in some countries.

Risk Acceptability Criteria

Authority and Application	Maximum Tolerable Risk (Per Year)	Negligible Risk (Per Year)
VROM, The Netherlands (New)	1.0E-6	1.0E-8
VROM, The Netherlands (Existing)	1.0E-5	1.0E-8
HSE, UK (Existing Hazardous Industry)	1.0E-4	1.0E-6
HSE, UK (New Industries)	1.0E-5	1.0E-6
HSE, UK (Substance Transport)	1.0E-4	1.0E-6
HSE, UK (New Housing Near Plants)	3 x 1.0E-6	3 x 1.0E-7
Hong Kong Government (New Plants)	1.0E-5	Not Used

Individual risk

Individual risk is defined (by AIChE/CCPS) as risk to a person in the vicinity of a hazard. This includes the nature of the injury to the individual, the likelihood of the injury occurring and the time period over which the injury might occur. Individual risk can be estimated for the most exposed individual, for groups of individuals at places or for an average individual in an effect zone. For a given incident or set of incidents, these individual risk measures have different values.

Individual risk to a person at a specific point in the direction of the wind/plume or heat radiation will be dependent on many factors. Important ones are listed below.

Risk Modification factors based on Wind direction at the time of release/spillage:

- In the case of the wind direction, the plume width may be represented by the sector of a circle having an included angle of 45° . In such case, on the basis that wind direction arise, it is possible to approximate that an individual present in a single location for one year may be exposed for only 45/360th of that year, or 1.25×10^{-1}

In actual practice, it is unlikely that a person would be present at any one location in the open air for 100% of the year. Allowing for periods at work or indoors, a risk reduction factor of 3 is reasonably conservative.(three shift operation assumed.)

- the person may present 50% of time inside of closed facility/ elevated position (upstream position) to toxic

- The overall consequence of the mitigation due to wind direction and indoor/outdoor location would be the product of these factors, namely 2×10^{-2} .

Risk modification factor for Radiation:

- Individual person may be inside or outside of building/location.

- Person will be only available $1/3^{\text{rd}}$ of 24 hrs at site.

- Also, the fatality % due to radiation is assumed at 50%, which assumption is based on the response time and the duration of fire.

Total Risk Modification factor : 8×10^{-2}

- Ref: Guidelines for Chemical Process quantitative risk assessment (CCPS) book

The overall chance of an individual being affected at a specific location by exposure due to accident (due to toxicity, flammability, and radiation) is indicated in individual risk table.

Estimation of Individual risk

Total individual risk at any geographic location x, y in and around the industrial area is the sum of individual risk at that point, due to various incident outcome cases associated with the various industries in the industrial area. Individual Risk at a geographical location x, y is given by (AIChE/CCPS) as

$$IR_{x,y} = \sum_{i=1}^n IR_{x,y,i}$$

where

$IR_{x,y}$ is the total individual risk of fatality at geographic location x, y ,

$IR_{x,y,i}$ is the individual risk of fatality at geographical location x,y from the incident outcome case i (probability of fatality per year),

n is the total number of individual outcome cases from the industrial area. $IR_{x,y,i}$, can be estimated using the equation,

$$IR_{x,y,i} = f_i p_{f,i}$$

where

f_i is the frequency of incident outcome case i , from the frequency analysis,

$p_{f,i}$ is the probability that that incident outcome case i will result in a fatality at location x,y , from the consequence and effect models. Frequency f_i of incident outcome case is estimated.

And the inputs to above are to be obtained from

$$f_i = F_I p_{O,i} p_{OC,i}$$

Where

f_i is the frequency of incident I which has incident outcome case i as one of its incident outcome case (per year)),

$p_{O,i}$ is the probability that incident outcome, having i as one of its incident outcome cases, occurs, given that incident I has occurred

$p_{OC,i}$ is probability that incident outcome case i occurs given the occurs of the precursor incident I and the incident outcome corresponding the outcome case i .

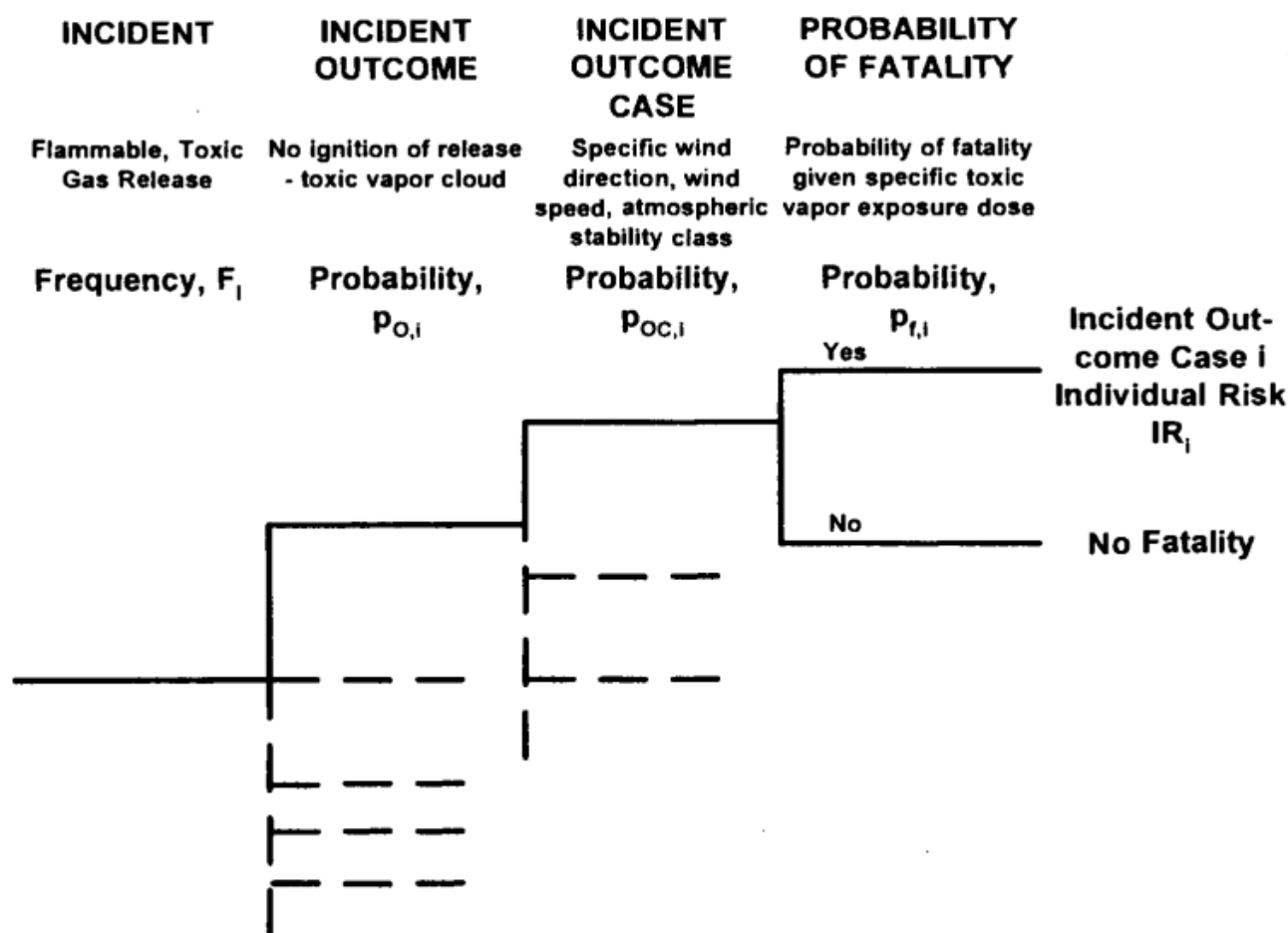


FIGURE 4.6. A sample event tree illustrating individual risk calculations [Eqs. (4.4.2) and (4.4.3)] for one incident outcome case resulting from a flammable, toxic gas release.

Following Assumptions are made for risk calculation:

- All hazards originate at a point of source
- The wind distribution is uniform (i.e wind is equally likely to blow in any direction)
- A single wind speed and atmospheric stability class used
- Ignition sources are uniformly distributed and ignition probability does not depend upon wind direction
- Consequence effects can be treated discreetly. The level of effect with in particular effect zone is constant(100% fatality). Beyond that zone there is no effect.
- Modification factors applied. i.e; for toxic zone: 2×10^{-2} and for Radiation Zone 8×10^{-2} .

Individual risk

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- The overall consequence of the mitigation due to wind direction and indoor/outdoor location would be the product of these factors, namely 2×10^{-2} .

Risk modification factor for Radiation:

- Individual person may be inside or outside of building/location.

- Person will be only available 1/3rd of 24 hrs at site.

- Also, the fatality % due to radiation is assumed at 50%, which assumption is based on the response time and the duration of fire.

Total Risk Modification factor : 8×10^{-2}

- Ref: Guidelines for Chemical Process quantitative risk assessment (CCPS) book

The overall chance of an individual being affected at a specific location by exposure due to accident (due to toxicity, flammability, and radiation) is indicated in individual risk table.

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And the inputs to above are to be obtained from

$$f_i = F_I p_{O,i} p_{OC,i}$$

Where

f_i is the frequency of incident I which has incident outcome case i as one of its incident outcome case (per year)),

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$p_{OC,i}$ is probability that incident outcome case i occurs given the occurs of the precursor incident I and the incident outcome corresponding the outcome case i .

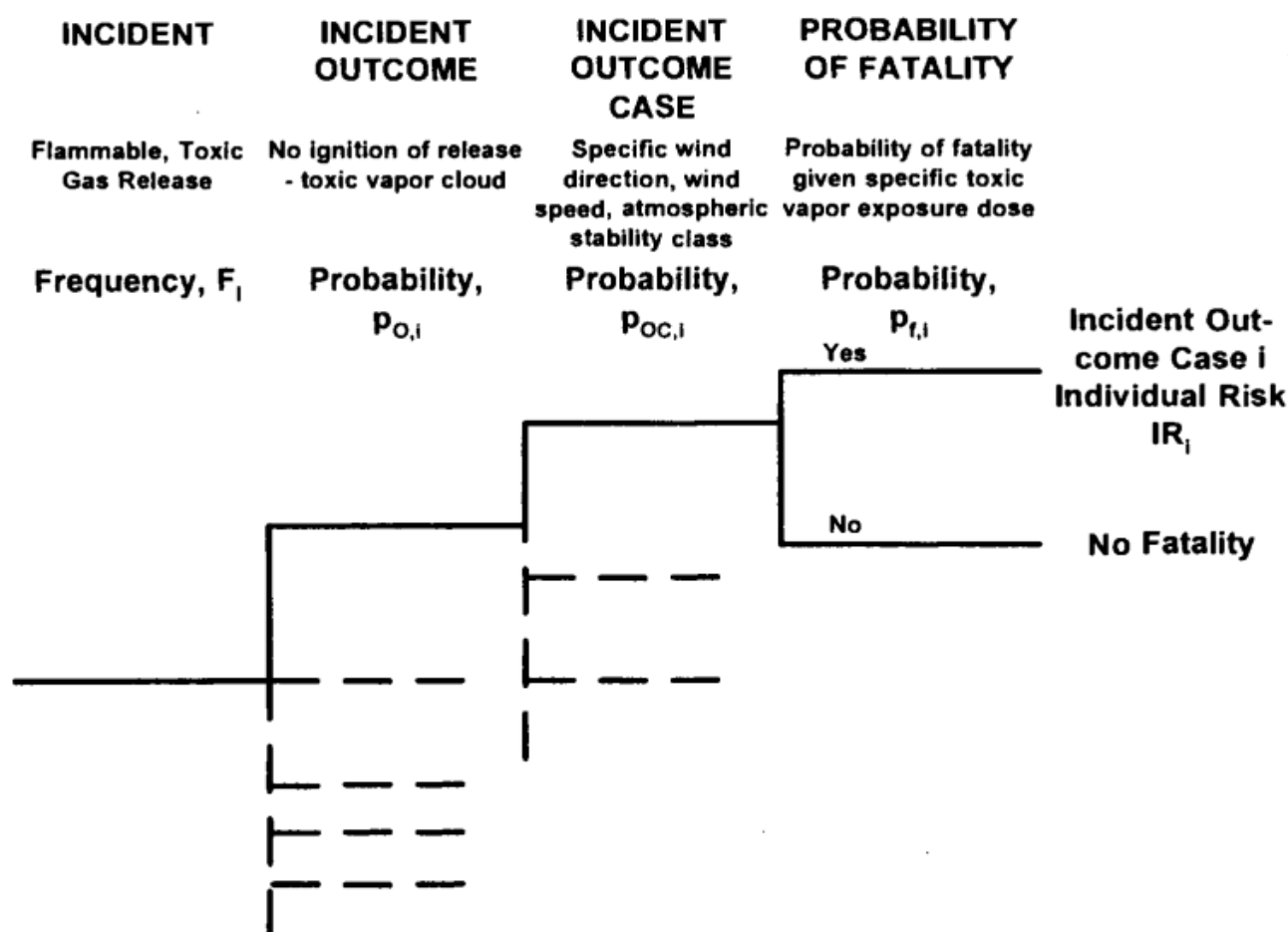


FIGURE 4.6. A sample event tree illustrating individual risk calculations [Eqs. (4.4.2) and (4.4.3)] for one incident outcome case resulting from a flammable, toxic gas release.

Following Assumptions are made for risk calculation:

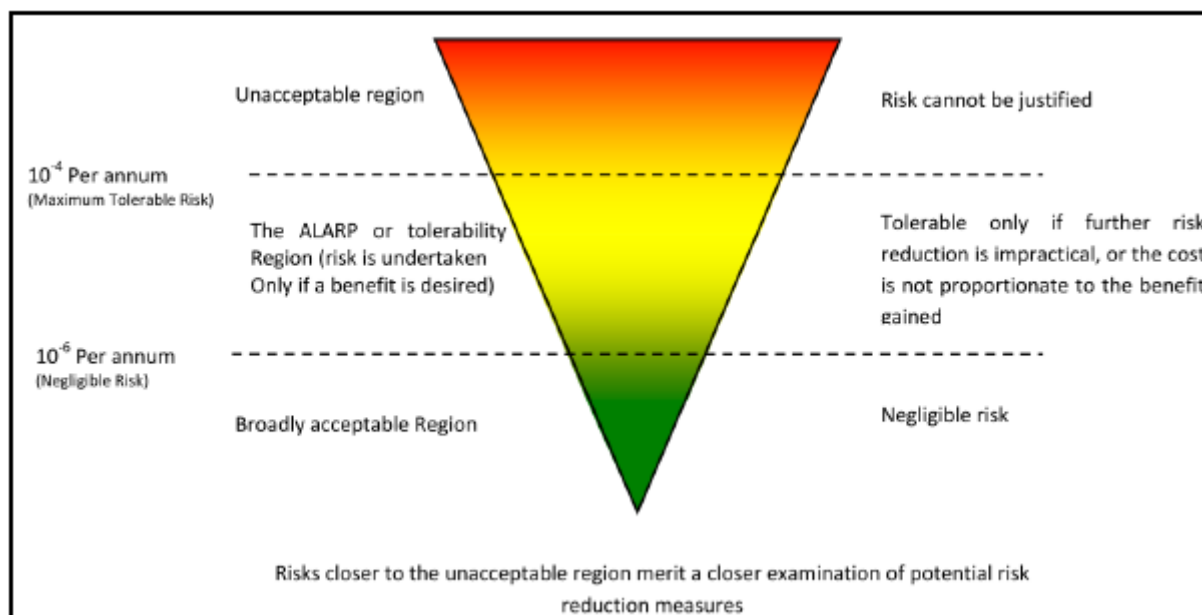
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- A single wind speed and atmospheric stability class used
- Ignition sources are uniformly distributed and ignition probability does not depend upon wind direction
- Consequence effects can be treated discreetly. The level of effect with in particular effect zone is constant(100% fatality). Beyond that zone there is no effect.
- Modification factors applied. i.e; for toxic zone: 2×10^{-2} and for Radiation Zone 8×10^{-2} .

Risk Acceptance:

In India, there are no defined criteria for risk acceptance. However, IS 15656 – Code of Practice for Hazard Identification and Risk Analysis is widely adopted. The Extracts for the risk criteria adopted in some countries are presented.

HSE, UK for existing hazardous industry highlighted in the above table has been used for the study.

To achieve the above risk acceptance criteria, ALARP principle was followed while suggesting risk reduction recommendations

**Risk Acceptance****FREQUENCY ANALYSIS**

The failure frequencies of the LOC scenarios considered for the project are listed below

Failure frequencies for LOCs of Tank:

Area	Leak	Leak Size	Base failure frequency	Units	Failure frequency for study	Unit
Storage tank	Solvent	10	1.00E-04	per year	1.00E-04	per year
	Tank CR	CR	5.00E-06	per year	5.00E-06	per year
Road Tanker	Tanker road tanker-Leak	50	5.00E-07	per year	5.00E-07	per year
	Road tanker - CR	CR	1.00E-05	per year	1.00E-05	per year

Hose / Piping	Solvent transfer Pump -Leak	4	5.00E-06	per meter per year	5.00E-06	per meter per year
	FBR	40	1.00E-06	per meter per year	1.00E-06	per meter per year
	Unloading Hose -Leak	2.5	4.00E-05	per hour of usage	4.00E-05	per hour of usage
	Transfer Pump -FBR	50	4.00E-06	per hour of usage	4.00E-06	per hour of usage

AEGL Understanding:

Acute Exposure Guideline Levels (AEGLs) set levels of chemical concentration that pose a defined level of risk to humans (the general population, including susceptible individuals). These levels are used in preventing and responding to disasters. These guidelines are ascertained for one, short exposure (with a maximum of eight hours) by the air. The AEGL values are determined for varying times of exposure, such as ten minutes, thirty minutes, one hour, four hours and eight hours.

The AEGL values describe the expected effects of inhalation exposure to certain compounds (airborne concentrations in ppm or mg/m³). Each AEGL is determined by different levels of a compound's toxicological effects, based on the 4 Ds: detection, discomfort, disability and death. There are three levels of AEGL-values: AEGL-1, AEGL-2 and AEGL-3.[2] AEGL-1 is the airborne concentration above which notable discomfort or irritation could be experienced. However, the effects are not disabling and reversible once exposure stops. AEGL-2 is the airborne concentration above which irreversible or other serious, long-lasting adverse health effects or an impaired ability to escape could be experienced. AEGL-3 is the airborne concentration above which life-threatening health effects or death could be experienced.

13.0 CONSEQUENCES ANALYSIS

Modelling for worst case scenario:

Toluene has been considered for worst case scenario out of PESO storage tanks based on its properties:

Dispersion Modelling:

Toulen Tank:

SITE DATA:

Location: VISAKHAPATNAM, INDIA, INDIA

Building Air Exchanges Per Hour: 0.44 (unsheltered single storied)

Time: September 30, 2022 1909 hours ST (using computer's clock)

CHEMICAL DATA:

Chemical Name: TOLUENE

CAS Number: 108-88-3 Molecular Weight: 92.14 g/mol

AEGL-1 (60 min): 67 ppm AEGL-2 (60 min): 560 ppm AEGL-3 (60 min): 3700 ppm

IDLH: 500 ppm LEL: 11000 ppm UEL: 71000 ppm

Ambient Boiling Point: 110.5° C

Vapor Pressure at Ambient Temperature: 0.048 atm

Ambient Saturation Concentration: 48,569 ppm or 4.86%

ATMOSPHERIC DATA: (MANUAL INPUT OF DATA)

Wind: 1.5 meters/second from SW at 3 meters

Ground Roughness: open country Cloud Cover: 5 tenths

Air Temperature: 30° C Stability Class: F

No Inversion Height Relative Humidity: 50%

SOURCE STRENGTH:

Leak from hole in vertical cylindrical tank

Flammable chemical escaping from tank (not burning)

Tank Diameter: 3 meters Tank Length: 6.08 meters

Tank Volume: 43 cubic meters

Tank contains liquid Internal Temperature: 30° C

Chemical Mass in Tank: 38.7 tons Tank is 95% full

Circular Opening Diameter: 1 centimeters

Opening is 0.61 meters from tank bottom

Ground Type: Concrete

Ground Temperature: equal to ambient

Max Puddle Diameter: Unknown

Release Duration: ALOHA limited the duration to 1 hour

Max Average Sustained Release Rate: 1.34 kilograms/min

(averaged over a minute or more)

Total Amount Released: 49.1 kilograms

Note: The chemical escaped as a liquid and formed an evaporating puddle.

The puddle spread to a diameter of 7.3 meters.

THREAT ZONE:

Model Run: Heavy Gas

Red : less than 10 meters(10.9 yards) --- (3700 ppm = AEGL-3 [60 min])

Note: Threat zone was not drawn because effects of near-field patchiness

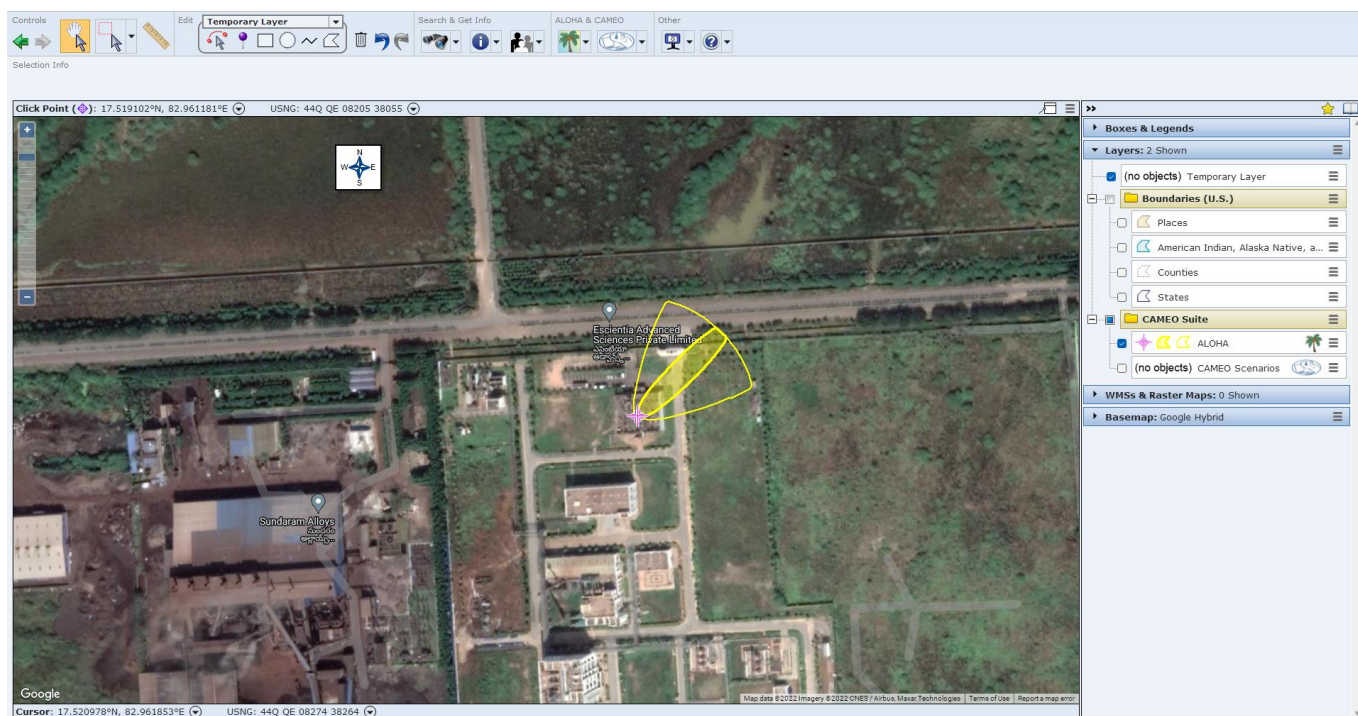
make dispersion predictions less reliable for short distances.

Orange: 25 meters --- (560 ppm = AEGL-2 [60 min])

Note: Threat zone was not drawn because effects of near-field patchiness

make dispersion predictions less reliable for short distances.

Yellow: 95 meters --- (67 ppm = AEGL-1 [60 min])



THREAT ZONE:

Threat Modeled: Flammable Area of Vapor Cloud

Model Run: Heavy Gas

Red : less than 10 meters(10.9 yards) --- (6600 ppm = 60% LEL = Flame Pockets)

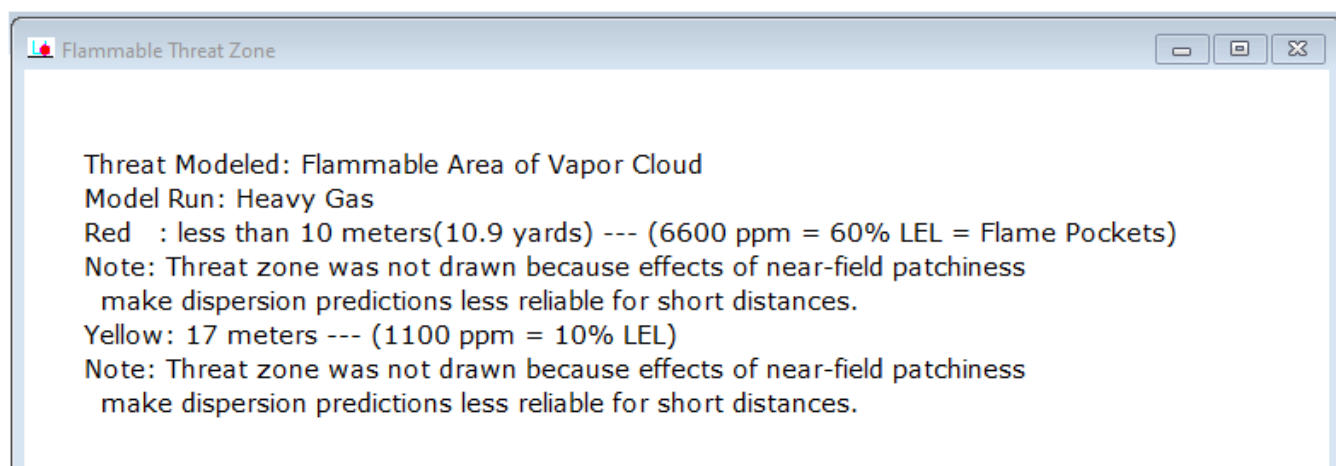
Note: Threat zone was not drawn because effects of near-field patchiness

make dispersion predictions less reliable for short distances.

Yellow: 17 meters --- (1100 ppm = 10% LEL)

Note: Threat zone was not drawn because effects of near-field patchiness

make dispersion predictions less reliable for short distances.



THREAT ZONE:

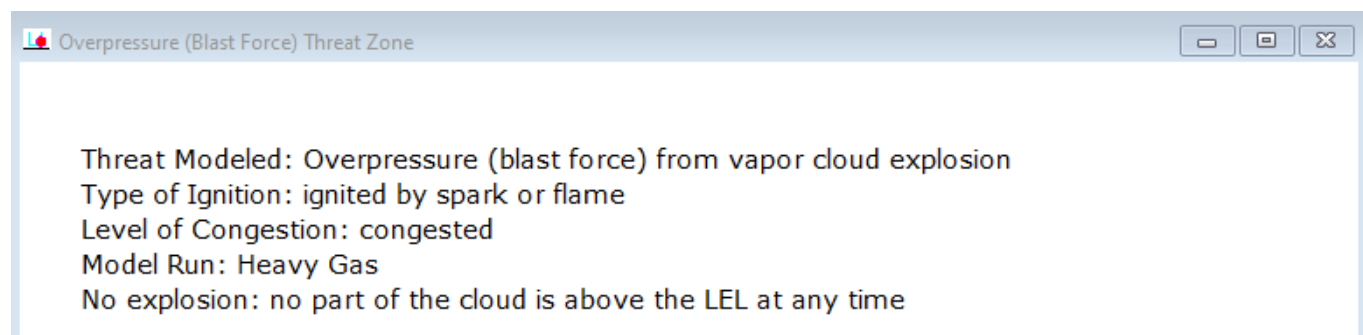
Threat Modeled: Overpressure (blast force) from vapor cloud explosion

Type of Ignition: ignited by spark or flame

Level of Congestion: congested

Model Run: Heavy Gas

No explosion: no part of the cloud is above the LEL at any time

**SOURCE STRENGTH:**

Leak from hole in vertical cylindrical tank

Flammable chemical is burning as it escapes from tank

Tank Diameter: 3 meters Tank Length: 6.08 meters

Tank Volume: 43 cubic meters

Tank contains liquid Internal Temperature: 30° C

Chemical Mass in Tank: 38.7 tons Tank is 95% full

Circular Opening Diameter: 1 centimeters

Opening is 0.61 meters from tank bottom

Max Puddle Diameter: Unknown

Max Flame Length: 4 meters

Burn Duration: ALOHA limited the duration to 1 hour

Max Burn Rate: 3.79 kilograms/min

Total Amount Burned: 225 kilograms

Note: The chemical escaped as a liquid and formed a burning puddle.

The puddle spread to a diameter of 1.0 meters.

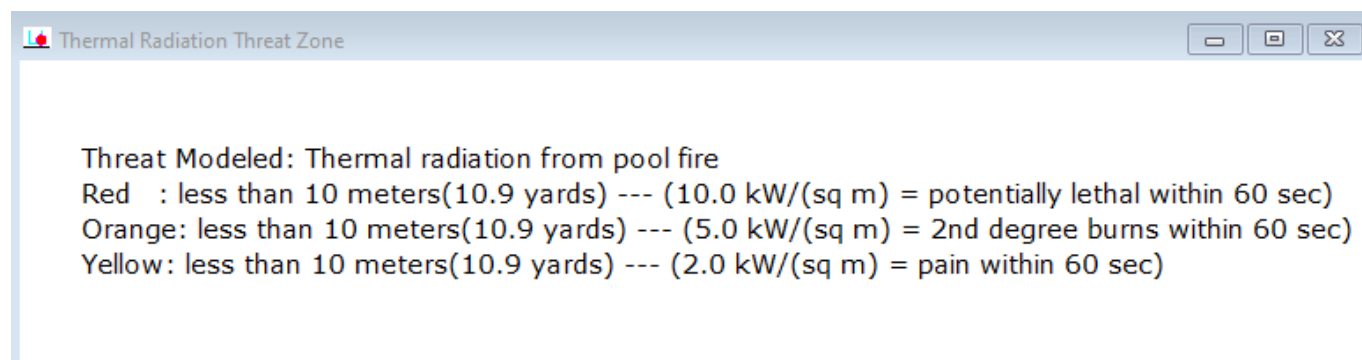
THREAT ZONE:

Threat Modeled: Thermal radiation from pool fire

Red : less than 10 meters(10.9 yards) --- (10.0 kW/(sq m) = potentially lethal within 60 sec)

Orange: less than 10 meters(10.9 yards) --- (5.0 kW/(sq m) = 2nd degree burns within 60 sec)

Yellow: less than 10 meters(10.9 yards) --- (2.0 kW/(sq m) = pain within 60 sec)



SOURCE STRENGTH:

BLEVE of flammable liquid in vertical cylindrical tank

Tank Diameter: 3 meters Tank Length: 6.08 meters

Tank Volume: 43 cubic meters

Tank contains liquid

Internal Storage Temperature: 30° C

Chemical Mass in Tank: 38.7 tons Tank is 95% full

Percentage of Tank Mass in Fireball: 100%

Fireball Diameter: 190 meters Burn Duration: 12 seconds

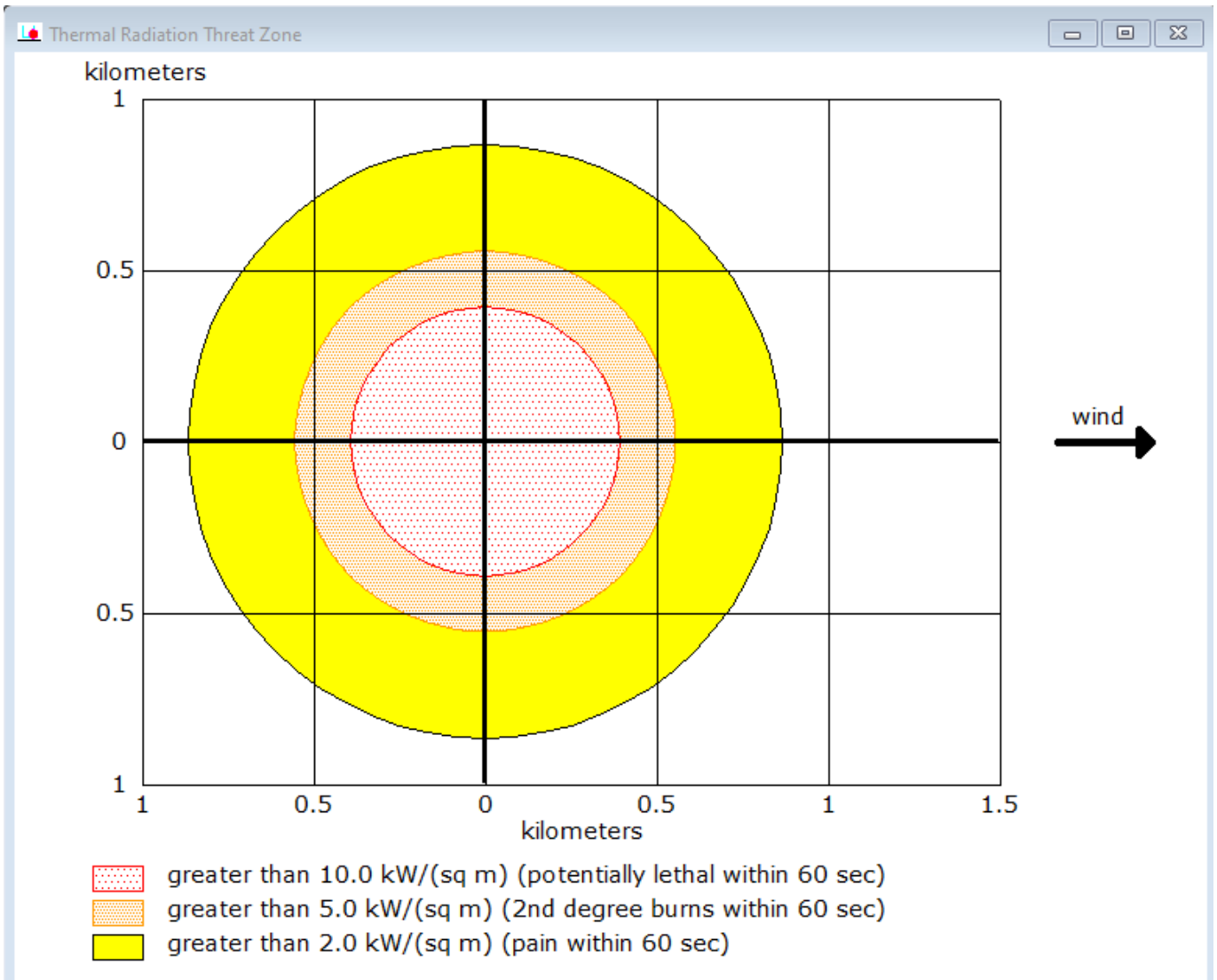
THREAT ZONE:

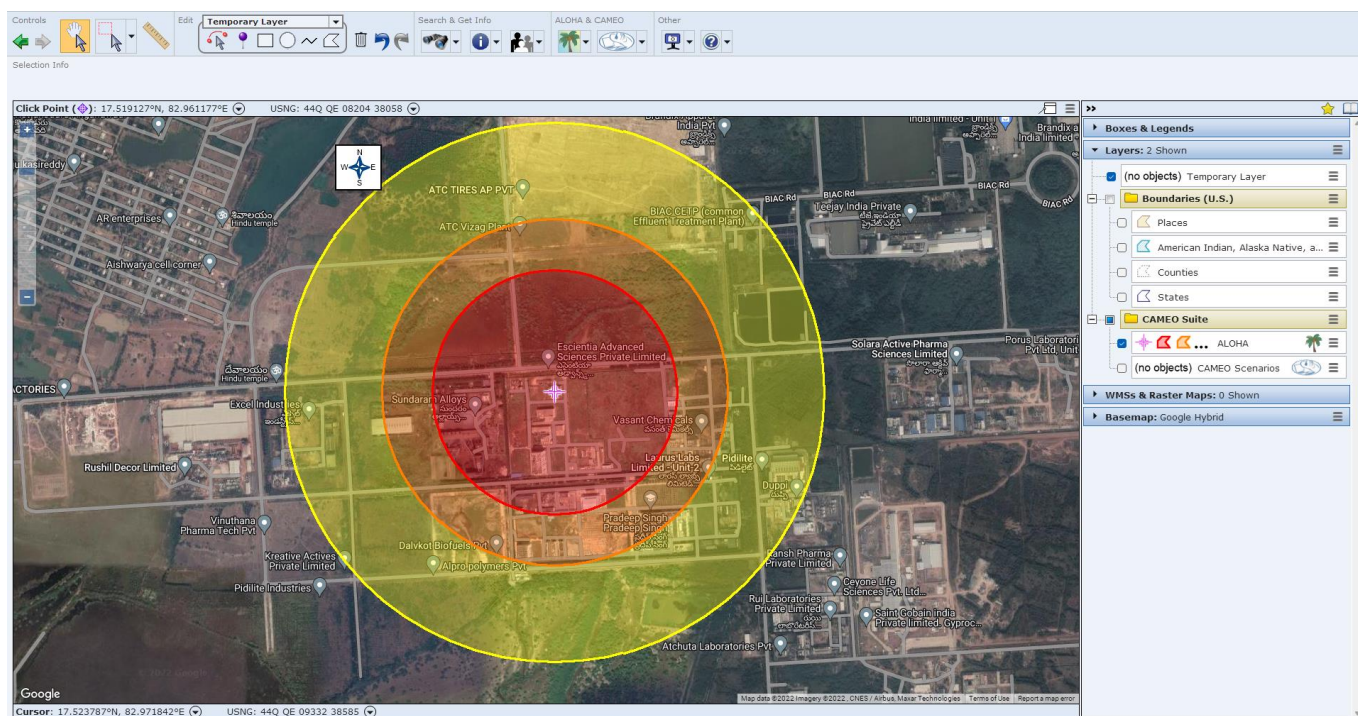
Threat Modeled: Thermal radiation from fireball

Red : 391 meters --- (10.0 kW/(sq m) = potentially lethal within 60 sec)

Orange: 554 meters --- (5.0 kW/(sq m) = 2nd degree burns within 60 sec)

Yellow: 864 meters --- (2.0 kW/(sq m) = pain within 60 sec)





Full Bore Rupture:

CHEMICAL DATA:

Chemical Name: TOLUENE

CAS Number: 108-88-3

Molecular Weight: 92.14 g/mol

AEGL-1 (60 min): 67 ppm AEGL-2 (60 min): 560 ppm AEGL-3 (60 min): 3700 ppm

IDLH: 500 ppm LEL: 11000 ppm UEL: 71000 ppm

Ambient Boiling Point: 110.5° C

Vapor Pressure at Ambient Temperature: 0.048 atm

Ambient Saturation Concentration: 48,569 ppm or 4.86%

ATMOSPHERIC DATA: (MANUAL INPUT OF DATA)

Wind: 1.5 meters/second from SW at 3 meters

Ground Roughness: open country Cloud Cover: 5 tenths

Air Temperature: 30° C Stability Class: F

No Inversion Height Relative Humidity: 50%

SOURCE STRENGTH:

Direct Source: 5 cubic meters/hr Source Height: 0

Source State: Liquid

Source Temperature: equal to ambient

Release Duration: 60 minutes

Release Rate: 71.6 kilograms/min

Total Amount Released: 4,297 kilograms

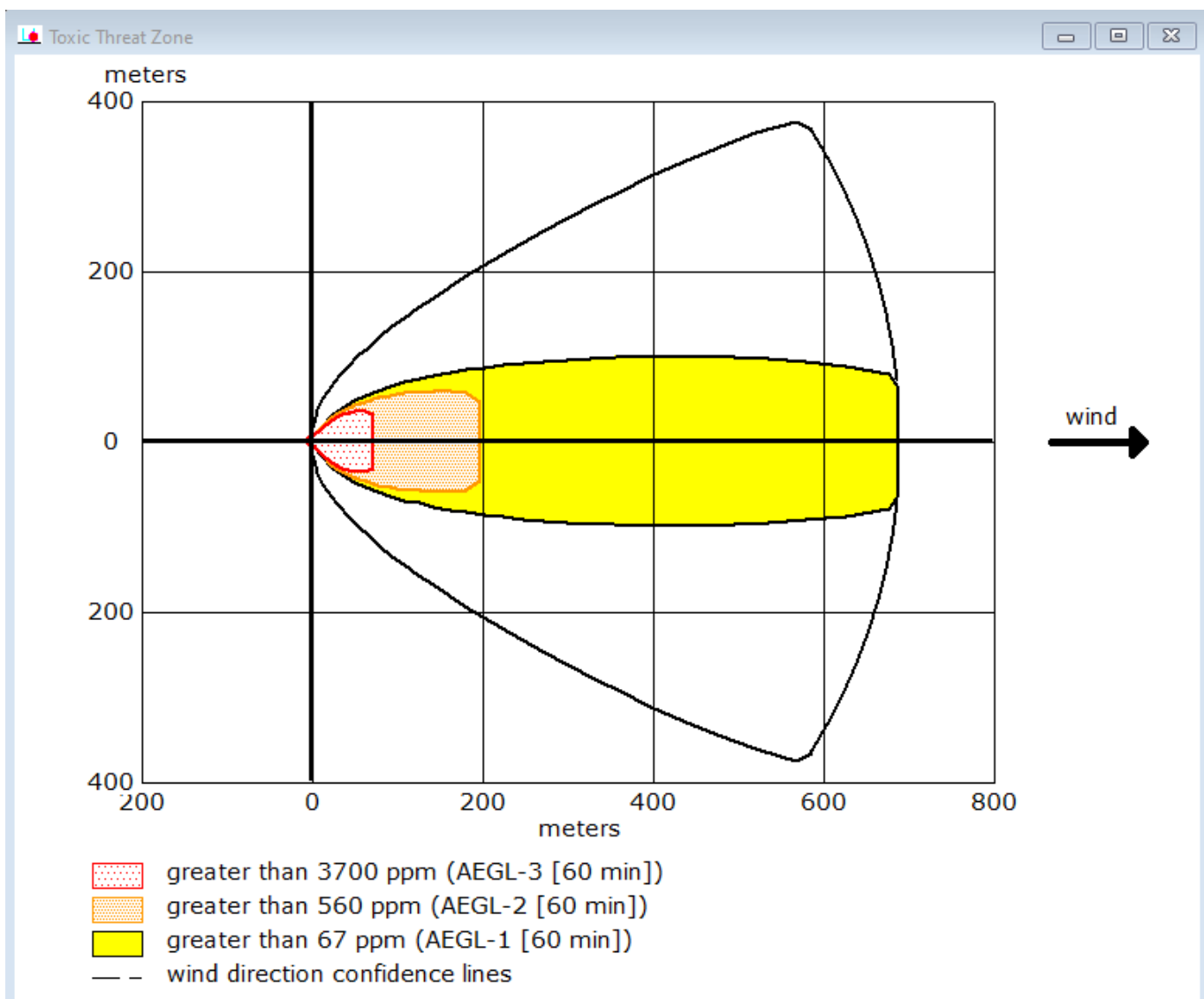
THREAT ZONE:

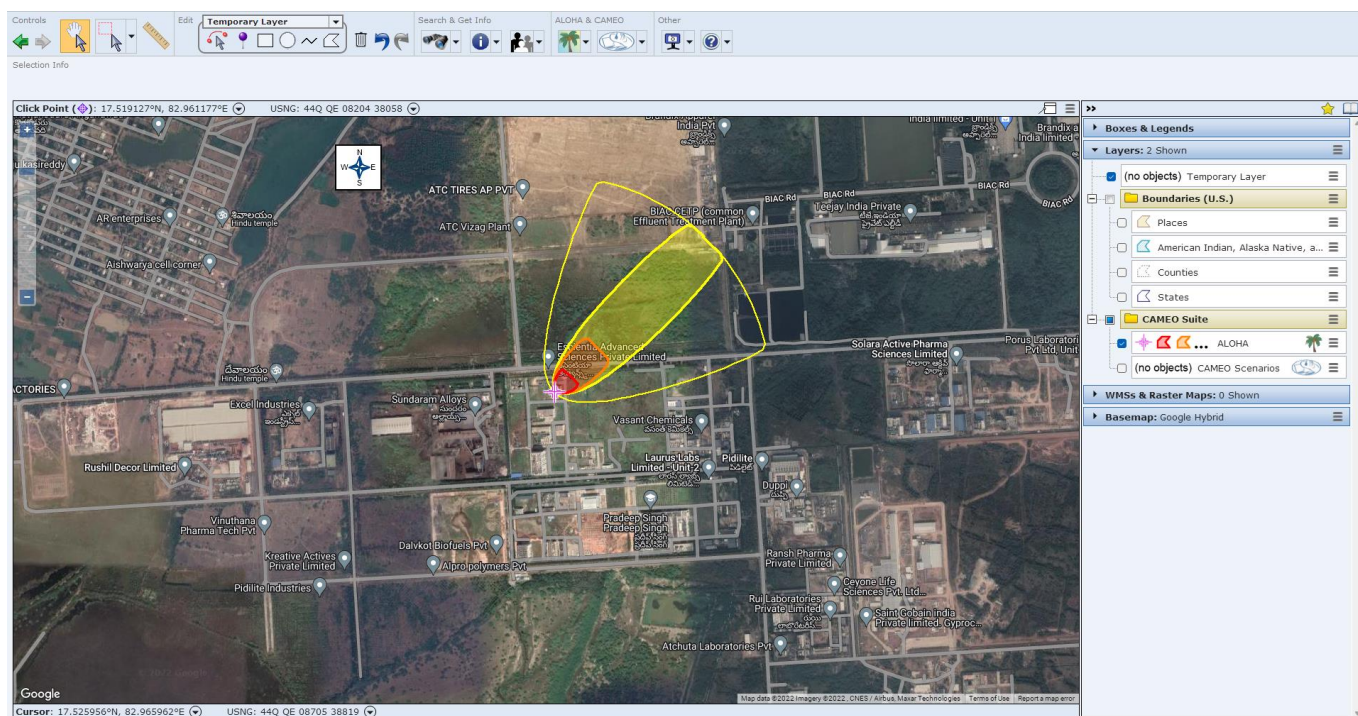
Model Run: Heavy Gas

Red : 72 meters --- (3700 ppm = AEGL-3 [60 min])

Orange: 198 meters --- (560 ppm = AEGL-2 [60 min])

Yellow: 688 meters --- (67 ppm = AEGL-1 [60 min])





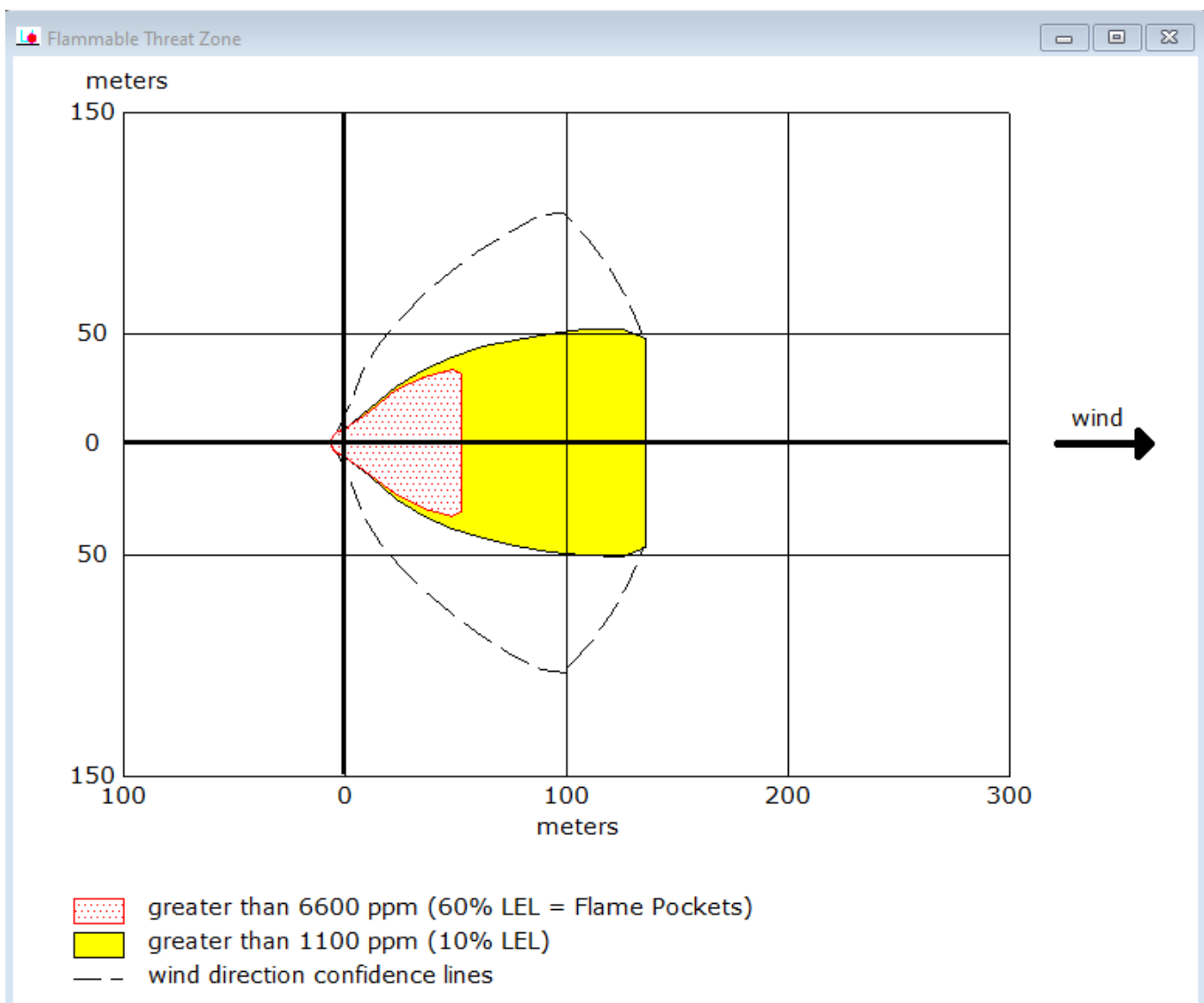
THREAT ZONE:

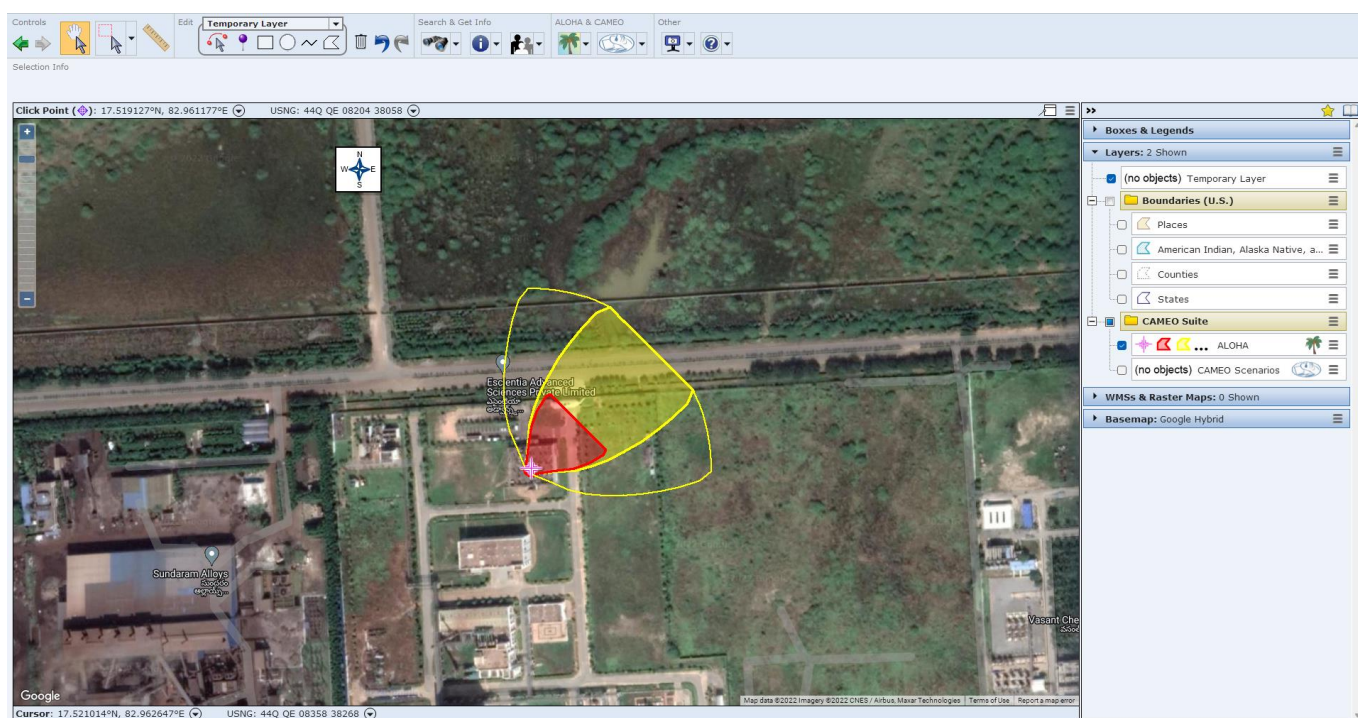
Threat Modeled: Flammable Area of Vapor Cloud

Model Run: Heavy Gas

Red : 53 meters --- (6600 ppm = 60% LEL = Flame Pockets)

Yellow: 136 meters --- (1100 ppm = 10% LEL)





THREAT ZONE:

Threat Modeled: Overpressure (blast force) from vapor cloud explosion

Type of Ignition: ignited by spark or flame

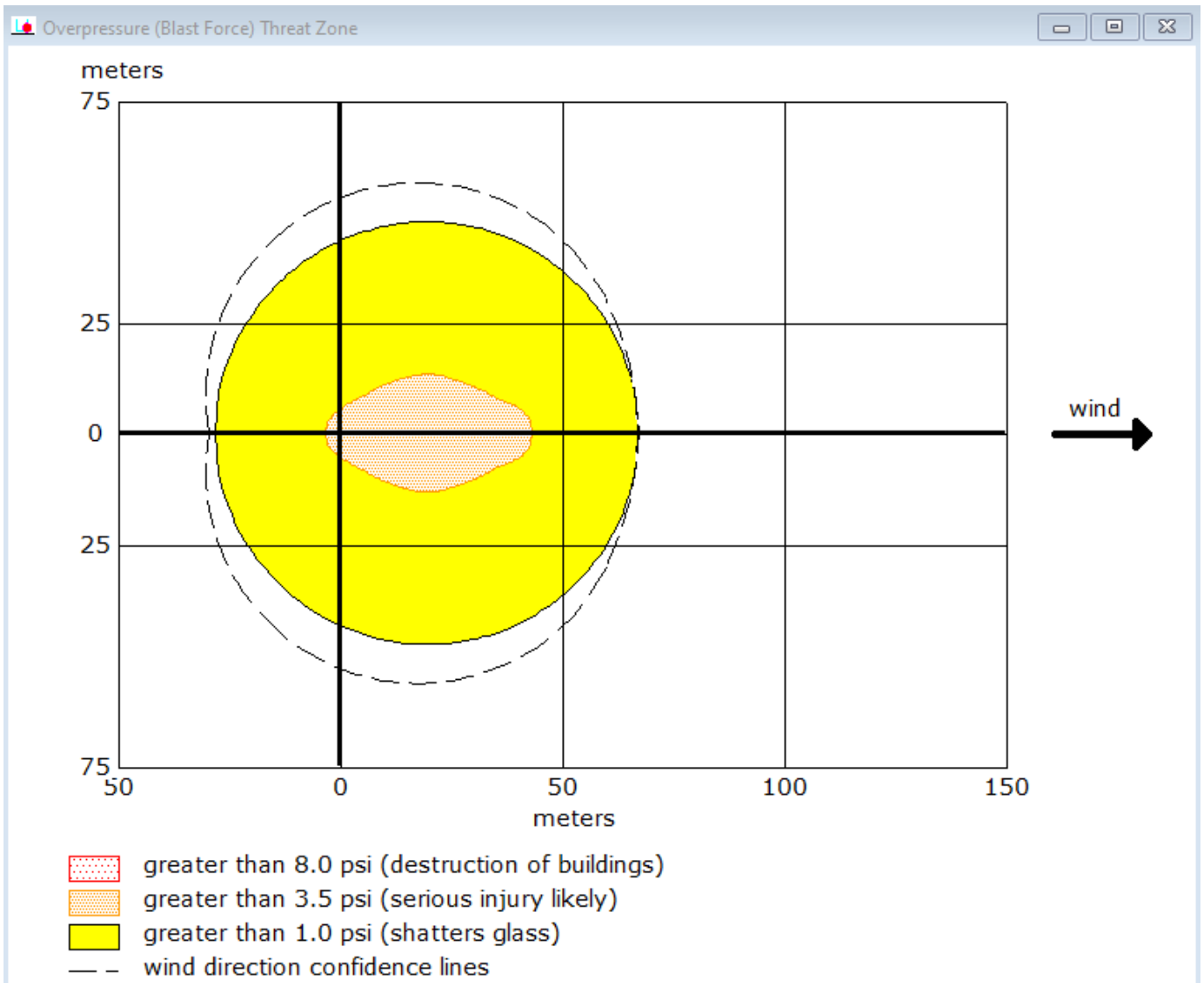
Level of Congestion: congested

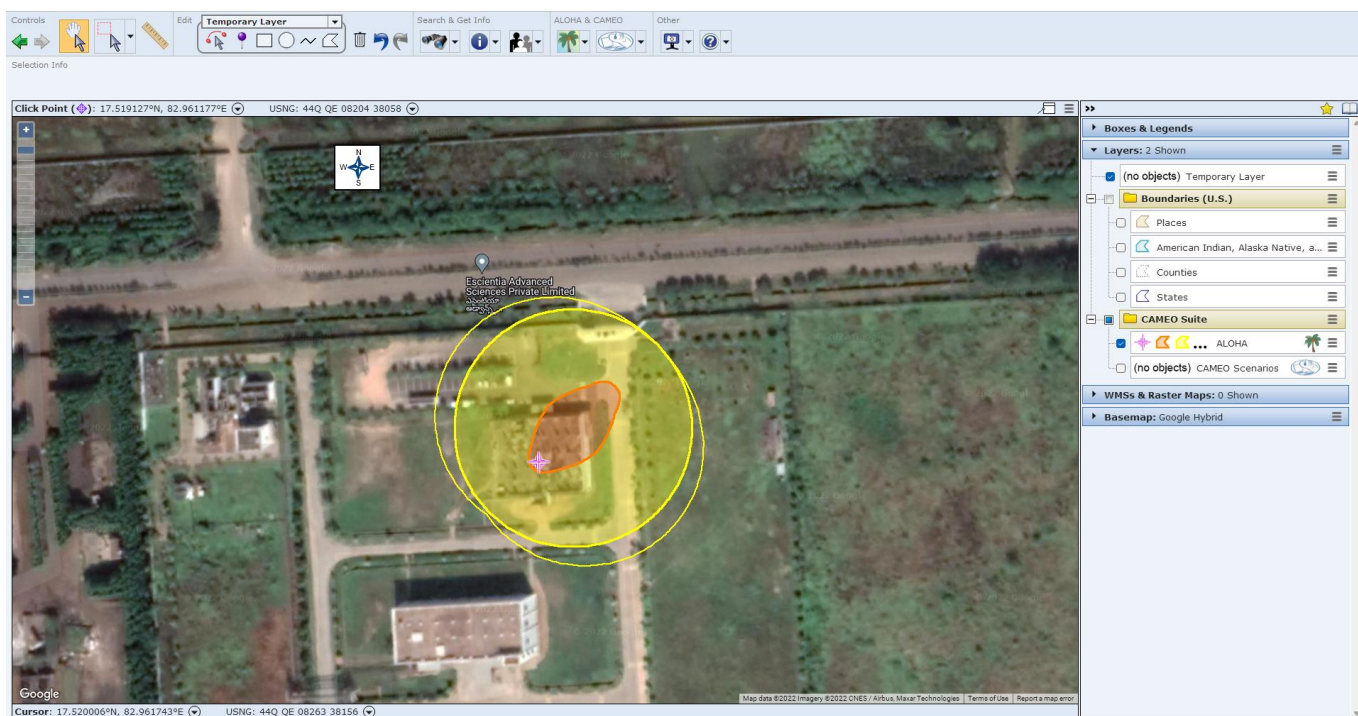
Model Run: Heavy Gas

Red : LOC was never exceeded --- (8.0 psi = destruction of buildings)

Orange: 43 meters --- (3.5 psi = serious injury likely)

Yellow: 67 meters --- (1.0 psi = shatters glass)





High Consequence scenarios Risk Calculation:

Area	Leak	Leak Size	Base failure frequency	UOM	Scenario	Distance covered	Population Covered	Modification factor	LSIR (per year)	IRPA (per Avg. year)	Risk Cumulative	Acceptability
PESO Tank	Solvent (Toulene)	10	1.00E-04	(per unit per year)	VCE	11	2	8.00E-02	2.00E-04	1.60E-05	1.60E-05	Acceptable
			1.00E-04		Toxic Exposure	10	2	2.00E-02	2.00E-04	4.00E-06	2.00E-05	Acceptable
			1.00E-04		pool fire	11	2	8.00E-02	2.00E-04	1.60E-05	3.60E-05	Acceptable
Tank CR	CR	5.00E-06	(per unit per year)	fire ball	3.91E+02	1.60E+02	8.00E-02	2.00E-04	3.00E-07	3.63E-05	Acceptable	
transfer pipe FBR	50	1.00E-06	per meter	Pipe FBR-exposure	7.20E+01	2.00E+01	8.00E-02	2.00E-05	1.60E-06	3.79E-05	Acceptable	

		50	1.00E-06	per meter	VCE	4.30E+01	2.00E+01	2.00E-02	2.00E-05	4.00E-07	3.83E-05	Acceptable
PESO tank	Tank CR (Societal Risk)	CR	5.00E-06	(per unit per year)	fire ball	3.91E+02	2.00E+01	8.00E-02	1.00E-04	8.00E-06	-	Acceptable

- CR : catastrophic rupture

Legend:

Unacceptable	ALARP	Acceptable

Acceptability of Risk is provided as per UK HSE as follows:

- **Unacceptable Risk** : Risk greater than 1.00E-04 per average year
- **ALARP Risk** : Between 1.00E-04 and 1.00E-06 per average year
- **Acceptable Risk** : Risk less than 1.00E-06 per average year

13.1 RISK CONTROL MEASURES

Existing Risk Control Measures

1. Double Body Earthing for all equipment's at plant
2. Earthing & bonding to piping at plant
3. Earth interlock for tanker unloading at plant
4. Earth pit Preventive maintenance available at plant
5. Good safety practices being followed at plant
6. Work permit system being followed at plant
7. Good engineering practices practiced at plant
8. Trainings on safety to all employees being practised.
9. Standard operating procedures available and being followed
10. Qualified manpower engaged in core operations
11. Mechanical integrity assurance by preventive maintenance standard available.
12. Boiler SRV test being carried at regular interval as per fire boiler act.
13. Lifting tackles are certified by competent person at regular intervals as per factories act.
14. Emergency equipment's are well maintained
15. ERT members are available at site
16. Positive pressure nitrogen blanketing system to storage tanks provided.
17. Emergency evacuation provided according to standard
18. Adequate Fire extinguishers are provided as per standard

Additional Risk Control measures recommended

1. Recommended to have Arc Flash Study.
2. Recommended to FLP devices integrity assurance based on MESH.
3. Recommended to prepare the chemical compatibility matrix and store the chemicals accordingly in warehouse.
4. Recommended to have Safety relief sizing.
5. Recommended to generate Process Safety Information.

14.0 CONCLUSION

A combination of proposed In Built Safety Measures and compliance of recommended safety measures would go a long way in reducing identified associated risks to an acceptable level.

The measures are to be periodically reviewed with reference to best available technology and safety practices and creating awareness among employees about changes taking place.

This report shall be read in conjunction with HAZOPS Report & other safety reports prepared by the Management.

15.0 DISCLAIMER

The GLOBAL EHS SOLUTIONS consultant , based upon professional experience and training, will offer recommendations to abate violations identified during the walk-through, but does not guarantee that all (and every), safety issues will be identified. M/S, Escientia Advanced Sciences Private Limited-

Unit: Plot No.11, 11A, 12 and 12A, APSEZ, Atchutapuram, 531 011, Andhra Pradesh 531011, will hold the Consultant, harmless for violations identified but not cured; violations not identified; or any claim, dispute or other form of controversy arising from or out of an actual or purported safety violation , remains required to comply with Factories' Acts & Rules, SMPV Rules and all applicable Standards under State and Central Codes. Consider other consultancy services that may be available from Director of Factories, DGFASLI, your insurance carrier, and other safety consultants.

30-09-2022

For Global HSE Solutions



N SRINIVAS, Lead Auditor

M. Sc (Chemistry) with 21 Years of experience in API

Industry



Escientia Advanced Sciences Private Limited
Plot No. 11, 11A, 12 & 12A, APSEZ, Atchutapuram,
Anakapalli - 531 011, Andhra Pradesh, INDIA.
Telephone : +91 8924 665000
Facsimile : +91 8924 665299
Website : www.escientia.com

EASPL/IF/SPL.DRV/COMP/01

07th April 2023

To,
Deputy Chief Inspector of Factories,
Visakhapatnam.

Respected Sir,

Sub: Submission of compliance status for Improvement Notice – reg.

Your vide letter no. Lr.No: A/ 339682/ 2023, Dt: 25-03-2023

With reference to the above subject, herewith we are submitting the compliance status with annexures against the improvement notice received from your good office.

We are requesting your good office to acknowledge our letter.

Thanking you.

For ESCIENTIA ADVANED SCIENCES PRIVATE LIMITED

AUTHORIZED SIGNATORY

Enclosure: Improvement notice compliance status with annexures.

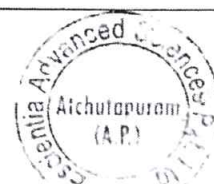


Improvement Notice Lr. no. A/ 339682/ 2023, Dt: 25-03-2023

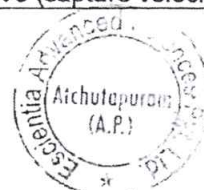
A. Health And Safety Policy			
1	b	The health and safety Policy has to be prepared keeping the guidelines under Rule 61(SB)A of AP Factory rules like arrangements for involving the workers, Considering safety performance of individuals in career advancement, fixing the responsibility of the contractors and other agencies entering the premises, conducting periodical audits and risk assessments, arrangements for informing, training and retraining of workers etc and shall be submitted	<p>Escientia has prepared an EHS policy which complies with the requirements of Rule 61(SB)A of AP factories rules, 1950. Copy of the EHS policy enclosed as ANNEXURE 1.</p> <p>Escientia has prepared a visitor safety guide and contractor safety management procedures separately.</p>
2	c	The policy shall be translated into local language also and be made available at all locations.	EHS policy has been translated into local language and will be displayed at all relevant locations before 31.05.2023. Copy of the EHS policy in local language enclosed as ANNEXURE 2.
B. Safety Department			
1	a	Appoint a knowledgeable person exclusively for administration of safety and health at work in the factory and report the details	<p>Escientia has been appointed the safety personnel having good experience in EHS field with rich knowledge in Occupational Health and Safety.</p> <p>Details of the safety officers and qualifications enclosed as ANNEXURE 3.</p>
C. Safety Committee			
3	a b c d e	<ul style="list-style-type: none"> The safety committee shall function and should discharge its duties towards Creating safety awareness among workers/ Undertaking educational, training & Promotional activities/ Reviewing the documents like HARA, HAZOP, Audit, Onsite Emergency Plan and recommendation implementation / Carrying out H & S Surveys/ Looking into complaints by workers on imminent dangers etc. Appoint a Medical Officer with the qualifications specified in Rules. The Medical Officer should be a member of committee to survey health of workers engaged in handling of Chemicals. 	<p>The Safety committee has been framed by including all levels of employees and contract employees. The Safety committee meetings are conducted once in 3 months with a predefined agenda. The safety committee agenda included with safety management system update & progress, safety training statistics, incidents and near misses reported, lessons learning from incidents/near misses, employee engagement in safety promotional activities, compliance status of plant inspection points, risk assessment recommendations, internal audit points, external audit points, HAZOP recommendations, compliance status of legal and other requirements.</p> <p>A full-time qualified Medical Officer will be appointed for the company before end of June 2023.</p>
D. Safety Budget			
1		<ul style="list-style-type: none"> Annual safety budget in the year 2021-22 is not mentioned. Percentage of this budget in the total turnover of the company is not informed. 	The management is very keen to protect the people by providing the safest workplace and open to investing in safety. There are no restrictions for spending on safety management system improvements.

		<p>No practice of separate budget allocation is being followed. Use the allocation of budget as a tool.</p> <ul style="list-style-type: none"> To make provision for future improvements towards the compliance of legislation and recommendations from safety monitoring activities, risk assessment and accident investigations. To ensure managers pay sufficient attention to the subject and in assessing future workplace safety provisions. To encourage the creative thinking and proactive approach in enhancement of safety at workplace (Encouraging Research, Learning from Best Practices etc.) 	<p>Escientia spends INR 76 Lakhs – OPEX and INR 60 Lakhs – CAPEX in the financial year 2022 – 23.</p> <p>An Annual Safety Budget for the year 2023 – 24 has been prepared. Copy of CAPEX & OPEX for the year 2023-24 enclosed as ANNEXURE 4.</p>
E. Information, Instructions, & Training			
1	b	<p>The Safety Data Sheets of all intermediates derived from Key Start Material to finished product are not available; and some of the MSDS of intermediates produced are not containing properties like physical, chemical, biological, threshold quantities of LD50/LC50 and antidotes if any person affected.</p> <p>MSDS of all chemicals shall be made available and accessible to all workers both in English and the local language.</p>	<p>Safety Data Sheets for the products and intermediates manufactured are being prepared and maintained. Sample SDS copy of a product enclosed as ANNEXURE 5.</p> <p>Safety Data Sheets for the chemicals, products and intermediates are being maintained at all respective locations i.e., warehouse, production, QC & PD lab in English language.</p> <p>Chemical fact sheets will be prepared in the local language for all common chemicals and will be displayed in respective workplaces on or before 30.06.2023.</p>
2	a	<p>Arrange a separate training cell in the factory for extending continuous training on various aspects in safety and health at work.</p>	<p>As per your advice we will be formed Training Cell consists of 5 members (i.e., With those members from departments of QA, EHS and HR) to monitor and track the training programs.</p>
	b	<p>i. The induction training for employees was not included with safety and Health module. It shall be designed suitably.</p> <p>ii. The induction training to contract workers was not adequately designed to cover all the basic aspects of health and safety at work. The training hours for Regular Workers should be 6 to 8 Hours and Contract Workers: 2 to 4 Hours.</p>	<p>SOP on training QAD004 is in place and the relevant Induction training format QAD004/F03/03 is included with Health & safety topic.</p> <p>The current version of training SOP will be revised and the induction training hours for employees will be included. Need of contract employee induction training will be evaluated and implemented.</p>
3	a	<p>Persons holding supervisory position and overseeing the handling of hazardous materials shall be got trained in</p>	<p>Safety professional at Escientia is holding educational qualifications as per Rule 61(SC)F of AP factories rules, 1950 and the qualified safety professional are the trainers for the workers at Escientia. Copy of the</p>

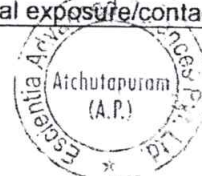
		prescribed course as detailed in Rule 61(SC) F. They shall also be trainers for workers in the factory.	Safety professional certification enclosed as ANNEXURE 6.
b	i.	Specific retraining shall be extended to the workers whenever a new hazard is added into the factory as no such practice is in force.	Escientia is being prepared the annual EHS training calendar for every year and refresher training being conducted accordingly. Copy of EHS annual training calendar – 2023 enclosed as ANNEXURE 7. In addition to the approved EHS annual training calendar, Product/job/hazard specific training is being given to the respective personnel whenever a new hazard is introduced. Copy of a hazard specific training attendance sheet enclosed as ANNEXURE 8.
	ii.	Arrange for a calendar for Refresher training for all workers in OHS matters and implement the same	Annual EHS training calendar is in place for refresher training and kindly refer ANNEXURE 7 for annual EHS training calendar.
c		The data with reference to number of persons trained, Number of training Man hours etc shall be maintained for at least for last 2 years	Training statistics available for the year 2021 & 2022 with the details of number of persons trained, number of training manhours, training man days, etc. Copy of the training statistics for the year 2021 & 2022 enclosed as ANNEXURE 9.
d		The safety training record shall be maintained in worker wise so as to assess the training effectiveness and designing the future schedules	Training cards are available for each individual and being updated every month. All classroom refresher trainings are being evaluated by training questionnaire to ensure training effectiveness.
F. Accident / Near Miss Reporting			
1		There is no record of investigations carried on into such near miss incidents is available in the factory. Arrange for this system and maintain the record for at least 3 years.	All incidents are being investigated and records of incident investigations are maintained. In addition to the incident investigations, near misses will also be investigated to identify the probable root cause and corrective actions will be taken accordingly.
I. General Working Conditions:			
House Keeping			
1	a	There are working conditions which make the floors slippery.	Workplace slippery hazards are being identified in daily plant rounds by safety personnel and being corrected immediately.
	b	Corrosion was noticed at different locations in the passages, floors etc.	Floor corrosions in the passages at Suite-I first floor south technical area were corrected.
	e	Drip trays should be positioned wherever necessary.	Utility line condensed water leakages at all workplaces of API building were cleaned frequently and contained wherever possible.
	g	Walkways across the plant as well as locations for material placement shall be clearly painted.	Walkways and material storage areas are clearly marked.



	h&i	Conduct inter departmental competitions in the factory for good housekeeping and the best can be suitably awarded. Explain the house keeping standards to all the workers elaborately based which the competitions can be held.	We are on that process as per your advice and will be informing details subsequently to Hon'ble authority.
Ventilation			
2	a	Natural ventilation in different sections is inadequate, the number of air changes per hour should be measured in Production blocks.	API building Suite – I & Suite – II first floor areas are provided with forced ventilation system to maintain minimum 12 air changes per hour. 2 nd and 3 rd floor of Suite - I & II are provided with windows (size - 4.5 sq.m x 2 nos each area).
	b	Fumes/ vapours are being generated in the process area. (Suite – 1 & 2 of 2 nd & 3 rd floors.) Take necessary steps to render them safe.	The process areas are provided with the following controls to contain and control fumes and vapors: <ul style="list-style-type: none"> - All reactors are provided with primary and secondary condensers connected to +5 deg. C utility connections. - Reactor condenser vents connected with scrubber. - All reactors are provided with RD & SRV connected to dump tank. - Telescopic ventilation hoods provided near to reactor manhole to capture the localized airborne contaminants and the same is connected to scrubber. - Local exhaust ventilation canopy is in place for acids handling and the same is connected to scrubber.
	c	Provide local exhaust system at the manholes of the reactors where the chemical dust / vapor is escaping into work environment and connect the same to a scrubber. (2 nd & 3 rd floors of production blocks (suite) 1 & 2.)	Telescopic ventilation hoods provided near to reactor manhole to capture the localized airborne contaminants and the same is connected to scrubber.
	d	Get the ventilation study done through a competent resource for production blocks and other sections in the factory where only natural ventilation prevailed and submit the report.	<ul style="list-style-type: none"> - Performance verification study conducted for the local exhaust ventilation systems provided in the workplace to ensure the effectiveness of the LEVs (capture velocity). - Production areas provided with air circulation fans and exhaust fans to maintain the natural ventilation. - A ventilation study will be carried out through competent resource for the production areas provided with natural ventilation and ventilation study report will be submitted before 30.06.2023.
	e	Maintain proper record for periodical preventive maintenance of ventilation system.	Performance verification study conducted for the local exhaust ventilation systems provided in the workplace to ensure the effectiveness of the LEVs (capture velocity).



	g	Get the work environment monitored in the sections like clean rooms where the air is re-circulated for the minimum percentage of Oxygen and presence of flammable / toxic materials with online detection systems	Clean rooms are provided with O2 sensors with audio-visual alarms to ensure the Oxygen level inside the clean room not less than 19.5%.
Illumination			
3	a	Arrange for lighting audit towards assessing the sufficiency and suitability of lighting based on the nature and type of the work at each location and arrange for measuring the lighting level during day and night times separately in comparison to such assessed levels of lighting and maintain the record.	An illumination study will be carried out for the facility on or before 30.06.2023.
	d	The possibility of formation of Glare and shadows shall be also examined during night-time and accordingly the lighting shall be arranged to avoid them.	Adequate lighting arrangements were provided in the facility in such a manner to reduce the glare.
J. Hazard & Risk Control			
2		The HARA report needs to be immediately revised as is not covering the products/intermediates of the products (15no's) produced in annexure. It shall be submitted in this office along with the compliance report on recommendations in the report.	The HARA report will be revised to include all products manufactured in the facility and the report will be submitted to your good office on or before 30.06.2023.
K. Safe Operating Procedures			
1	b	The SOPs shall be displayed or made available at workplaces for ready reference	SOPs are being displayed in respective work locations across the facility.
	e	All the SOPs shall be reviewed and updated at least once in a year or as and when there is a new learning by taking into consideration the data on accidents & near miss incidents as well as the experiences across the industry, in order to enhance the safety integration in the operations even though there are no changes	All the relevant SOPs are reviewed once in 3 years by default. In addition to the regular reviews, further gaps identified in SOPs through audits, incident investigations, new learnings, etc. will be handled through change management procedure time-to-time.
	f	Prepare written SOPs for the operations like 1) data of accident and record keeping and 2) definition of processing and non-processing area to restrict the contract workers' entry into the processing area 3) for the operations like engagement of contract worker in chemical handling and implement after appropriate training to the workers	SOPs were prepared for the following at Escientia: 1. EHS procedure on Incident reporting and investigation is in place to maintain the data for incident/near misses. 2. Task specific SOPs are in place for all respective departments especially for entry/exit and restriction of contract workers. 3. All the contract workers involved in supporting activities and posing risk of chemical exposure/contact are



		<p>4) Shift relieving activities, engaging new shift relievers, working hours if the workers engaged to continue in the same shift and reporting to Inspectorate of Factories.</p> <p>5) reporting to Inspectorate of Factories, if any deviations from Form-11.</p> <p>6) Pre and Post employment medical examinations.</p> <p>7) Health and Safety Surveys by safety committee along with Industrial Hygienist.</p> <p>8) inclusion of certification of competent person in the confined space entry work permit.</p> <p>9) The operations of boiler by contract workers and appropriate training to them.</p> <p>10) Notifying the emergency works to the Inspectorate of Factories.</p>	<p>trained on respective operational SOPs, Hazardous chemicals Handling procedure, Chemical Health Hazards.</p> <ol style="list-style-type: none"> 4. We will complying as per your advice. 5. We will submit the details when it occurred the change. 6. Pre & Post employment medical examination is done periodically. 7. Industrial Hygiene Qualitative Exposure Assessment (QLEA) has been carried out through third party and reviewed by in-house qualified Industrial Hygienist to anticipate and recognize the workplace hazards. 8. Confined Space Entry (CSE) permits have been issued by trained EHS employees and the same is being monitored by trained EHS contract personnel as CSE attendants. 9. The boiler has been operated by certified boiler operators and the boiler operators are being trained in boiler operation SOP. 10. The emergency works at the premises will be notified to Inspectorate of Factories. <p>We have obtained certificate of registration under the Contract Labour (R&A) Ac from concerned authority and all details of contractors there in certificate of registration. Please find the attached copy of the certificate for your reference. And we will ensure to submit the integrated returns within time limit as per your advice.</p>
	<p>b</p>	<p>The contract workers engaged in the operations, which are not covered by the licences issued under Contract Labour (Abolition & Regulation) Act. The Integrated annual returns were not submitted annually. The details of contractors are not available.</p>	<p>We bring to your kind notice that contractor who are deploying less than 50 employees need not required to obtain license from the authority. Due to this reason some of the contractors did not have license under the act.</p> <p>(Note: clause-b of sub-section 4 in Section 1 under Contract Labour (R&A) (Andhra Pradesh Amendment) Act,2015.)</p> <p>And we will ensure to you will deploying contractor labor in coverable works under the act.</p>
<p>3</p>	<p>a</p>	<p>i. The contract workers are found working in activities having interface with the chemicals near reactors and other equipment with hazardous substances,</p>	<p>The contract workers working in production areas are trained on handling of hazardous chemicals, chemical health hazards and handling of flammable chemicals.</p>



		but they were not trained in chemical safety. This shall be addressed suitably.	
		ii. Engaging the contract workers shall be avoided in charging the raw materials into the reactors and other operations involving transfer of chemicals which are part and parcel of core manufacturing activity.	Contract workers are NOT involved in any of the raw material charging or dispensing activities on the premises. They are being used for supporting activities like shifting of materials, handling of closed material drums/empty drums, lifting of materials, handling of cleaned or used containers, hoses, AODD pumps, other accessories, etc.
	b	The contract workers operations should be covered by SOPs.	Activity based SOPs are available in respective departments and contract workers are trained on the same.
	c	Get the contract workers adequately trained on SOPs being adopted as the same was found not attempted suitably	SOPs are in place and the contract workers are trained in the same. Copy of the SOP training record enclosed as Annexure 10.
L. Emergency Management			
1	a	On site emergency plan is not prepared by considering all hazards identified in HARA as well as associated worst cases among all credible cases.	All possible worst-case scenarios were covered in the current version of the On-site emergency plan. In addition to the current worst-case scenarios, the OSEP will be revised by considering all hazards identified in HARA on or before 30.06.2023.
	b	No steps were found taken to make the workers aware of Onsite emergency plan and its details. Arrange for training on this topic immediately.	Training was imparted in Emergency preparedness and response to working personnel. Copy of training attendance sheet enclosed as ANNEXURE 11.
	c	The scenarios identified are only for raw materials, no emergencies identified based on the chemical in process like chances of runaway reactions and the emergencies associated with the specific processes.	Current version of Emergency preparedness and response procedure included the following scenarios with emergency response plan. <ul style="list-style-type: none"> - Spillage and leakage - Fire/explosion in process areas including small, medium, and large-scale production areas, highly potent area, service floors. - Fire/explosion in solvent storages (bulk/non-bulk). - Fire/explosion in hydrogenation block - Dust explosion in powder processing area - Fire in QC laboratory - Raw material storage racks collapse - Toxic or poisonous gas release from process areas - Toxic gas release from neighbor industries - Food poisoning
	d	The possible emergencies shall be reviewed based on the industry experience and internal assessments once in every year. The onsite emergency plan shall also be revised based on this review.	Current version of Emergency Preparedness and response plan will be revised on or before 31.05.2023.



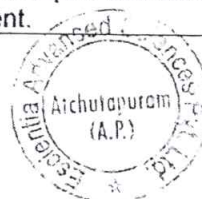
	e	The emergency plan is not reflecting the arrangement made if any for summoning the outside help rescue, firefighting, urgent medical needs. Ensure their coverage while revising the plan.	Current version of Emergency Preparedness and response plan will be revised to include the mutual aid requirements.
M. Maintenance and Condition Monitoring			
1		Statutory tests should be added in the Preventive maintenance schedules for all equipment & instruments etc...	Statutory test requirements for process equipment/instruments will be included in Preventive Maintenance schedules.
2	a	All the parts of plant, equipment and machinery, failure of which can rise to emergency situation shall be got identified and tested once in 2 years as per the test procedure evolved by the competent person and record shall be maintained	All parts of the plant, equipment and machinery which can cause emergency situations will be identified by competent person and same will be tested once in 2 years by competent authority.
	b	All the parts of plant, equipment and machinery, failure of which can rise to emergency situation shall be got identified and examined by the competent person once in a month.	All parts of the plant, equipment and machinery which can cause emergency situations will be identified by competent person and same will be examined once in a month by competent authority.
3		Get all parts of lifting machinery found being used like chain pulley blocks including their lifting tackles thoroughly been examined by a competent person immediately and in future once in 12 months. Get all parts of lifting machinery found being used like chain pulley blocks including their lifting tackles thoroughly not been examined in the presence of competent person. Hence it is treated as not tested and test it once again.	All lifting machinery, lifting tools and tackles are being tested by competent person once in 12 months.
4	a	i. Get the pressure plants including pressure vessels having pressure greater than atmospheric pressure like air receives been examined and tested as per the prescribed periodicity by a competent person. The Pressure vessels tested and examined not in the presence of competent person. Hence it is not considered as tested and test it once again.	All pressure vessels will be examined and tested in presence of competent person and the records will be maintained.
		ii. The mountings of pressure vessels like SRV are found not got tested & examined by the competent person approved by the Director of Factories, AP	The SRVs provided in the process equipment are being tested by a third party. Additionally, the critical safety devices like SRVs will be tested by competent person approved by Director of Factories, AP.
	b	The pressure vessels were found due for Hydrostatic tests. Get them tested immediately as prescribed.	All the pressure vessels will be examined and hydrostatically tested by competent person before 30.04.2023.



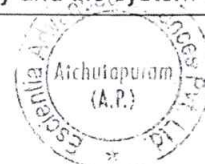
		<ul style="list-style-type: none"> On 02/08/2022, tested pressure vessels are – 28 no's from 15:20 hrs. to 20:15 hrs. 04/8/2022 total pressure vessels – 20 from 9:30 hrs. to 17:40 hrs. and 10 lifting tackles, 6 safety belts. 	
5		All instruments and safety devices used in the process shall be tested before taking into use and after carrying out any repair to them and shall be examined periodically once in a month, by a competent person approved by the Director of Factories, AP, Vijayawada and record shall be maintained.	<p>All safety critical instruments and safety devices will be tested after maintenance or before installation by competent person.</p> <p>All safety critical instruments and safety devices will be examined once in a month by competent person approved by Director of Factories, AP.</p>
9		Get the factory buildings certified for their stability by the competent person approved by the Director of Factories, AP. Get the building certified immediately and furnish the details of the same.	Building stability certificates are obtained post construction and the copy of building stability certificates enclosed as ANNEXURE 12.
N. Work Permit System			
2	a	The physical fitness of the worker shall be cross checked each time a worker is engaged in an activity covered by permit system	Physical fitness check for the worker involved in confined space and height work will be included in permit-to-work system.
O. Process Safety			
1	a	Provide rupture discs in addition to SRV to all SS reactors and Rupture discs to GLRs in the factory.	All reactors are provided with RD & SRVs at the premises.
	b	Determine the size of SRV/RD based on the vent size calculations made for each reactor and maintain the record of the same.	Vent sizing calculation has been carried out for the reactors provided in the factory. Copy of the vent sizing calculation enclosed as ANNEXURE 13.
4	b	Automatic vacuum cut off arrangements should be made to the vacuum pump; so as to limit the vacuum in safe limits at all times.	Escientia has studied the equipment design basis and provided vacuum pumps that can create vacuum not more than 750 mmHg only.
5	a	Provide suitable provisions such as automatic and remote-control systems for controlling the effects of dangerous chemical reactions.	Chemical hazard assessment report being prepared for each product at the development stage to generate the process safety data. The process safety data is being considered for scale up activities to assess the existing process controls, equipment suitability, vent sizing, cooling capacity, chemical dosing time, quenching mechanism, etc. Product/process specific additional controls being implemented.
	b	Provide automatic flooding or blanketing or other effective arrangements to come into operation in the event of failure of such control arrangements.	Reaction specific process containment system such as quenching arrangements being considered as additional controls wherever possible.
	c	Provide automatic audio visual warning devices to the reactors preferably by	Reactors are connected with Distributed Control System (DCS) to control the critical



	integrating with process correction systems	parameters such as temperature, pressure and RPM.
d	Arrange for process heating in equipment is designed to automatic control and cut off the heating below the predetermined safe limit and arrange for checking them daily and tested once in a month	Single fluid heating and cooling system is provided with TCVs and operated through DCS system. All single fluid heating & cooling systems are under preventive maintenance program and the operational checks being carried out part of batch process.
e	Provide an automatic feed cut off arrangement provided to stop the addition of materials into reactor if the process conditions excessively deviate from normal limits	Reaction behaviors are carefully studied through Chemical Hazard Assessment Report and addition time calculated upon the report. Orifice plates for addition vessels and double valve controls being provided additionally.
f	Arrange for all safety instrumentation checking daily and testing once in a month. Checks in daily rounds should be maintained in logbook.	Safety detection and monitoring systems like Oxygen sensors, LEL sensors, smoke detectors being monitored during daily plant rounds and deviations of any safety instrumentation recorded.
6	Arrange all the reactors in which exothermic/ runaway reactions /distillations are being carried on either in isolation or installed in separate sheds	High pressure/exothermic reactions are separated from regular process areas.
11	Production in the factory involves handling of toxic chemicals. Provide sufficient continuous exhaust arrangement to said process and get it interlocked with the said process so as to ensure the process cannot be carried on without the operation of said ventilation system	All highly toxic chemicals are being handled in a closed loop manner within process containment controls like isolators, IBC bins, PTS. Other process areas are being isolated while handling of highly toxic chemicals in a particular area by all means (i.e. dedicated scrubber, dedicated LEVs, portable local exhaust blower).
12	Through ventilation system needs to be provided in all production blocks and processing areas. (Suite 1 & 2, 2nd& 3rd floor.)	Ventilation arrangements like exhaust fans are provided in a naturally ventilated areas to increase the number of air changes.
14	The serious operations are involved in Hydrogenation processes, special strategy should be developed to mitigate untoward incidents. Submit the same.	<p>The hydrogenation reactors are installed away from regular manufacturing areas. The hydrogenation block is provided with three sides of concrete wall with access doors and one side open to atmosphere with mesh. The ceiling is provided with a breakable roof. Addition to the design basis, the following process controls provided for the hydrogenation area:</p> <ul style="list-style-type: none"> - Double stage PRS Hydrogen manifold - Mass flow meter for measuring hydrogen. - Reactor vent connected with adequate wet receiver and flame arrester provided 3 meter above the block. - Hydrogenator is provided with BIAR inline auto-sampler with flushing arrangement.



17		Arrange for studying the critical properties like Minimum Ignition energy (Layer/Cloud), particle size, and minimum dispersal concentration etc... for all the powders and based on the finding, take necessary steps for prevention of dust explosions for the powders having the property of like Minimum Ignition energy less than 10mJ.	Escientia is generating the process safety data like DSC, RC1e, ARC, MIE, Impact sensitivity test, resistivity test, etc. for the products to carry out powder processing activities and implementing the recommendations to control dust explosions.
18	a	Provide suitably designed chemical and heat resistant full body suits to the workers engaged in charging of chemicals into reactors either with SCBA or online air supply	Fire retardant suit, fire proximity suit, breathing air unit with compressed air and SCBA are in place for handling of highly hazardous chemicals handling.
19	b	Get the scrubbers functioning interlocked with process continuity so as to interrupt the process if the scrubber failed to function	Scrubber failure alarm/indication will be provided.
	c	Arrange for periodical sampling of scrubbing media in scrubbers and analysis for its potentiality and maintain the data	Online pH meters are in place in scrubber system and scrubbing media is being changed for each product part of batch process.
22		The initiatives like timely intervention, correction, counselling or coaching designed and being practiced for abnormal behaviour of workers at work especially in the areas of chemical safety & Process Safety.	Daily safety rounds being taken to observe abnormal behavior of workers and counselling being given continuously through on-the-job-training modules. Serious violations being stopped and handled through safety violations procedure.
P. Fire Safety			
21	a	Identify all process, storages, equipment and plants where in serious explosion and flash fire hazards are present and propose them only in a segregated building	High hazard chemicals are being segregated physically and stored in dedicated facilities.
	b	Identify all industrial processes involving serious fire hazard and locate them locate them in buildings or workplaces separated from one another by walls of fire-resistant constructions	Serious fire hazard operations are physically segregated by providing walls and fire-resistant access doors.
22		The equipment having serious fire hazard like reactors, centrifuges etc shall be isolated from rest of the workplace.	Process areas are isolated from all other workplaces.
23		Provide electrical interlocking to the dampers in ventilation ducts with smoke/heat detection system	All AHUs are provided with automatic fire dampers with smoke/heat detection system.
24		The Gas cutting operations shall be carried on with relevant precautions like cylinder handling, PPE, Flash back arrester, gauges in good condition etc	All the gas cutting machines are provided with flashback arresters, pressure gauges in good condition, regulators. Gas cutting activities are controlled through hot work permit system to ensure the adequate precautions.
34		The firefighting systems in the factory are not in proportion to the fire load potential in the factory thereby the factory is not	Escientia has provided an adequate fire hydrant system and fire sprinkler system with 1000 KL capacity and the system can deliver



35	<p>self-sufficient. Get the fire safety audit done through an expert third party and submit the compliance report</p> <p>Arrange for well-ventilated rooms of fire resisting constructions which are isolated from the remainder of the building by fire walls and self-closing fire doors for keeping the flammable liquids, if any, intended for batch production requirements in production blocks</p>	<p>sufficient water flow for more than 2 hours. The fire hydrant main electrical pump can deliver 410 m³/hr with 10 kg/cm² operating pressure. The sprinkler main pump can deliver 273 m³/hr with operating pressure 8 kg/cm². The fire hydrant system and sprinkler system supported with Diesel engine driven pump can deliver 410 m³/hr at 10 kg/cm² operating pressure.</p> <p>Suitable fire resistant self closing doors, walls, windows and break panels are provided across the premises to prevent the spread of fire.</p>
36	<p>Provide Fire resisting doors at appropriate places along the escape routes to prevent spread of fire and smoke, particularly at the entrance of lifts or stairs where funnel or flue effect may be created inducing an upward spread of fire</p>	<p>Suitable fire resistant self-closing doors, walls, windows and break panels are provided across the premises to prevent the spread of fire</p>
39	<p>Arrangements should be made for removing the smoke immediately after a fire in an enclosed area</p>	<p>Portable emergency blowers are in place to remove the smoke in case of fire emergency</p>
Q. Storage and Handling		
2	<p>Provide standby storage container equal to biggest container in order to transfer the hazardous substances if any defect develops in any of the container</p>	<p>Solvent storage in bulk provided with spare tank equal to biggest tank to store the material in case of leak/defect.</p>
4	<p>Provide the bund walls independently to each of the Bulk storage tanks, process storage tanks, receivers containing flammable, toxic and corrosive chemicals (instead of common bund walls) in order to reduce the risk.</p>	<p>All bulk storage solvent tanks are provided with 110% dike wall with collection pit. Acid/alkali storage tanks are not available.</p>
R. Equipment Safety		
7	<p>Driers:</p> <ul style="list-style-type: none"> • Provide safety ventilation system to dilute flammable mixture in air to limit the concentration to 25% LEL. • Provide arrangements to prevent dripping of combustible substances on electric heaters or burner flame. 	<ul style="list-style-type: none"> - Forced ventilation provided through AHUs for driers area provided to maintain minimum 12 air changes per hour. LEL sensors provided in the driers with audio-visual alarms to ensure the LEL concentration less than 10% - Driers are provided with a hot water system and no electric heaters available.
S. Electrical Safety		
6	<p>The rubber mats should be examined periodically by an authorized person and record of such examinations shall be</p>	<p>Rubber mats provided in the panel room will be examined by authorized person and records will be maintained.</p>



maintained and made available during inspection.

U. Additional Recommendations

1	Provide Latch to the hook of the mobile crane.	Mobile cranes are not being used in Escientia.
2	Provide fire module over the furnace oil panel board.	Auto-modular fire extinguishers will be provided for boiler electrical panel.
3	Provide iron griiii below the transport sheets over the roof of boiler in order to arrest fall of workers whenever maintenance works are going on the roof.	Walkable roof sheets for boiler room and suitable lifeline will be provided above the roof provided during replacement of roof sheets. Temporary mesh will be provided below above the boiler during replacement of roof sheets.
4	Provide fire module over the panel board in powerhouse.	Auto-modular fire extinguishers will be provided for electrical panels.
5	Provide water sprinkler system in commercial block 2,3,4, in production block.	All the production suites are provided with automatic fusible sprinklers.
6	Provide bushes to the legs of the stands in production block	Suitable bushes provide for the stands used in production areas.
7	Provide water sprinkler system in Kilo lab (Commercial block -2).	Kilo lab is provided with automatic fusible sprinklers.



Sl. No.	Name of the chemical	Storage Capacity in Tons	Schedule-1 (Part -1)											Schedule-2 Named Chemicals	Schedule-3		
			Oral toxicity LD 50mg/kg		Dermal Toxicity LD 50mg/kg		Inhalation toxicity mg/liter		(b) Flammable Chemicals						Part -I	Part -II	
			1-50	51-200	1-200	201-1000	0,1-2	2-10	b)(i)	b)(ii)	b)(iii)	b)(iv)	b)(v)		Named Chemicals	-4	
			Extreme	Toxic	Extreme	Toxic	Extreme	Toxic	15T	1000T	1000T	2500T	1000T			25T	
75	Tertiary butyl amine	0.219	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
76	Tetrahydrofuran	1.131	---	---	---	---	---	---	---	---	1.13	---	---	---	---	---	---
Total Quantity			Not Available	Not Available	Not Available	Not Available	1.35 Tons	1.71 Tons	0.012 Tons	Not Available	174.21 Tons	9.09 Tons	Not Available	Not Available	Not Available	Not Available	

Note -1: FLAMMABLE CHEMICALS under Schedule-I(Part-I).

b) (i) flammable gases: Gases which at 20°C and at standard pressure of 101.3KPa are: -

(a) ignitable when in a mixture of 13% or less by volume with air, or;

(b) have a flammable range with air of at least 12% points regardless of the lower flammable limits.

Note: The flammability shall be determined by tests or by calculation in accordance with methods adopted by International Standards Organization ISO Number 10156 of 1990 or by Bureau of Indian Standard ISI Number 1446 of 1985.

b) (ii) extremely flammable liquids: chemicals which have flash point lower than or equal to 23°C and boiling point less than 35°C.

b) (iii) very highly flammable liquids: chemicals which have a flash point lower than or equal to 23°C and initial boiling point higher than 35°C.

b) (iv) highly flammable liquids: chemicals which have a flash point lower than or equal to 60°C but higher than 23°C.

b) (v) flammable liquids: chemicals which have a flash point higher than 60°C but lower than 90°C.

Schedule-3(Part-II) (4) FLAMMABLE CHEMICALS: Highly Flammable Liquids which remains liquid under pressure

Note-2: The name of the chemicals may be pure or intermediates* being stored for significant time before further Process or disposal.

MANIFEST FOR HAZARDOUS AND OTHER WASTE

1	Sender's Name & Mailing Address (including PhoneNo. and email)	Name : ESCIENTIA ADVANCED SCIENCES PRIVATE LIMITED Address: Plot no. 11, 11A, 12 & 12A, APSEZ, Atchutapuram, Visakhapatnam, Phone No : 9849004808 Email: amballasatyanarayana@escientia.com																
2	Sender's Authorisation No:	APPCB/VSP/VSP/418/HO/CTO/2024 dated 25.05.2024																
3	Manifest Document No:	153343																
4	Transporter Name & Mailing Address: (including PhoneNo. and email):	Name: MADHULATHA COMMUNICATION TRAVELS Address: 37-11-65/9, VIGNESWARA APARTMENT 1, SF 2, PATTABHIREDDY GARDENS, VISAKHAPATNAM 53000 Phone No : 9866278566 Email : madhulatha1971@gmail.com																
5	Type of Vehicle:	Tanker																
6	VehicleRegistration No:	AP39TG6779																
7	Receiver's Name & mailingAddress, (including PhoneNo. and Email:	Name : Atchutapuram Effluent Treatment Ltd-AETL Address: Atchutapuram, Visakhapatnam District , Phone No : 9177844638 Email: admin@aetltd.org																
8	Receiver's Authorisation No:	CFO																
9	Waste Description:	a) Effluent Waste - LTDS																
10	Total Quantity No. of Containers:	a) 20 - KL																
11	Physical Form:	a) Liquid																
12	Special Handling Instructions & Additional Information:	Use PPE, use hand glove, use helmet																
13	Sender's Certificate:	I hereby declare that the contents of the consignment are fully and accurately described above by proper shipping name and are categorised, packed, marked and labelled, and are in all respects in proper conditions for transport by road according to applicable national government regulations.																
	Name and stamp:	Signature: Acknowledged from IP: 14.97.151.130 <table border="1"> <tr> <td>D</td><td>D</td><td>M</td><td>M</td><td>Y</td><td>Y</td><td>Y</td><td>Y</td> </tr> <tr> <td>1</td><td>0</td><td>0</td><td>9</td><td>2</td><td>0</td><td>2</td><td>4</td> </tr> </table>	D	D	M	M	Y	Y	Y	Y	1	0	0	9	2	0	2	4
D	D	M	M	Y	Y	Y	Y											
1	0	0	9	2	0	2	4											
14	Transporter acknowledgement of receipt of Wastes:																	
	Name and stamp:	Signature: Acknowledged from IP: 100.107.194.238 <table border="1"> <tr> <td>D</td><td>D</td><td>M</td><td>M</td><td>Y</td><td>Y</td><td>Y</td><td>Y</td> </tr> <tr> <td>1</td><td>0</td><td>0</td><td>9</td><td>2</td><td>0</td><td>2</td><td>4</td> </tr> </table>	D	D	M	M	Y	Y	Y	Y	1	0	0	9	2	0	2	4
D	D	M	M	Y	Y	Y	Y											
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15	Receivers certification for receipt of hazardous and other waste:																	
	Name and stamp:	Signature: Acknowledged from IP: 103.22.174.78 <table border="1"> <tr> <td>D</td><td>D</td><td>M</td><td>M</td><td>Y</td><td>Y</td><td>Y</td><td>Y</td> </tr> <tr> <td>1</td><td>1</td><td>0</td><td>9</td><td>2</td><td>0</td><td>2</td><td>4</td> </tr> </table>	D	D	M	M	Y	Y	Y	Y	1	1	0	9	2	0	2	4
D	D	M	M	Y	Y	Y	Y											
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FORM 10

[See rule 19 (1)]

MANIFEST FOR HAZARDOUS AND OTHER WASTE

1	Sender's Name & Mailing Address (including PhoneNo. and email)	Name : ESCIENTIA ADVANCED SCIENCES PRIVATE LIMITED Address : Plot no. 11, 11A, 12 & 12A, APSEZ, Atchutapuram, Visakhapatnam, Phone No :9849004808 Email : amballasatyanarayana@escientia.com																
2	Sender's Authorisation No:	APPCB/VSP/VSP/418/HO/CTO/2024 dated 25.05.2024																
3	Manifest Document No:	153575																
4	Transporter Name & Mailing Address: (including PhoneNo. and email):	Name : MADHULATHA COMMUNICATION TRAVELS Address : 37-11-65/9, VIGNESWARA APARTMENT 1, SF 2, PATTABHIREDDY GARDENS, VISAKHAPATNAM 53000 Phone No :9866278566 Email :madhulatha1971@gmail.com																
5	Type of Vehicle:	Tanker																
6	VehicleRegistration No:	AP04TU3186																
7	Receiver's Name & mailingAddress, (including PhoneNo. and Email:	Name : Atchutapuram Effluent Treatment Ltd-AETL Address : Atchutapuram, Visakhapatnam District , Phone No :9177844638 Email : admin@aetltd.org																
8	Receiver's Authorisation No:	CFO																
9	Waste Description:	a) Effluent Waste - LTDS																
10	Total Quantity No. of Containers:	a) 20 - KL																
11	Physical Form:	a) Liquid																
12	Special Handling Instructions & Additional Information:	Use PPE, use hand glove, use helmet																
13	Sender's Certificate:	I hereby declare that the contents of the consignment are fully and accurately described above by proper shipping name and are categorised, packed, marked and labelled, and are in all respects in proper conditions for transport by road according to applicable national government regulations.																
	Name and stamp:	Signature: Acknowledged from IP: 49.43.225.130 <table border="1"> <tr> <td>D</td><td>D</td><td>M</td><td>M</td><td>Y</td><td>Y</td><td>Y</td><td>Y</td> </tr> <tr> <td>1</td><td>1</td><td>0</td><td>9</td><td>2</td><td>0</td><td>2</td><td>4</td> </tr> </table>	D	D	M	M	Y	Y	Y	Y	1	1	0	9	2	0	2	4
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14	Transporter acknowledgement of receipt of Wastes:																	
	Name and stamp:	Signature: Acknowledged from IP: 100.121.195.212 <table border="1"> <tr> <td>D</td><td>D</td><td>M</td><td>M</td><td>Y</td><td>Y</td><td>Y</td><td>Y</td> </tr> <tr> <td>1</td><td>1</td><td>0</td><td>9</td><td>2</td><td>0</td><td>2</td><td>4</td> </tr> </table>	D	D	M	M	Y	Y	Y	Y	1	1	0	9	2	0	2	4
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15	Receivers certification for receipt of hazardous and other waste:																	
	Name and stamp:	Signature: Acknowledged from IP: 103.22.174.78 <table border="1"> <tr> <td>D</td><td>D</td><td>M</td><td>M</td><td>Y</td><td>Y</td><td>Y</td><td>Y</td> </tr> <tr> <td>1</td><td>2</td><td>0</td><td>9</td><td>2</td><td>0</td><td>2</td><td>4</td> </tr> </table>	D	D	M	M	Y	Y	Y	Y	1	2	0	9	2	0	2	4
D	D	M	M	Y	Y	Y	Y											
1	2	0	9	2	0	2	4											

FORM 10

[See rule 19 (1)]

MANIFEST FOR HAZARDOUS AND OTHER WASTE

1	Sender's Name & Mailing Address (including PhoneNo. and email)	Name : ESCIENTIA ADVANCED SCIENCES PRIVATE LIMITED Address : Plot no. 11, 11A, 12 & 12A, APSEZ, Atchutapuram, Visakhapatnam, Phone No :9849004808 Email : amballasatyanarayana@escientia.com																
2	Sender's Authorisation No:	APPCB/VSP/VSP/418/HO/CTO/2024 dated 25.05.2024																
3	Manifest Document No:	153882																
4	Transporter Name & Mailing Address: (including PhoneNo. and email):	Name : MADHULATHA COMMUNICATION TRAVELS Address : 37-11-65/9, VIGNESWARA APARTMENT 1, SF 2, PATTABHIREDDY GARDENS, VISAKHAPATNAM 53000 Phone No :9866278566 Email :madhulatha1971@gmail.com																
5	Type of Vehicle:	Tanker																
6	VehicleRegistration No:	AP31TE2499																
7	Receiver's Name & mailingAddress, (including PhoneNo. and Email:	Name : Atchutapuram Effluent Treatment Ltd-AETL Address : Atchutapuram, Visakhapatnam District , Phone No :9177844638 Email : admin@aetltd.org																
8	Receiver's Authorisation No:	CFO																
9	Waste Description:	a) Effluent Waste - LTDS																
10	Total Quantity No. of Containers:	a) 20 - KL																
11	Physical Form:	a) Liquid																
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	Name and stamp:	Signature: Acknowledged from IP: 14.97.151.130 <table border="1" data-bbox="1394 1608 2028 1712"> <tr> <td>D</td><td>D</td><td>M</td><td>M</td><td>Y</td><td>Y</td><td>Y</td><td>Y</td> </tr> <tr> <td>1</td><td>2</td><td>0</td><td>9</td><td>2</td><td>0</td><td>2</td><td>4</td> </tr> </table>	D	D	M	M	Y	Y	Y	Y	1	2	0	9	2	0	2	4
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	Name and stamp:	Signature: Acknowledged from IP: 192.168.1.8 <table border="1" data-bbox="1394 1863 2028 1967"> <tr> <td>D</td><td>D</td><td>M</td><td>M</td><td>Y</td><td>Y</td><td>Y</td><td>Y</td> </tr> <tr> <td>1</td><td>2</td><td>0</td><td>9</td><td>2</td><td>0</td><td>2</td><td>4</td> </tr> </table>	D	D	M	M	Y	Y	Y	Y	1	2	0	9	2	0	2	4
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15	Receivers certification for receipt of hazardous and other waste:																	
	Name and stamp:	Signature: Acknowledged from IP: 103.22.174.78 <table border="1" data-bbox="1394 2119 2028 2223"> <tr> <td>D</td><td>D</td><td>M</td><td>M</td><td>Y</td><td>Y</td><td>Y</td><td>Y</td> </tr> <tr> <td>1</td><td>3</td><td>0</td><td>9</td><td>2</td><td>0</td><td>2</td><td>4</td> </tr> </table>	D	D	M	M	Y	Y	Y	Y	1	3	0	9	2	0	2	4
D	D	M	M	Y	Y	Y	Y											
1	3	0	9	2	0	2	4											

FORM 10

[See rule 19 (1)]

MANIFEST FOR HAZARDOUS AND OTHER WASTE

1	Sender's Name & Mailing Address (including PhoneNo. and email)	Name : ESCIENTIA ADVANCED SCIENCES PRIVATE LIMITED Address : Plot no. 11, 11A, 12 & 12A, APSEZ, Atchutapuram, Visakhapatnam, Phone No :9849004808 Email : amballasatyanarayana@escientia.com																
2	Sender's Authorisation No:	APPCB/VSP/VSP/418/HO/CTO/2024 dated 25.05.2024																
3	Manifest Document No:	154102																
4	Transporter Name & Mailing Address: (including PhoneNo. and email):	Name : MADHULATHA COMMUNICATION TRAVELS Address : 37-11-65/9, VIGNESWARA APARTMENT 1, SF 2, PATTABHIREDDY GARDENS, VISAKHAPATNAM 53000 Phone No :9866278566 Email :madhulatha1971@gmail.com																
5	Type of Vehicle:	Tanker																
6	VehicleRegistration No:	AP31TW1134																
7	Receiver's Name & mailingAddress, (including PhoneNo. and Email:	Name : Atchutapuram Effluent Treatment Ltd-AETL Address : Atchutapuram, Visakhapatnam District , Phone No :9177844638 Email : admin@aetltd.org																
8	Receiver's Authorisation No:	CFO																
9	Waste Description:	a) Effluent Waste - LTDS																
10	Total Quantity No. of Containers:	a) 20 - KL																
11	Physical Form:	a) Liquid																
12	Special Handling Instructions & Additional Information:	Use PPE, use hand glove, use helmet																
13	Sender's Certificate:	I hereby declare that the contents of the consignment are fully and accurately described above by proper shipping name and are categorised, packed, marked and labelled, and are in all respects in proper conditions for transport by road according to applicable national government regulations.																
	Name and stamp:	Signature: Acknowledged from IP: 14.97.151.130 <table border="1" data-bbox="1394 1608 2028 1709"> <tr> <td>D</td><td>D</td><td>M</td><td>M</td><td>Y</td><td>Y</td><td>Y</td><td>Y</td> </tr> <tr> <td>1</td><td>3</td><td>0</td><td>9</td><td>2</td><td>0</td><td>2</td><td>4</td> </tr> </table>	D	D	M	M	Y	Y	Y	Y	1	3	0	9	2	0	2	4
D	D	M	M	Y	Y	Y	Y											
1	3	0	9	2	0	2	4											
14	Transporter acknowledgement of receipt of Wastes:																	
	Name and stamp:	Signature: Acknowledged from IP: 100.102.180.60 <table border="1" data-bbox="1394 1863 2028 1964"> <tr> <td>D</td><td>D</td><td>M</td><td>M</td><td>Y</td><td>Y</td><td>Y</td><td>Y</td> </tr> <tr> <td>1</td><td>3</td><td>0</td><td>9</td><td>2</td><td>0</td><td>2</td><td>4</td> </tr> </table>	D	D	M	M	Y	Y	Y	Y	1	3	0	9	2	0	2	4
D	D	M	M	Y	Y	Y	Y											
1	3	0	9	2	0	2	4											
15	Receivers certification for receipt of hazardous and other waste:																	
	Name and stamp:	Signature: Acknowledged from IP: 103.22.174.78 <table border="1" data-bbox="1394 2119 2028 2220"> <tr> <td>D</td><td>D</td><td>M</td><td>M</td><td>Y</td><td>Y</td><td>Y</td><td>Y</td> </tr> <tr> <td>1</td><td>4</td><td>0</td><td>9</td><td>2</td><td>0</td><td>2</td><td>4</td> </tr> </table>	D	D	M	M	Y	Y	Y	Y	1	4	0	9	2	0	2	4
D	D	M	M	Y	Y	Y	Y											
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MANIFEST FOR HAZARDOUS AND OTHER WASTE

1	Sender's Name & Mailing Address (including PhoneNo. and email)	Name : ESCIENTIA ADVANCED SCIENCES PRIVATE LIMITED Address: Plot no. 11, 11A, 12 & 12A, APSEZ, Atchutapuram, Visakhapatnam, Phone No : 9849004808 Email: amballasatyanarayana@escientia.com																						
2	Sender's Authorisation No:	APPCB/VSP/VSP/418/HO/CTO/2024 dated 25.05.2024																						
3	Manifest Document No:	155369																						
4	Transporter Name & Mailing Address: (including PhoneNo. and email):	Name: MADHULATHA COMMUNICATION TRAVELS Address: 37-11-65/9, VIGNESWARA APARTMENT 1, SF 2, PATTABHIREDDY GARDENS, VISAKHAPATNAM 5 Phone No : 9866278566 Email : madhulatha1971@gmail.com																						
5	Type of Vehicle:	Tanker																						
6	VehicleRegistration No:	AP31TE2499																						
7	Receiver's Name & mailingAddress, (including PhoneNo. and Email:	Name : Atchutapuram Effluent Treatment Ltd-AETL Address: Atchutapuram, Visakhapatnam District , Phone No : 9177844638 Email: admin@aetltd.org																						
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14	Transporter acknowledgement of receipt of Wastes:																							
15	Name and stamp:	Signature: Acknowledged from IP: 100.121.117.238					<table border="1" style="width: 100%; text-align: center;"> <tr> <td>D</td><td>D</td><td>M</td><td>M</td><td>Y</td><td>Y</td><td>Y</td><td>Y</td> </tr> <tr> <td>2</td><td>0</td><td>0</td><td>9</td><td>2</td><td>0</td><td>2</td><td>4</td> </tr> </table>		D	D	M	M	Y	Y	Y	Y	2	0	0	9	2	0	2	4
D	D	M	M	Y	Y	Y	Y																	
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15	Receivers certification for receipt of hazardous and other waste:																							
15	Name and stamp:	Signature: Acknowledged from IP: 103.22.174.78					<table border="1" style="width: 100%; text-align: center;"> <tr> <td>D</td><td>D</td><td>M</td><td>M</td><td>Y</td><td>Y</td><td>Y</td><td>Y</td> </tr> <tr> <td>2</td><td>1</td><td>0</td><td>9</td><td>2</td><td>0</td><td>2</td><td>4</td> </tr> </table>		D	D	M	M	Y	Y	Y	Y	2	1	0	9	2	0	2	4
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2	1	0	9	2	0	2	4																	

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2	Sender's Authorisation No:	APPCB/VSP/VSP/418/HO/CTO/2024 dated 25.05.2024																
3	Manifest Document No:	161814																
4	Transporter Name & Mailing Address: (including PhoneNo. and email):	Name : Coastal Waste Management Project Address : Ramky Enviro Engineers Limited TSDf Site:- Coastal Waste Management Project,Road No. 20/5,JNPC,Parawada,Visakhapatnam-531021 Phone No : 9701065712 Email : sambasivarao.yvn@resustainability.com																
5	Type of Vehicle:	Truck																
6	VehicleRegistration No:	AP09TA1247																
7	Receiver's Name& mailingAddress, (including PhoneNo. and Email:	Name : Costal Waste Management Project,Incineration,A Division of Re Sustainability Limited Address : JN Pharmacity, Parawada, Visakhapatnam District Phone No : 9701065712 Email : sambasivarao.yvn@resustainability.com																
8	Receiver's Authorisation No:	APPCB/VSP/VSP/285/CFO/HO/2021																
9	Waste Description:	a) HW - Incinerable Waste - 28.4 Off specification products, Off specification & discarded products / raw materials/ intermediates / lab chemical																
10	Total Quantity No. of Containers:	a) 0.32 - Tonnes, 3 Drum																
11	Physical Form:	a) Liquid																
12	Special Handling Instructions & Additional Information:	Use PPE, use hand glove, use helmet																
13	Sender's Certificate:	I hereby declare that the contents of the consignment are fully and accuratelydescribed above by proper shipping name and are categorised, packed, marked and labelled, and are in all respects in proper conditions for transport by roadaccording to applicable national government regulations.																
	Name and stamp:	Signature: Acknowledged from IP: 14.97.151.130 <table border="1" data-bbox="1394 1709 2028 1813"> <tr> <td>D</td><td>D</td><td>M</td><td>M</td><td>Y</td><td>Y</td><td>Y</td><td>Y</td> </tr> <tr> <td>2</td><td>3</td><td>1</td><td>0</td><td>2</td><td>0</td><td>2</td><td>4</td> </tr> </table>	D	D	M	M	Y	Y	Y	Y	2	3	1	0	2	0	2	4
D	D	M	M	Y	Y	Y	Y											
2	3	1	0	2	0	2	4											
14	Transporter acknowledgement of receipt of Wastes:																	
	Name and stamp:	Signature: Acknowledged from IP: 103.138.1.162 <table border="1" data-bbox="1394 1970 2028 2074"> <tr> <td>D</td><td>D</td><td>M</td><td>M</td><td>Y</td><td>Y</td><td>Y</td><td>Y</td> </tr> <tr> <td>2</td><td>3</td><td>1</td><td>0</td><td>2</td><td>0</td><td>2</td><td>4</td> </tr> </table>	D	D	M	M	Y	Y	Y	Y	2	3	1	0	2	0	2	4
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2	3	1	0	2	0	2	4											
15	Receivers certification for receipt of hazardous and other waste:																	
	Name and stamp:	Signature: Acknowledged from IP: 103.138.0.110 <table border="1" data-bbox="1394 2228 2028 2332"> <tr> <td>D</td><td>D</td><td>M</td><td>M</td><td>Y</td><td>Y</td><td>Y</td><td>Y</td> </tr> <tr> <td>2</td><td>3</td><td>1</td><td>0</td><td>2</td><td>0</td><td>2</td><td>4</td> </tr> </table>	D	D	M	M	Y	Y	Y	Y	2	3	1	0	2	0	2	4
D	D	M	M	Y	Y	Y	Y											
2	3	1	0	2	0	2	4											

**BEFORE THE NATIONAL GREEN TRIBUNAL
(SOUTHERN ZONE) CHENNAI**

ORIGINAL APPLICATION No. 279 OF 2024(SZ)

Earlier O.A. No. 1097/2024 (PB)

In the matter of:

Suo Moto matter in respect of news item titled “**17
killed 20 injured in reactor blast at Pharma
company in Andhra Pradesh’s Anakapalli**”
appearing in The Hindu dated 22.08.2024

..... Applicant (s)

Versus

Central Pollution Control Board & Ors.

.....Respondent(s)

REPORT ON BEHALF OF RESPONDENT NO.1
CENTRAL POLLUTION CONTROL BOARD

M/s R.Thirunavukarasu

Counsel for the 1st Respondent

M-9444012986