CIN No.: U01100TG2005PLC045887

S.P.Y. Agro Industries Limited

Date: 26.12.2024

To,
The Director,
Compliance and Monitoring Division (C&MD),
Impact Assessment Division,
Ministry of Environment, Forest and Climate Change,
Government of India, Indira Paryavaran Bhawan,
Aliganj, Jor Bagh Road, New Delhi – 110 003,
E-mail: moefcc-monitoring@gov.in.

Sub : Submitting the Compliance Report for Action Taken Report (ATR) – Reg.
Ref: F.No. IA-J-11014/291/2024-IA-I, Dated 27th November, 2024.

Respected Sir,

With reference to the above, we herewith submitting a detailed compliance report.

S.NO	SPECIFIC CONDITIONS	STATUS OF COMPLIANCE
1	Pucca approach road to project site shall be constructed prior to commencing construction activity of the main distillery so as to avoid fugitive emissions. (Condition – 4)	We have laid cement concrete roads for all the approach roads with 4 inch concrete layer, now those roads are in use. APIIC is planning to improve the conditions of the roads.
2	The gaseous emissions from DG set shall be dispersed through adequate stack height as per CPCB guidelines. Acoustic enclosure shall be provided to the DG sets to mitigate the noise pollution. (Condition – 5, General Condition – 5)	We are in the process of providing acoustic enclosure for the other DG set. We will complete shortly.
3	The company shall be upload the status of compliance of the stipulated environmental clearance conditions, including result of monitored data on its website and shall update the same periodically. It shall simultaneously be sent to the Regional Office of MOEF, the respective Zonal office of CPCB and APPCB. The levels of PM,SO2,CO and HC[Methane] in ambient air shall be monitored and displayed at a convenient location near the main gate of the company and at important public places. (Condition - 6)	We will update compliance clearance conditions periodically to the Regional Office of the MOEF and installed digital display board with details of PM, SO_2, NO_X at the main gate. Respective photo copies are enclosed Page No 1 - 4.

Regd.Office : D.No. 8-3-833, Plot No. 188, 1st Floor, Phase - II, Kamalapuri Colony, Hyderabad - 500 073. T.S. INDIA
E-mail: spyagroindustries@gmail.com

Works : New Industrial Estate, Sy. No. 446 to 449, APIIC Udumalpur, Nandyal District - 518 502. A.P. INDIA
Phone: +91 8514 222084, Fax: 08514-222082, E-mail: spyagro_nandigroup@yahoo.com

4	Process effluency /any waste water shall not be allowed to mix storm water. Storm water drain shall be passed through guard pond. (Condition – 9)	Process effluence /any waste water was not allowed to mix storm water and storm water drain is passing through guard pond. Enclosed images Page No 5.
5	Adequate numbers of ground water quality monitoring stations by providing piezometers around the project area shall be set up. Sampling and trend analysis monitoring must be made on monthly a basis and report submitted to SPCB and Ministry. The ground water quality monitoring for pH, BOD, COD, Chloride, sulphate and total dissolve solids shall be monitored and report submitted to the Ministry's Regional Office at Bangalore and APPCB. (Condition – 10)	Piezometer was installed Sampling and trend analysis monitoring. We will submit the reports to respective authorities. Enclosed Photo copy of Piezometer and sampling and trend analysis report Page No 6 – 11.
6	Fly ash shall be stored separately as per CPCB guidelines so that it shall not adversely affect the air quality, becoming air borne by wind or water regime during rainy season by flowing along with storm water .Direct exposure of workers to fly ash and dust shall be avoided..Ash shall be transferred to the brick manufacturing/cement plant in a covered truck. A tie-up with brick manufactures to be made in the form of agreement. (Condition – 13)	Fly ash was stored separately in silos to avoid air borne dispersal. Copies of MoU/ Agreement with brick manufacturers are enclosed Page No 12
7	Fire fighting system shall be as per norms and cover all areas where alcohol is produced, handled and stored. Provision of foam system for fire fighting shall be made to control fire from the alcohol storage tank (Condition – 14)	We obtained renewed NOC from State Disaster Response & Fire Service Department on 01.07.2022, which is valid for a period of Five years i.e 30.06.2027. Respective NOC copies are enclosed Page No 13 - 33.
8	Risk Assessment shall be carried to assess the fire and explosion risk due to storage of alcohol and report submitted to the Ministry and its Regional Office at Bangalore within six months. (Condition – 15)	Quantitative Risk Assessment Report by Lumen Engineering Associates, Visakhapatnam dated 26-08-2024 was carried out to assess the fire and explosion risk regarding storage of alcohol. Enclosed copy of the report Page No 34 - 108.

<table>
<tr><td>9</td><td>Automatic/online monitoring system for flow measurement and for relevant pollutants in the treatment system to be installed. The data to be made available to respective SPCB and in the Company's website. (Condition –17)</td><td>We have uploaded the data in our website</td></tr>
<tr><td>10</td><td>As proposed, green belt over 33% of the total project area should be developed within plant premises with at least 10 meter wide green belt on all sides along the periphery of the project area, in downward direction, and along road sides etc. Selection of plant species shall be as per the CPCB guidelines in consultation with the DFO. (Condition – 20)</td><td>We have developed 33% (14.30 Acres) greenbelt of total area (43.00 Acres) and respective images are enclosed Page No 109 - 120.</td></tr>
<tr><td>11</td><td>At least 5 % of the total cost of the project should be earmarked towards the Enterprise social responsibility based on public hearing issues and item-wise details along with time bound action plan should be prepared and submitted to the Ministry's Regional Office at Bangalore. Implementation of such program should be ensured accordingly in a time bound manner. (Condition – 22)</td><td>The expansion cost from 135 KLPD to 500 KLPD is around Rs.250.00 Crores. In the first stage of expansion, we have reached 135 KLPD to 220 KLPD. Now the plant is running at 220 KLPD. The first stage expansion cost is around Rs. 60 Crores. In the second stage of expansion, we are planning to reach 500 KLPD.

As of now, we have spent for ESR towards Establishment of Decanter, Bio Digester, SETP, RO, Evaporation, Dryers, Bag Filters and ESP. Details are as under:-
<table>
<tr><th>Description</th><th>Capital Cost (Lakhs)</th><th>Recurring Expenditures (Lakhs)</th></tr>
<tr><td>Decanter</td><td>320.00</td><td>120.00</td></tr>
<tr><td>Bio Digester</td><td>714.00</td><td>100.00</td></tr>
<tr><td>SETP</td><td>74.98</td><td>40.00</td></tr>
<tr><td>RO</td><td>458.00</td><td>80.00</td></tr>
<tr><td>Evaporation</td><td>88.32</td><td>40.00</td></tr>
<tr><td>Dryers</td><td>500.00</td><td>30.00</td></tr>
<tr><td>Bag Filters</td><td>60.00</td><td>15.00</td></tr>
<tr><td>ESP</td><td>1000.00</td><td>300.00</td></tr>
<tr><td>Total</td><td>3215.30</td><td>725.00</td></tr>
</table></td></tr>
</table>

12	The Company shall submit within three months their policy towards Corporate Environment Responsibility which should inter-alia address (1) Standard operating process/procedure to being into focus any infringement deviation/violation of environmental or forest norms/conditions, (il) Hierarchical system or Administrative order of the Company to deal with environmental issues and ensuring compliance to the environmental clearance conditions and (ii) System of reporting of non compliance/violation environmental norms to the Board of Directors of the company and/or stakeholders or shareholders. (Condition – 23)	We are enclosing the copies of board resolutions regarding Corporate Environment Responsibility Page No 121.
13	During transfer of materials, spillages shall be avoided and garland drains be constructed to avoid mixing of accidental spillages with domestic wastewater and storm water drains. (General Condition – 8)	Garland drains are provided at appropriate locations and images are enclosed Page No 122.
14	The environmental statement for each financial year ending 31* March in Form-V as is mandated shall be submitted to the A P Pollution Control Board as prescribed under the Environment (Protection) Rules, 1986, .as amended subsequently, shall also be put on the website of the company along with the status of compliance of environmental clearance conditions and shall also be sent to the Bangalore Regional Offices of MoEF by e-mail. (Condition – 18)	We will submit the respective reports to the concerned authorities periodically Page No 123.
15	The project authorities shall inform the Regional Office as well as the Ministry, the date of financial closure and final approval of the project by the concerned authorities and the date of start of the project. (Condition – 20)	We will submit the respective reports to the concerned authorities periodically.

Thanking you Sir.
Yours faithfully,
For M/s S.P.Y Agro Industries Limited,

S.P.Y. Agro Ind Ltd. NANDYAL-518 502

Authorized Signatory

Cc: EE, APPCB, Regional Office, Kurnool

Digital Display Board Details


S.P.Y AGRO
INDUSTRIES LIMITED
19-12-2024
5:19:23
Stack_2:
Con.
Units
PM
0.01
mg/Nm3
SO2
0.09
mg/Nm3
NOX
0.09
mg/Nm3

CFO Display Board Details

Tax Invoice

(DUPLICATE FOR TRANSPORTER) **e-Invoice**

IRN : **0b3873040630d0ca072551627a32ead4dcbc54d5642-273e65baf47b72048fb9e**
Ack No. : **112422809820207**
Ack Date : **29-Nov-24**

Green Enviro International Pvt Ltd
Plot No-477, MIG, Sy No- 20 & 28/1
Huda Mayurinagar,
Opp:Yashodha Sannidhi
Miyapur,Hyderabad
GSTIN/UIN: 36AAFCG7092L1Z3
State Name : Telangana, Code : 36
CIN: U74999AP2014PTC095040
E-Mail : info@greenenviro.co.in

Consignee (Ship to)
S.P.Y Agro Industries Limited
APIIC, New Industrial Area
Udumalpuram-Nandyal
Nandyal Dist
Aandhra Pradesh-518502
GSTIN/UIN : 37AAJCS0911J1ZB
State Name : Andhra Pradesh, Code : 37

Buyer (Bill to)
S.P.Y Agro Industries Limited
APIIC, New Industrial Area
Udumalpuram-Nandyal
Nandyal Dist
Aandhra Pradesh-518502
GSTIN/UIN : 37AAJCS0911J1ZB
State Name : Andhra Pradesh, Code : 37
Place of Supply : Andhra Pradesh

Invoice No. GEIPL/218/24-25 e-Way Bill No. 1419 9092 4281	Dated **29-Nov-24**
Delivery Note **137/24-25**	Mode/Terms of Payment **Advance**
Reference No. & Date.	Other References
Buyer's Order No. SPYAIL/2024-25/Instrumention, PCB/660	Dated **7-Nov-24, 7-Nov-24**
Dispatch Doc No. **137**	Delivery Note Date **29-Nov-24**
Dispatched through **Courier**	Destination **Nandyal**
Terms of Delivery **Immediately**	

Sl No.	Description of Goods	HSN/SAC	Quantity	Rate	per	Amount
1	**LED Multi Colour Display Board** *Size:6x4 ft , Colour : RGB* *Communication: LAN Or USB* *16 Gauges Powder Coated* *Other Specs As Per PO*	85312000	**1 No.**	1,90,000.00	No.	**1,90,000.00**
	Output - IGST			*18*	%	**34,200.00**
	Total		**1 No.**			**₹ 2,24,200.00**

Amount Chargeable (in words) *E. & O.E*
INR Two Lakh Twenty Four Thousand Two Hundred Only

HSN/SAC	Taxable Value	IGST Rate	IGST Amount	Total Tax Amount
85312000	1,90,000.00	18%	34,200.00	34,200.00
Total	**1,90,000.00**		**34,200.00**	**34,200.00**

Tax Amount (in words) : **INR Thirty Four Thousand Two Hundred Only**
Company's PAN : **AAFCG7092L**

Declaration
We declare that this invoice shows the actual price of the goods described and that all particulars are true and correct.

for Green Enviro International Pvt Ltd
Authorised Signatory

This is a Computer Generated Invoice

S.P.Y.AGRO SECURITY
BOTTLING DIVISION
INWARD No. 1955
DATE: 5/12/24
IN TIME: 9:30PM
SIGNATURE:

S.P.Y.AGRO SECURITY
INWARD No. 1955
DATE: 06/12/24.
IN TIME: 11:00AM.
SIGNATURE:


OPPO F5 Youth
Andhra Pradesh
By NIHANTH REDDY

Piezometer Details

BSS Magmeter Pvt. Ltd.

Works: Gat No.357/18, Plot No. 6, Near Ambika Weight Bridge, Waghjainagar,
Kharabwadi,Tal: Khed, Dist: Pune, Pin: 410 501 Cell: 7263010004/05
Email: sales@bssmagmeter.com; mktg@bssmagmeter.com
Web :- www.bssmagmeter.in

Tax Invoice

BUYER :- S.P.Y. Agro Industries Limited

APLIIC ,New Industries Area ,
Udumalpuram- Nandyal (P.O.),
Nandyal (Dt.)-518502, A.P.
Contact No : 6301951137
GST NO : 37AAJCS0911J1ZB

Invoice No. : BSS/2024-25/299
Invoice Date : 12/11/2024
Challan No.: BSS/2024-25/299
Challan Date:-12/11/2024
PO No.: SPYAIL/2024-25/PO/661
PO Date : 07/11/2024

Sr. No.	Description	HSN Code	Qty	Rate	Amount
1	**Telemetric Piezometer (Battery Type)** BSS -AT-01	90318000	1	42,500.00	42500.00

Rs. in Figure (Round Off)	50150.00	Total Amount :-	42500.00
Rs. In words:- Fifty Thousand One Hundred Fifty Rupees Only.		Fright Charges	Topay
		P & F 3%	
		Total	42500.00
Bank Details :- BSS Magmeter Pvt.Ltd.			
Bank Name :- ICICI Bank, Branch:- Chakan 410501.		IGST 18 % :-	7650.00
Current Account No.:- 050805005351 , IFSC:- ICIC0000508.			
GSTIN 27AAHCB7487Q1ZO		Grand Total	50150.00
PAN NO.:- AAHCB7487Q		Total Amount	50150.00
MSME NO :- UDYAM-MH-26-0043052			

Declaration :-

we herby certify that our registration certificate under the Goods And Services Tax Act 2017 is inforce on the date on which sale of the goods & Services specifed in this tax invoice is made by us & that the transaction of the sale & Service covered by this tax invoice has been effected by us and it shall be accounted for in the turnover of sales while filling of return and the due tax,if any,payable on the sale has been paid or shall be paid.

Terms & Condition :

1. Goods once sold will not be taken back or Exchange.
2. Your Risk & Responsibility Ceases Once Leave our premise.
3. Interest @ 24% will be changed on bill if not paid within due Date.
4. Warrenty/Service of parts directly from respective service center.
5. Warrenty 12 Month From the Date Of dispatch.against manufacturing defe

For BSS Magmeter Pvt.Ltd.

SPY Agro Ind Ltd.
STORES
GRN.No: 1369
DATE: 18-11-2024
Sign:

subject to pune jurisdiction

Authorised Signatory

Pollu-tech Laboratory & Consultancy Services

Analysts & Consultants in Pollution Control
- Twenty Five Years of Service in Environment Monitoring

Ref No.PTLCS/SPY/2024-25/EA-147 Date 2024 04 26

NAME & ADDRESS : M/s. SPY AGRO INDUSTRIES LTD
APIIC, SY.NO.446 Udumulapur
NANDYAL – 518 501
KURNOOL

SAMPLE PARTICULARS : WATER

SOURCE OF COLLECTION : APIIC UDUMULAPURAM MAIN DRAIN

DATE OF COLLECTION : 16 04 2024

NOTE: SAMPLE NOT COLLECTED BY PTLCS.

RESULTS
EXPRESSED IN Milligram/Litre, EXCEPT pH, EC.

COLOUR Hazen Units	BLACKISH
TURBIDITY NTU	60
pH	6.60
TOTAL HARDNESS as $CaCO_3$	288
CALCIUM as Ca	77
MAGNESIUM as Mg	23
CHLORIDES as Cl	312
SULPHATES as SO_4	80
FLUORIDES as F	1.10
NITRATES as NO_3	26

POLLU-TECH LABORATORY &
CONSULTANCY SERVICES.

Lab & Office : 4-1-26, Snehapuri, Nacharam, Hyderabad - 500 076.
Tele Fax : 040 - 27173437 Mob. : 9000688565

25 YEARS EXCELLENT SERVICE

Pollu-tech Laboratory & Consultancy Services

Analysts & Consultants in Pollution Control
- Twenty Five Years of Service in Environment Monitoring

Ref No.PTLCS/SPY/2024-25/EA-148

Date 2024 04 26

NAME & ADDRESS : M/s. SPY AGRO INDUSTRIES LTD
APIIC, SY.NO.446 Udumulapur
NANDYAL – 518 501
KURNOOL

SAMPLE PARTICULARS : WATER

SOURCE OF COLLECTION : BOMMALA SATRAM – FACTORY EAST

DATE OF COLLECTION : 16 04 2024

NOTE: SAMPLE NOT COLLECTED BY PTLCS.

RESULTS: EXPRESSED IN Milligram/Litre, EXCEPT pH, EC.		IS- 10500 DRINKING WATER SPECIFICATIONS
COLOUR Hazen Units	6	5
TURBIDITY NTU	5	5
pH	7.30	6.50 - 8.50
TOTAL HARDNESS as $CaCO_3$	464	300
CALCIUM as Ca	128	75
MAGNESIUM as Mg	35	30
CHLORIDES as Cl	398	250
SULPHATES as SO_4	220	200
FLUORIDES as F	1.30	1.50
NITRATES as NO_3	40	45
Conductivity.		

POLLU-TECH LABORATORY &
CONSULTANCY SERVICES.

Lab & Office : 4-1-26, Snehapuri, Nacharam, Hyderabad - 500 076.
Tele Fax : 040 - 27173437 Mob. : 9000688565

25 YEARS EXCELLENT SERVICE

Pollu-tech Laboratory & Consultancy Services

Analysts & Consultants in Pollution Control
- Twenty Five Years of Service in Environment Monitoring

Ref No.PTLCS/SPY/2024-25/EA-149

Date 2024 04 26

NAME & ADDRESS : M/s. SPY AGRO INDUSTRIES LTD
APIIC, SY.NO.446 Udumulapur
NANDYAL – 518 501
KURNOOL

SAMPLE PARTICULARS : WATER

SOURCE OF COLLECTION : YSR NAGAR – FACTORY NORTH

DATE OF COLLECTION : 16 04 2024

NOTE: SAMPLE NOT COLLECTED BY PTLCS.

RESULTS: EXPRESSED IN Milligram/Litre, EXCEPT pH, EC.		IS- 10500 DRINKING WATER SPECIFICATIONS
COLOUR Hazen Units	<5	5
TURBIDITY NTU	5	5
pH	7.60	6.50 - 8.50
TOTAL HARDNESS as $CaCO_3$	212	300
CALCIUM as Ca	45	75
MAGNESIUM as Mg	22	30
CHLORIDES as Cl	182	250
SULPHATES as SO_4	120	200
FLUORIDES as F	1.20	1.50
NITRATES as NO_3	34	45

Conductivity

POLLU-TECH LABORATORY &
CONSULTANCY SERVICES.

Lab & Office : 4-1-26, Snehapuri, Nacharam, Hyderabad - 500 076.
Tele Fax : 040 - 27173437 Mob. : 9000688565

25 YEARS EXCELLENT SERVICE

Pollu-tech Laboratory & Consultancy Services

Analysts & Consultants in Pollution Control
- Twenty Five Years of Service in Environment Monitoring

Ref No.PTLCS/SPY/2024-25/EA-150

Date 2024 04 26

NAME & ADDRESS : M/s. SPY AGRO INDUSTRIES LTD
APIIC, SY.NO.446 Udumulapur
NANDYAL – 518 501
KURNOOL

SAMPLE PARTICULARS : WATER

SOURCE OF COLLECTION : VENKATESWARAPURAM – FACTORY SOUTH

DATE OF COLLECTION : 16 04 2024

NOTE: SAMPLE NOT COLLECTED BY PTLCS.

RESULTS: EXPRESSED IN Milligram/Litre, EXCEPT pH, EC.		IS- 10500 DRINKING WATER SPECIFICATIONS
COLOUR Hazen Units	<5	5
TURBIDITY NTU	5	5
pH	7.80	6.50 - 8.50
TOTAL HARDNESS as $CaCO_3$	1,680	300
CALCIUM as Ca	512	75
MAGNESIUM as Mg	96	30
CHLORIDES as Cl	852	250
SULPHATES as SO_4	661	200
FLUORIDES as F	2.10	1.50
NITRATES as NO_3	62	45

Conductivity

POLLU-TECH LABORATORY &
CONSULTANCY SERVICES.

Lab & Office : 4-1-26, Snehapuri, Nacharam, Hyderabad - 500 076.
Tele Fax : 040 - 27173437 Mob. : 9000688565

25 YEARS EXCELLENT SERVICE

CIN No.: U01100TG2005PLC045887

S.P.Y. Agro Industries Limited

AGREEMENT LETTER

The Fly Ash Off take Agreement (Agreement") is made on this 10th day of August, 2024 at Nandyal by and between and the agreement shall be effective from 19-08-2024.

BETWEEN

SPY Agro Industries Ltd, having its registered address at New Industrial Estate Sy.No446 to 449,APIIC,Udumalpuram,Nandyal Kurnool District-A.P-518502 represented by General Manger here in after referred to as the "Company" or "Employer", which expression shall, unless repugnant to the meaning or context here of, be deemed to include all permitted successors and assigns),

AND

K.Shafiulla, KH Light Bricks Hussainapuram, Nandyal, AP-518501

This agreement is by and between SPY Agro Industries Ltd and K.Shafiulla, **KH Light Bricks** to by Fly Ash for bricks manufacturing process.

SPY Agro Industries Power Plant 50-TPH FBC Boiler generate 100Tons/Day of Fly ash from husk and coal mixture. This agreement is to supply 50-Tons/day of fly ash to KH Bricks at Hussainapuram.

IN WITNESS WHEREOF the Parties have set their hands and signed this agreement on the day and date stated in the presence of Witnesses herein below.

SPYAGROINDUSTRIESLTD **KHLIGHTBRICKS**

In the presence of witnesses:

1. G.V. Narayana
2. C.S. Murthy

Regd.Office : D.No. 8-3-833, Plot No. 188, 1st Floor, Phase - II, Kamalapuri Colony, Hyderabad - 500 073. T.S. INDIA
E-mail: spyagroindustries@gmail.com

Works : New Industrial Estate, Sy. No. 446 to 449, APIIC Udumalpur, Nandyal District - 518 502. A.P. INDIA
Phone: +91 8514 222084, Fax: 08514-222082, E-mail: spyagro_nandigroup@yahoo.com

GOVERNMENT OF ANDHRA PRADESH
STATE DISASTER RESPONSE & FIRE SERVICES DEPARTMENT

From :
The Director General,
State Disaster Response and Fire Services,
Andhra Pradesh, Vijayawada.

To :
The Management,
M/s S.P.Y Agro Industries Limited, Co2 Unit, and Bottling Unit, New Industrial Estate, Sy.No.446 to 449, APIIC, Udumalpuram, Nandyal, Nandyal District

Rc.No.14456/KRNL/DFO/2020 MSB-SR, SDP Dated:0/ -07-2022.

Sir,

Sub: A.P. State Disaster Response and Fire Services Department-MSB Section-Issuance of Renewal of No Objection Certificate to Existing Building of M/s S.P.Y Agro Industries Limited, Co2 Unit, and Bottling Unit, New Industrial Estate, Sy.No.446 to 449, APIIC, Udumalpuram, Nandyal, Nandyal District - Regarding.

Ref: 1. Occupancy NOC issued vide Rc.No: 14456/KRNL/DFO/2020, Dated:18-11-2020 of District Fire Officer, Kurnool District.
2. Application of M/s S.P.Y Agro Industries Limited, Co2 Unit, and Bottling Unit, New Industrial Estate, Sy.No.446 to 449, APIIC, Udumalpuram, Nandyal, Nandyal District

* * * * * * * *

The Management of M/s S.P.Y Agro Industries Limited, Co2 Unit, and Bottling Unit, New Industrial Estate, Sy.No.446 to 449, APIIC, Udumalpuram, Nandyal, Nandyal District has requested to issue Renewal of No Objection Certificate by duly remitting the Renewal Fee towards Fire Precautionary Fee vide reference 2nd cited.

2) The No Objection Certificate for Occupancy Certificate was issued vide reference 1st cited to the existing Application of M/s S.P.Y Agro Industries Limited, Co2 Unit, and Bottling Unit, New Industrial Estate, Sy.No.446 to 449, APIIC, Udumalpuram, Nandyal, Nandyal District with (09) Blocks with total built up area of 25811.75Sq. Mtrs., for Industrial Occupancy(Category-G2).

3) Block Wise Details.

Sl. No	Name of the Block	No of Floors	Height of the Building	Built up Area in Sq.Mtrs	No. of Staircase
1	Admin	Ground+ 02 UF	09.00	587.76	1 No.
2	PCC,DG Room, Transformer Yard, and Husk Shed	Ground Floor	09.00	1580.00	--
3	Grain Shed, Milling, Liquefaction, Fermentation, DCS Building	Ground Floor+02 UF	09.00	6006.09	--
4	RO, Clarifier and Aeration Tank	Ground Floor	09.00	2104.00	--

(Contd..2p)

5	Power Plant	Ground Floor+02 UF	09.00	2936.66	02 Nos.
6	ENA Storage Tank	Ground Floor	09.00	3705.00	--
7	Canteen	Ground Floor	09.00	600.00	--
8	Distillation and Cooling Tower	Ground Floor	09.00	515.25	--
9	CO2	Ground Floor	09.00	1269.99	--
10	Bottling	Ground Floor	09.00	6507.00	--
			Total	**25811.75**	

4) The management has submitted the self-Certification report / Affidavit and stated that the furnished information is correct and to maintained the conventional systems (existing Firefighting systems) are in good working condition along with the following Fire Safety Measures keeping in view of practicality, an extra safety precaution, maintenance and resilience and also, it is noticed at any time that the information provided is false, they understand that Renewal NOC deemed may be cancelled by the concerned authority.

5) In view of the above and taking into consideration of the larger public interest and in the context of the COVID-19 pandemic across the country and also based on the Self-Certification/Affidavit submitted by the management, the Renewal of No Objection Certificate is issued to the Existing Building of M/s S.P.Y Agro Industries Limited, Co2 Unit, and Bottling Unit, New Industrial Estate, Sy.No.446 to 449, APIIC, Udumalpuram, Nandyal, Nandyal District with (09) Blocks with total built up area of 25811.75Sq. Mtrs., for Industrial Occupancy (Category-G2).

6) It is suggested to the Management for providing the following Fire Safety Measures keeping in view of practicality, maintenance and resilience:

Sl. No.	Fire Fighting Equipment	Prescribed	Provided	Deficit
1	Fire Extinguishers	ABC type	121Nos.	Nil
2	Temperature Sensors	Temperature Sensors connected " Hooter " and that can give alerts through Cell phone instead of Sprinklers	Provided	Nil
3	Manual Call Point System	One Number per Floor	70 Nos.	Nil
4	Under Ground Static Water Tank (or) Terrace Water Tank	5,000 Ltrs. (Minimum)	70,00,000 Ltrs	Nil
5	5 HP (Mobile Pump + Petrol Engine on wheels) by connecting at Ground floor sump	Required	5HP-07 Nos. 8HP-3 Nos.	Nil
6	Other Fire Pumps	Required	Electrical Pump 2250 LPM-01 No. Diesel Pump 2250 LPM-01 No. Jockey Pump 180 LPM-01 No.	Nil

(Contd..3p)

7) **Electrical Safety System.**

(i) Miniature Circuit Breakers, MCB's.	:	Yes/Provided
(ii) No Overloading of Power Sockets.	:	Yes, ensured
(iii) 10 years old wiring to be changed specially wherever A/c is there ?	:	Yes, ensured
(iv) LED Lights in Closed Rooms, Corridors, Staircases connected to Inverter (Battery).	:	Yes, Connected
(v) Grounding/Earthing is provided	:	Yes/Provided
(vi) Lightening Conductor is provided	:	Yes/Provided
(vii) The above shall be certified by authorized Electrical Contractor/ Supervisor.	:	Yes/Certified

8) In view of the above and based on the Affidavit submitted by the Management, the Renewal No Objection Certificate is hereby issued to the M/s S.P.Y Agro Industries Limited, Co2 Unit, and Bottling Unit, New Industrial Estate, Sy.No.446 to 449, APIIC, Udumalpuram, Nandyal, Nandyal District

9) Further, the Management has submitted the following documents.

i. Hazard Assessment and Risk analysis report

ii. On site/Off site emergency plan.

iii. Third party safety audit.

10) Further, the Management has to submit the following information in self certification format to the website which will be intimated soon as shown below.

SELF CERTIFICATION (to be uploaded)					
Name and address of the industry / premises:					
S.No	Name of the Chemical	Storage Quantity at Present	No.of Days The quantity received	Nearest Fire Station with Phone No	Last Information given to Fire Services on Date
The above information is true to the best of my Knowledge					
Date			Signature Authority		

(b) **LIST OF HAZARDOUS CHEMICALS EMERGENCY INFORMATION**

Name of the Industry:															
Address:															
S. No	Chemical Name	Nature of chemical/toxic/ poisonous/flammable/explosive/hazardous	In case of Fire: Fire Fighting Media and instructions	Spill Cleanup procedure	Contact with eye/skin	Incompatible with	PPE	Flash point OC	Boiling Point OC	LEL%	UEL %	MSDS CODE	STORAGE Quantity	Geo -- Coordinates	
														Latitude	Longitude

11) Fire Safety Suggestions:

Sl. No.	As Builder	As Occupant	As Security personnel
1.	All the Fire protection arrangements shall be maintained in good working condition at all time.	The Escape/Exit roots shall not be kept Locked/Blocked or Encroached.	All the occupants must be trained the correct method of operation of the Fire Fighting System installed.

(Contd..4p)

2.	Any loss of life or property due to non-functioning of Fire Safety Measures and other Installations shall be the responsibility of the management.	All occupants shall be trained to operate the Fire Safety Equipment during Emergency.	Mock Drills should be conducted once in 03 months for initial two years. Thereafter, once in every 06 months.
3.	Addition/Alteration, if any in the Building may be verified by Building Authority.	Mock Drills should be conducted once in 03 months for initial two years. Thereafter, once in every 06 months.	All Security Personnel shall be trained to operate the Fire Safety Equipment during Emergency.
4.	This Renewal Fire Certificate is only from Fire Safety Point of View.	Raise the alarm If the fire cannot be controlled, Evacuate the area completely at once with nearest Safe Exit.	Attack the Fire using available Fire Equipment only if you feel capable of controlling it. If not, take all steps to isolate the area by closing Doors and Windows.

11) The Management is responsible all risks involved in case of Fire Accident.

12) This Renewal of No Objection Certificate is valid for a period of Five years from the date of issue of this letter to the Management M/s S.P.Y Agro Industries Limited, Co2 Unit, and Bottling Unit, New Industrial Estate, Sy.No.446 to 449, APIIC, Udumalpuram, Nandyal, Nandyal District subject to the compliance of above Fire and Electrical Safety Measures. *The Owner/Occupier/Builder/Management concerned of the Building shall submit Self Declaration/Certification with regard to working condition of above Fire Safety System every year in the prescribed format and submit/upload the photographs of the Mock Drills conducted in the premises.* It is the responsibility of the Builder to maintain the Fire Safety Equipment in good working condition at all times and apply for next Periodical Renewal of No Objection Certificate, duly remitting the User Charges vide G.O.Ms.No.90, Home (Prisons & Fire Services) Department Dated:13-08-2021 & G.O.Ms.No.120, Home (Prisons & Fire Services) Department Dated:25.10.2021, two (02) months before expiry of this Renewal of No Objection Certificate.

Yours Sincerely,

Director General,
State Disaster Response and Fire Services,
Andhra Pradesh, Vijayawada.

Copy to the Director of Industries, 8th floor, APIIC Towers, Mangalagiri-522503

Note: In case of any emergency call to 101 or State Fire Control Room-9100108101.

Government of Andhra Pradesh

A.P. State Disaster Response and Fire Services Department

No Objection Certificate for Occupancy

To
DEPUTY CHIEF INSPECTOR OF FACTORIES,
KURNOOL

File No: 14456/KRNL/DFO/2020
Date: 18/11/2020

Sir/Madam,

Sub: Andhra Pradesh State Disaster Response and Fire Services Department - No Objection Certificate for Occupancy to the existing / newly constructed Multi Storeyed Building **(S P Y AGRO INDUSTRIES LIMITED) sajjala sreedhar reddy, Sy. No. 446/449, Udumalpuram Village, Nandyal.** - Regarding.

Ref: 1. Online Application Dt. 10-11-2020 , sajjala sreedhar reddy, Sy. No. 446/449, Udumalpuram Village, Nandyal.
2. Online Inspection Report submitted by Officers of this Department on 13-11-2020.

It is to inform that sajjala sreedhar reddy applied for No Objection Certificate on 10-11-2020 for Occupancy to the existing / newly constructed Multi Storeyed Building for S P Y AGRO INDUSTRIES LIMITED at Sy. No. 446/449, Udumalpuram Village, Nandyal.. The officers of the department have scrutinized the information, documents and plans submitted by the applicant along with the undertaking provided by the applicant, and have submitted the following report.

ADMIN BLOCK

2. The builder has constructed a Non Multi Storeyed Building with Ground Floor + 2 Upper Floors with a height of 9 Mtrs for Industrial Occupancy (Category - G1) in a total plot area of 72843 sq. meters.

3. The builder has provided open spaces all around the building

Side	Open Space Required as per Provisional	Open Space Proposed by the Builder	Open Space Provided by the Builder	Remarks
North	4.50 Meters	4.50 Meters	10.00 Meters	-Nil-
East	4.50 Meters	4.50 Meters	10.00 Meters	-Nil-
South	4.50 Meters	4.50 Meters	12.00 Meters	-Nil-
West	4.50 Meters	4.50 Meters	8.00 Meters	-Nil-

4. The builder has constructed following means of escape:

Sl	Details of Staircases	Provided Nos / Meters	Deficit
1	Internal Staircases	1 No. - 1.5 Meters	-Nil-
2	External Staircases	0 No. - 0 Meters	-Nil-
Total		1.5 Meters	-Nil-

5. The builder has proposed to provide Occupant Load :

Sl	Floor	Built up area (Sq Mtrs)	Occupancy Type	No of Occupants as declared by the builder	Aggregate width of Staircases Provided(Meters)	Fire Doors	Fire Lift	Deficit
1	GROUND	195.92	Industrial	19	5	2	0	Nil
2	FIRST	195.92	Industrial	15	1.5	2	0	Nil
3	SECOND	195.92	Industrial	10	1.5	2	0	Nil
	Total	587.76		44				

6. The minimum Fire Fighting Installations required as per Table 7 of Part 4 of National Building Code of India 2016 are:

Sl	Fire Safety System	Proposed as per PNOC	Provided
1	Fire Extinguishers	8 Nos.	8 Nos.
2	Hose Reel Systems	3 Nos.	3 Nos.
3	Wet Riser	1 Nos (For Each Floor)	1 Nos (For Each Floor)
4	Yard Hydrants	1 Nos.	1 Nos.
5	Automatic Sprinkler System	0 Nos.	0 Nos.
6	Manually Operated Electric Fire Alarm System	3 Nos.	3 Nos.
7	Automatic Detection & Alarm System	12 Nos.	12 Nos.
8	Underground Tank	7000KL (Common Tank) Ltrs	7000KL (Common Tank) Ltrs
9	Fire Pump	2280 LPM ELE,DIESEL AND180LPM JOCKEY (Common Pump House)	2280 LPM ELE,DIESEL AND180LPM JOCKEY (Common Pump House)
10	Additional Fire Safety measures	0	0

7. The builder has provided the following floorwise Fire Fighting installations as per Table 7 of Part - 4 of NBC of India 2016.

Sl.	Floor	Fire Ext.	Hose Reel	Wet Riser	Yard Hydrants	Sprinklers	MCP	Auto. Det.	Underground Tank	Fire Pump	Addl
1	GROUND	2 /2	1 /1			0 /0	1 /1	4 /4			
2	FIRST	3 /3	1 /1			0 /0	1 /1	4 /4			
3	SECOND	3 /3	1 /1			0 /0	1 /1	4 /4			

Sl.	Floor	Fire Ext.	Hose Reel	Wet Riser	Yard Hydrants	Sprinklers	MCP	Auto. Det.	Underground Tank	Fire Pump	Addl
	Total	8 /8	3 /3	1 Nos (For Each Floor) /1 Nos (For Each Floor)	1 Nos. /1 Nos.	0 /0	3 /3	12 /12	7000KL (Common Tank) Ltrs /7000KL (Common Tank) Ltrs	2280 LPM ELE,DIESEL AND180LPM JOCKEY (Common Pump House) /2280 LPM ELE,DIESEL AND180LPM JOCKEY (Common Pump House)	0 /0

PCC, DG ROOM, TRANSFORMER YARD AND HUSK SHED BLOCK

2. The builder has constructed a Non Multi Storeyed Building with Ground Floor with a height of 9 Mtrs for Mixed (Industrial) Occupancy (Category - G3) in a total plot area of 72843 sq. meters.

3. The builder has provided open spaces all around the building

Side	Open Space Required as per Provisional	Open Space Proposed by the Builder	Open Space Provided by the Builder	Remarks
North	4.50 Meters	4.50 Meters	12.00 Meters	-Nil-
East	4.50 Meters	4.50 Meters	12.00 Meters	-Nil-
South	4.50 Meters	4.50 Meters	10.00 Meters	-Nil-
West	4.50 Meters	4.50 Meters	10.00 Meters	-Nil-

4. The builder has constructed following means of escape:

Sl	Details of Staircases	Provided Nos / Meters	Deficit
2	Internal Staircases	0 No. - 0 Meters	-Nil-
3	External Staircases	0 No. - 0 Meters	-Nil-
	Total	0 Meters	-Nil-

5. The builder has proposed to provide Occupant Load :

Sl	Floor	Built up area (Sq Mtrs)	Occupancy Type	No of Occupants as declared by the builder	Aggregate width of Staircases Provided(Meters)	Fire Doors	Fire Lift	Deficit
1	GROUND	1580	Industrial	35	3	2	0	Nil
	Total	1580		35				

6. The minimum Fire Fighting Installations required as per Table 7 of Part 4 of National Building Code of India 2016 are:

Sl	Fire Safety System	Proposed as per PNOC	Provided
1	Fire Extinguishers	15 Nos.	15 Nos.

Sl	Fire Safety System	Proposed as per PNOC	Provided
2	Hose Reel Systems	2 Nos.	2 Nos.
3	Wet Riser	Nos (For Each Floor)	Nos (For Each Floor)
4	Yard Hydrants	2 Nos.	2 Nos.
5	Automatic Sprinkler System	0 Nos.	0 Nos.
6	Manually Operated Electric Fire Alarm System	2 Nos.	2 Nos.
7	Automatic Detection & Alarm System	8 Nos.	8 Nos.
8	Underground Tank	7000KL (Common Tank) Ltrs	7000KL (Common Tank) Ltrs
9	Fire Pump	2280 LPM ELE,DIESEL AND180LPM JOCKEY (Common Pump House)	2280 LPM ELE,DIESEL AND180LPM JOCKEY (Common Pump House)
10	Additional Fire Safety measures	4 modulars	4 modulars

7. The builder has provided the following floorwise Fire Fighting installations as per Table 7 of Part - 4 of NBC of India 2016.

Sl.	Floor	Fire Ext.	Hose Reel	Wet Riser	Yard Hydrants	Sprinklers	MCP	Auto. Det.	Underground Tank	Fire Pump	Addl
1	GROUND	15 /15	2 /2			0 /0	2 /2	8 /8			
	Total	15 /15	2 /2	-- /--	2 Nos. /2 Nos.	0 /0	2 /2	8 /8	7000KL (Common Tank) Ltrs /7000KL (Common Tank) Ltrs	2280 LPM ELE,DIESEL AND180LPM JOCKEY (Common Pump House) /2280 LPM ELE,DIESEL AND180LPM JOCKEY (Common Pump House)	4 modulars /4 modulars

GRAIN SHED, MILLING, LIQUEFACTION, FERMENTATION, DCS BUILDING BLOCK

2. The builder has constructed a Non Multi Storeyed Building with Ground Floor + 2 Upper Floors with a height of 9 Mtrs for Mixed (Industrial) Occupancy (Category - G3) in a total plot area of 72843 sq. meters.

3. The builder has provided open spaces all around the building

Side	Open Space Required as per Provisional	Open Space Proposed by the Builder	Open Space Provided by the Builder	Remarks
North	4.50 Meters	4.50 Meters	10.00 Meters	-Nil-
East	4.50 Meters	4.50 Meters	10.00 Meters	-Nil-

Side	Open Space Required as per Provisional	Open Space Proposed by the Builder	Open Space Provided by the Builder	Remarks
South	4.50 Meters	4.50 Meters	10.00 Meters	-Nil-
West	4.50 Meters	4.50 Meters	10.00 Meters	-Nil-

4. The builder has constructed following means of escape:

Sl	Details of Staircases	Provided Nos / Meters	Deficit
3	Internal Staircases	1 No. - 1.5 Meters	-Nil-
4	External Staircases	1 No. - 1.5 Meters	-Nil-
Total		3 Meters	-Nil-

5. The builder has proposed to provide Occupant Load :

Sl	Floor	Built up area (Sq Mtrs)	Occupancy Type	No of Occupants as declared by the builder	Aggregate width of Staircases Provided(Meters)	Fire Doors	Fire Lift	Deficit
1	GROUND	5622.09	Industrial	30	3	6	0	Nil
2	FIRST	192	Industrial	10	3	6	0	Nil
3	SECOND	192	Industrial	5	3	6	0	Nil
	Total	6006.09		45				

6. The minimum Fire Fighting Installations required as per Table 7 of Part 4 of National Building Code of India 2016 are:

Sl	Fire Safety System	Proposed as per PNOC	Provided
1	Fire Extinguishers	26 Nos.	26 Nos.
2	Hose Reel Systems	7 Nos.	7 Nos.
3	Wet Riser	1 Nos (For Each Floor)	1 Nos (For Each Floor)
4	Yard Hydrants	10 Nos.	10 Nos.
5	Automatic Sprinkler System	0 Nos.	0 Nos.
6	Manually Operated Electric Fire Alarm System	8 Nos.	8 Nos.
7	Automatic Detection & Alarm System	30 Nos.	30 Nos.
8	Underground Tank	7000KL (Common Tank) Ltrs	7000KL (Common Tank) Ltrs
9	Fire Pump	2280 LPM ELE,DIESEL AND180LPM JOCKEY (Common Pump House)	2280 LPM ELE,DIESEL AND180LPM JOCKEY (Common Pump House)
10	Additional Fire Safety measures	10 modulars	10modulars

7. The builder has provided the following floorwise Fire Fighting installations as per Table 7 of Part - 4 of NBC of India 2016.

Sl.	Floor	Fire Ext.	Hose Reel	Wet Riser	Yard Hydrants	Sprinklers	MCP	Auto. Det.	Underground Tank	Fire Pump	Addl
1	GROUND	22 /22	5 /5			0 /0	6 /6	14 /14			
2	FIRST	2 /2	1 /1			0 /0	1 /1	8 /8			
3	SECOND	2 /2	1 /1			0 /0	1 /1	8 /8			
	Total	26 /26	7 /7	1 Nos (For Each Floor) /1 Nos (For Each Floor)	10 Nos. /10 Nos.	0 /0	8 /8	30 /30	7000KL (Common Tank) Ltrs /7000KL (Common Tank) Ltrs	2280 LPM ELE,DIESEL AND180LPM JOCKEY (Common Pump House) /2280 LPM ELE,DIESEL AND180LPM JOCKEY (Common Pump House)	10 modulars /10modulars

RO, CLARIFIER AND AERATION TANK BLOCK

2. The builder has constructed a Non Multi Storeyed Building with Ground Floor with a height of 9 Mtrs for Mixed (Industrial) Occupancy (Category - G1) in a total plot area of 72843 sq. meters.

3. The builder has provided open spaces all around the building

Side	Open Space Required as per Provisional	Open Space Proposed by the Builder	Open Space Provided by the Builder	Remarks
North	4.50 Meters	4.50 Meters	10.00 Meters	-Nil-
East	4.50 Meters	4.50 Meters	10.00 Meters	-Nil-
South	4.50 Meters	4.50 Meters	8.00 Meters	-Nil-
West	4.50 Meters	4.50 Meters	10.00 Meters	-Nil-

4. The builder has constructed following means of escape:

Sl	Details of Staircases	Provided Nos / Meters	Deficit
4	Internal Staircases	0 No. - 0 Meters	-Nil-
5	External Staircases	0 No. - 0 Meters	-Nil-
	Total	0 Meters	-Nil-

5. The builder has proposed to provide Occupant Load :

Sl	Floor	Built up area (Sq Mtrs)	Occupancy Type	No of Occupants as declared by the builder	Aggregate width of Staircases Provided(Meters)	Fire Doors	Fire Lift	Deficit

Sl	Floor	Built up area (Sq Mtrs)	Occupancy Type	No of Occupants as declared by the builder	Aggregate width of Staircases Provided(Meters)	Fire Doors	Fire Lift	Deficit
1	GROUND	2104	Industrial	30	5	3	0	Nil
	Total	2104		30				

6. The minimum Fire Fighting Installations required as per Table 7 of Part 4 of National Building Code of India 2016 are:

Sl	Fire Safety System	Proposed as per PNOC	Provided
1	Fire Extinguishers	4 Nos.	4 Nos.
2	Hose Reel Systems	1 Nos.	1 Nos.
3	Wet Riser	Nos (For Each Floor)	Nos (For Each Floor)
4	Yard Hydrants	0 Nos.	0 Nos.
5	Automatic Sprinkler System	0 Nos.	0 Nos.
6	Manually Operated Electric Fire Alarm System	0 Nos.	0 Nos.
7	Automatic Detection & Alarm System	0 Nos.	0 Nos.
8	Underground Tank	7000KL(Common Tank) Ltrs	7000KL (Common Tank) Ltrs
9	Fire Pump	2280 LPM ELE,DIESEL AND180LPM JOCKEY (Common Pump House)	2280 LPM ELE,DIESEL AND180LPM JOCKEY (Common Pump House)

7. The builder has provided the following floorwise Fire Fighting installations as per Table 7 of Part - 4 of NBC of India 2016.

Sl.	Floor	Fire Ext.	Hose Reel	Wet Riser	Yard Hydrants	Sprinklers	MCP	Auto. Det.	Underground Tank	Fire Pump
1	GROUND	4 /4	1 /1			0 /0	0 /0	0 /0		
	Total	4 /4	1 /1	-- /--	0 Nos. /0 Nos.	0 /0	0 /0	0 /0	7000KL(Common Tank) Ltrs /7000KL (Common Tank) Ltrs	2280 LPM ELE,DIESEL AND180LPM JOCKEY (Common Pump House) /2280 LPM ELE,DIESEL AND180LPM JOCKEY (Common Pump House)

POWER PLANT BLOCK

2. The builder has constructed a Non Multi Storeyed Building with Ground Floor + 2 Upper Floors with a height of 9 Mtrs for Mixed (Industrial) Occupancy (Category - G3) in a total plot area of 72843 sq. meters.

3. The builder has provided open spaces all around the building

Side	Open Space Required as per Provisional	Open Space Proposed by the Builder	Open Space Provided by the Builder	Remarks
North	4.50 Meters	4.50 Meters	8.00 Meters	-Nil-
East	4.50 Meters	4.50 Meters	8.00 Meters	-Nil-
South	4.50 Meters	4.50 Meters	10.00 Meters	-Nil-
West	4.50 Meters	4.50 Meters	10.00 Meters	-Nil-

4. The builder has constructed following means of escape:

Sl	Details of Staircases	Provided Nos / Meters	Deficit
5	Internal Staircases	1 No. - 1.5 Meters	-Nil-
6	External Staircases	1 No. - 1.5 Meters	-Nil-
Total		3 Meters	-Nil-

5. The builder has proposed to provide Occupant Load :

Sl	Floor	Built up area (Sq Mtrs)	Occupancy Type	No of Occupants as declared by the builder	Aggregate width of Staircases Provided(Meters)	Fire Doors	Fire Lift	Deficit
1	GROUND	2359.86	Industrial	90	10	3	0	Nil
2	FIRST	288.4	Industrial	10	3	3	0	Nil
3	SECOND	288.4	Industrial	8	1.5	3	0	Nil
	Total	2936.66		108				

6. The minimum Fire Fighting Installations required as per Table 7 of Part 4 of National Building Code of India 2016 are:

Sl	Fire Safety System	Proposed as per PNOC	Provided
1	Fire Extinguishers	20 Nos.	20 Nos.
2	Hose Reel Systems	4 Nos.	4 Nos.
3	Wet Riser	1 Nos (For Each Floor)	1 Nos (For Each Floor)
4	Yard Hydrants	6 Nos.	6 Nos.
5	Automatic Sprinkler System	0 Nos.	0 Nos.
6	Manually Operated Electric Fire Alarm System	5 Nos.	5 Nos.
7	Automatic Detection & Alarm System	25 Nos.	25 Nos.
8	Underground Tank	7000KL (Common Tank Ltrs	7000KL (Common Tank) Ltrs

Sl	Fire Safety System	Proposed as per PNOC	Provided
9	Fire Pump	2280 LPM ELE,DIESEL AND180LPM JOCKEY (Common Pump House)	2280 LPM ELE,DIESEL AND180LPM JOCKEY (Common Pump House)
10	Additional Fire Safety measures	15 modulars,2 monitors	15 modulars,2 monitors

7. The builder has provided the following floorwise Fire Fighting installations as per Table 7 of Part - 4 of NBC of India 2016.

Sl.	Floor	Fire Ext.	Hose Reel	Wet Riser	Yard Hydrants	Sprinklers	MCP	Auto. Det.	Underground Tank	Fire Pump	Addl
1	GROUND	14 /14	3 /3			0 /0	3 /3	9 /9			
2	FIRST	3 /3	1 /1			0 /0	1 /1	8 /8			
3	SECOND	3 /3	0 /0			0 /0	1 /1	8 /8			
	Total	20 /20	4 /4	1 Nos (For Each Floor) /1 Nos (For Each Floor)	6 Nos. /6 Nos.	0 /0	5 /5	25 /25	7000KL (Common Tank Ltrs /7000KL (Common Tank) Ltrs	2280 LPM ELE,DIESEL AND180LPM JOCKEY (Common Pump House) /2280 LPM ELE,DIESEL AND180LPM JOCKEY (Common Pump House)	15 modulars,2 monitors /15 modulars,2 monitors

ENA STORAGE TANK BLOCK

2. The builder has constructed a Non Multi Storeyed Building with Ground Floor with a height of 9 Mtrs for Industrial Occupancy (Category - G3) in a total plot area of 72843 sq. meters.

3. The builder has provided open spaces all around the building

Side	Open Space Required as per Provisional	Open Space Proposed by the Builder	Open Space Provided by the Builder	Remarks
North	4.50 Meters	4.50 Meters	10.00 Meters	-Nil-
East	4.50 Meters	4.50 Meters	10.00 Meters	-Nil-
South	4.50 Meters	4.50 Meters	10.00 Meters	-Nil-
West	4.50 Meters	4.50 Meters	10.00 Meters	-Nil-

4. The builder has constructed following means of escape:

Sl	Details of Staircases	Provided Nos / Meters	Deficit

Sl	Details of Staircases	Provided Nos / Meters	Deficit
6	Internal Staircases	0 No. - 0 Meters	-Nil-
7	External Staircases	0 No. - 0 Meters	-Nil-
	Total	0 Meters	-Nil-

5. The builder has proposed to provide Occupant Load :

Sl	Floor	Built up area (Sq Mtrs)	Occupancy Type	No of Occupants as declared by the builder	Aggregate width of Staircases Provided(Meters)	Fire Doors	Fire Lift	Deficit
1	GROUND	3705	Industrial	20	3	4	0	Nil
	Total	3705		20				

6. The minimum Fire Fighting Installations required as per Table 7 of Part 4 of National Building Code of India 2016 are:

Sl	Fire Safety System	Proposed as per PNOC	Provided
1	Fire Extinguishers	15 Nos.	15 Nos.
2	Wet Riser	1 Nos (For Each Floor)	1 Nos (For Each Floor)
3	Yard Hydrants	4 Nos.	4 Nos.
4	Automatic Sprinkler System	150 Nos.	150 Nos.
5	Manually Operated Electric Fire Alarm System	1 Nos.	1 Nos.
6	Automatic Detection & Alarm System	0 Nos.	0 Nos.
7	Underground Tank	7000KL (Common Tank) Ltrs	7000KL(Common Tank) Ltrs
8	Fire Pump	2280 LPM ELE,DIESEL AND180LPM JOCKEY (Common Pump House)	2280 LPM ELE,DIESEL AND180LPM JOCKEY (Common Pump House)
9	Additional Fire Safety measures	4 Monitors	4 Monitors

7. The builder has provided the following floorwise Fire Fighting installations as per Table 7 of Part - 4 of NBC of India 2016.

Sl.	Floor	Fire Ext.	Wet Riser	Yard Hydrants	Sprinklers	MCP	Auto. Det.	Underground Tank	Fire Pump	Addl
1	GROUND	15 /15			150 /150	1 /1	0 /0			

Sl.	Floor	Fire Ext.	Wet Riser	Yard Hydrants	Sprinklers	MCP	Auto. Det.	Underground Tank	Fire Pump	Addl
	Total	15 /15	1 Nos (For Each Floor) /1 Nos (For Each Floor)	4 Nos. /4 Nos.	150 /150	1 /1	0 /0	7000KL (Common Tank) Ltrs /7000KL(Common Tank) Ltrs	2280 LPM ELE,DIESEL AND180LPM JOCKEY (Common Pump House) /2280 LPM ELE,DIESEL AND180LPM JOCKEY (Common Pump House)	4 Monitors /4 Monitors

CANTEEN BLOCK

2. The builder has constructed a Non Multi Storeyed Building with Ground Floor with a height of 9 Mtrs for Industrial Occupancy (Category - G1) in a total plot area of 72843 sq. meters.

3. The builder has provided open spaces all around the building

Side	Open Space Required as per Provisional	Open Space Proposed by the Builder	Open Space Provided by the Builder	Remarks
North	4.50 Meters	4.50 Meters	10.00 Meters	-Nil-
East	4.50 Meters	4.50 Meters	10.00 Meters	-Nil-
South	4.50 Meters	4.50 Meters	10.00 Meters	-Nil-
West	4.50 Meters	4.50 Meters	10.00 Meters	-Nil-

4. The builder has constructed following means of escape:

Sl	Details of Staircases	Provided Nos / Meters	Deficit
7	Internal Staircases	0 No. - 0 Meters	-Nil-
8	External Staircases	0 No. - 0 Meters	-Nil-
	Total	0 Meters	-Nil-

5. The builder has proposed to provide Occupant Load :

Sl	Floor	Built up area (Sq Mtrs)	Occupancy Type	No of Occupants as declared by the builder	Aggregate width of Staircases Provided(Meters)	Fire Doors	Fire Lift	Deficit
1	GROUND	600	Industrial	30	3	2	0	Nil
	Total	600		30				

6. The minimum Fire Fighting Installations required as per Table 7 of Part 4 of National Building Code of India 2016 are:

Sl	Fire Safety System	Proposed as per PNOC	Provided
1	Fire Extinguishers	4 Nos.	4 Nos.
2	Hose Reel Systems	1 Nos.	1 Nos.

Sl	Fire Safety System	Proposed as per PNOC	Provided
3	Wet Riser	Nos (For Each Floor)	Nos (For Each Floor)
4	Yard Hydrants	1 Nos.	1 Nos.
5	Automatic Sprinkler System	0 Nos.	0 Nos.
6	Manually Operated Electric Fire Alarm System	2 Nos.	2 Nos.
7	Automatic Detection & Alarm System	2 Nos.	2 Nos.
8	Underground Tank	7000KL (Common Tank) Ltrs	7000KL (Common Tank) Ltrs
9	Fire Pump	2280 LPM ELE,DIESEL AND180LPM JOCKEY (Common Pump House)	2280 LPM ELE,DIESEL AND180LPM JOCKEY (Common Pump House)

7. The builder has provided the following floorwise Fire Fighting installations as per Table 7 of Part - 4 of NBC of India 2016.

Sl.	Floor	Fire Ext.	Hose Reel	Wet Riser	Yard Hydrants	Sprinklers	MCP	Auto. Det.	Underground Tank	Fire Pump
1	GROUND	4 /4	1 /1			0 /0	2 /2	2 /2		
	Total	4 /4	1 /1	-- /--	1 Nos. /1 Nos.	0 /0	2 /2	2 /2	7000KL (Common Tank) Ltrs /7000KL (Common Tank) Ltrs	2280 LPM ELE,DIESEL AND180LPM JOCKEY (Common Pump House) /2280 LPM ELE,DIESEL AND180LPM JOCKEY (Common Pump House)

DISTILLATION AND COOLING TOWER BLOCK

2. The builder has constructed a Non Multi Storeyed Building with Ground Floor with a height of 9 Mtrs for Industrial Occupancy (Category - G3) in a total plot area of 72843 sq. meters.

3. The builder has provided open spaces all around the building

Side	Open Space Required as per Provisional	Open Space Proposed by the Builder	Open Space Provided by the Builder	Remarks
North	4.50 Meters	4.50 Meters	10.00 Meters	-Nil-
East	4.50 Meters	4.50 Meters	10.00 Meters	-Nil-
South	4.50 Meters	4.50 Meters	10.00 Meters	-Nil-
West	4.50 Meters	4.50 Meters	10.00 Meters	-Nil-

4. The builder has constructed following means of escape:

Sl	Details of Staircases	Provided Nos / Meters	Deficit
8	Internal Staircases	0 No. - 0 Meters	-Nil-
9	External Staircases	0 No. - 0 Meters	-Nil-

Sl	Details of Staircases	Provided Nos / Meters	Deficit
Total		0 Meters	-Nil-

5. The builder has proposed to provide Occupant Load :

Sl	Floor	Built up area (Sq Mtrs)	Occupancy Type	No of Occupants as declared by the builder	Aggregate width of Staircases Provided(Meters)	Fire Doors	Fire Lift	Deficit
1	GROUND	515.25	Industrial	30	3	2	0	Nil
	Total	515.25		30				

6. The minimum Fire Fighting Installations required as per Table 7 of Part 4 of National Building Code of India 2016 are:

Sl	Fire Safety System	Proposed as per PNOC	Provided
1	Fire Extinguishers	15 Nos.	15 Nos.
2	Hose Reel Systems	0 Nos.	0 Nos.
3	Wet Riser	1 Nos (For Each Floor)	1 Nos (For Each Floor)
4	Yard Hydrants	5 Nos.	5 Nos.
5	Automatic Sprinkler System	100 Nos.	100 Nos.
6	Manually Operated Electric Fire Alarm System	0 Nos.	0 Nos.
7	Automatic Detection & Alarm System	0 Nos.	0 Nos.
8	Underground Tank	7000KL (Common Tank) Ltrs	7000KL (Common Tank) Ltrs
9	Fire Pump	2280 LPM ELE,DIESEL AND180LPM JOCKEY (Common Pump House)	2280 LPM ELE,DIESEL AND180LPM JOCKEY (Common Pump House)
10	Additional Fire Safety measures	2 Monitors	2moniitors

7. The builder has provided the following floorwise Fire Fighting installations as per Table 7 of Part - 4 of NBC of India 2016.

Sl.	Floor	Fire Ext.	Hose Reel	Wet Riser	Yard Hydrants	Sprinklers	MCP	Auto. Det.	Underground Tank	Fire Pump	Addl
1	GROUND	15 /15	0 /0			100 /100	0 /0	0 /0			

Sl.	Floor	Fire Ext.	Hose Reel	Wet Riser	Yard Hydrants	Sprinklers	MCP	Auto. Det.	Underground Tank	Fire Pump	Addl
	Total	15 /15	0 /0	1 Nos (For Each Floor) /1 Nos (For Each Floor)	5 Nos. /5 Nos.	100 /100	0 /0	0 /0	7000KL (Common Tank) Ltrs /7000KL (Common Tank) Ltrs	2280 LPM ELE,DIESEL AND180LPM JOCKEY (Common Pump House) /2280 LPM ELE,DIESEL AND180LPM JOCKEY (Common Pump House)	2 Monitors /2moniitors

8. The Officers of the department have recommended to issue The No Objection Certificate for Occupancy of Non MSB Industrial Building (G1) belonging to **sajjala sreedhar reddy Sy. No. 446/449, Udumalpuram Village, Nandyal.**, subject to the following conditions.

Occupancy NOC Conditions :

Sl.	Condition	Complied by the Applicant / Not
1	The permission accorded doesn't confer any ownership rights. If it is found that the information furnished is false and fabricated, the permission will be revoked at any stage and the applicant will be liable for criminal prosecution as per IPC.	Yes
2	This permission is given based on the information, documents and drawings provided by the applicant. The applicant confirms that the information provided and the documents and drawings submitted electronically are correct. The final approvals of proceedings are subjected to verification of documents by concerned official including site visit. Any deviation noticed will lead to cancellation of NOC.	Yes
3	Prior approval should be obtained separately for any change of nature of occupancy or change of number of floors or area.	Yes
4	Structural safety shall be the responsibility of the Owner / Builder / Developer / Architect or Engineer.	Yes
5	Provide one entry and one exit to the premises with minimum width of 4.5 mts and height clearance of 5.0 mtrs.	Yes
6	Provide diesel generator of required capacity as alternate source of electric supply.	Yes
7	Provide emergency lighting in corridors, common passages and staircases.	Yes
8	The occupant load and occupants per unit exit width and minimum travel distance for occupancy shall be as per clause 4.3 (Table 3), clauses 4.4.2.1, Table 4 Capacity factors, Clauses 4.4.2.1,4.4.2.3(c), 4.4.2.4.2(a) and Table 5 Clauses 4.4.2.1, 4.4.2.2, of part 4-NBC 2016	Yes

Sl.	Condition	Complied by the Applicant / Not
9	The building shall be suitably compartmented so that fire/smoke remain confined to the area where fire incident has occurred and does not spread to the remaining parts of the building as per clause 4.5 Part 4 of National Building Code of India 2016.	Yes
10	Openings in any separating walls in any floor shall be limited to 5.6 meters in area with maximum height of 2.75 meters. Every wall opening shall be protected with Fire resisting doors having fire rating of not less than 2 hrs. All openings in the floors shall be protected by vertical enclosures extending above and below such openings, the wall of such enclosures having a fire resistance of not less than 2 hrs and all openings there in being protected with a fire resisting assembly Strictly Complying with IS:3614 Part-I 1966 and Clause 3.4.5 of NBC 2016, Part 4. Fire doors should be provided in each floor.	Yes
11	Illumination of means of Exit in Staircases and Corridors shall be provided with DG Set Electrical Power as per Clause 3.4.7 of Part 4 of NBC of India 2016.	Yes
12	Smoke Venting facilities for safe use of exits shall be provided as per clause 3.4.8, 4.4.2.5 & 4.6 Part -IV of NBC 2016. Emergency Power Supply shall be provided for smoke venting equipment with DG Supply.	Yes
13	All Fire Safety Systems shall be provided as per the provisions of Part -4 of NBC of India 2016	Yes
14	Levelled hard open spaces as mentioned in the Provisional NOC including 7 meters drive way all around the building for operation of fire vehicles shall be provided.	Yes
15	Fire doors with 2 hrs Fire Resistance shall be provided at appropriate places along the escape route and particularly at the entrance to the lift lobby, corridors and staircases.	Yes
16	Ventilation of Staircases shall comply with Clause 4.4.2.5, 4.6 of Part 4 of NBC 2016.	Yes
17	No Hazardous materials such as Petroleum products, explosives, chemicals etc should be stored on any floor of the building.	Yes
18	ANNEX-D, part-IV, NBC-2016, D-3 DRILLS : D-3.1 Fire drills shall be conducted, in accordance with the fire safety plan, at least once every three months for building during the first two years. thereafter, fire drills shall be conducted at least once every six months. D-3.2 All occupants of the building shall participate in the fire drill. However, occupants of the building, other than building service employees are not required to leave the floor or use the exits during the drill. D-3.3 A written record of such drill shall be kept on the premises for a three years period and shall be readily available for fire brigade inspection.	Yes
19	ANNEX-D, part-IV, NBC-2016, D-4 SIGNS AND PLANS D-4.1 Signs at lift Landings A sign shall be posted and maintained in a conspicuous place on every floor at or near lift landing in accordance with the requirements, indicating that in case of fire, occupants shall use the unless instructed otherwise. The sigh shall contain a diagram showing the location of the stairways except that such diagram may be omitted, provide signs containing such diagram are posted in conspicuous places on the respective floor.	Yes

Sl.	Condition	Complied by the Applicant / Not
20	ANNEX-D, part-IV, NBC-2016, D-5 FIRE SAFETY PLAN D-5.1 A Format for the fire safety plan shall be as given in D-9.10. D-5.2 The applicable parts of the approved fire safety plan shall be distributed to all tenants of the building by the building management when the fire safety plan has been approved by the fire Authority. D-5.3 The applicable parts of the approved fire safety plan shall the be distributed by the tenants to all their employees and by the building management to all their building employees. D-5.4 In the event there are changes from conditions existing at the time the fire safety plan for the building was approved. and the changes are such so as to require amending the fire safety plan. within 30 days after such changes an amended fire safety plan shall be submitted to the fire brigade for approval.	Yes
21	ANNEX-D, part-IV, NBC-2016, D-6 FIRE COMMANDS CENTRE A Fire Command Center shall be established in the building.	Yes

The No Objection Certificate for Occupancy is issued subject to the following conditions:

1. All fire safety systems provided shall be maintained in trim working condition at all times.
2. All Security/ Maintenance personnel shall be trained on the usage of fire equipment provided.
3. Fire Drills shall be conducted once in every 3 months.
4. As per report of Non MSB Inspection committee; the NOC Committee has scrutinized the Inspection Committee Report along with Proposals and recommended for issuance of No Objection Certificate for Occupancy subject to the following Conditions.

Sl	As Builder	As Occupant	As Security Personnel
1	All the fire protection arrangements shall be maintained in good condition as seen during inspection.	All the escape/exit routes shall not be kept locked/blocked or encroached	All the occupants must know the correct method of operation of the fire fighting system installed.
2	Any loss of life or property due to non-functioning of fire safety measures and other installations shall be the responsibilty of the management.	All occupants shall be trained to operate the fire safety equipments during emergency.	Mock drills should be conducted once in 3 months for initial two years. Thereafter, once in every 6 months.
3	Addition / alteration, if any in the building may be verified by building authority.	Mock drills should be conducted once in 3 months for initial two years. Thereafter, once in every 6 months.	All security personnel shall be trained to operate the fire safety equipments during emergency.
4	This No objection Certificate for occupancy is valid for one year from the date of issue of this letter	Raise the alarm if the fire cannot be controlled; Evacuate the area completely at once from nearest safe exit.	Attack the fire using available fire equipment only if you feel capable of controlling. If not, take all steps to isolate the area by closing doors and windows.

5. **This No Objection Certificate for Occupancy is valid for a period of one year only from the date of issue of this letter. It is the responsibility of the builder to apply for Renewal of No Objection Certificate for Occupancy, duly remitting the User Charges as per G.O.Ms.No.71, Home**

(Prison-A) Department, dated 01-04-2010 and G.O.Ms.No.140, Home (Prison & Fire) Department, dated.04-09-2015, before expiry of this No Objection Certificate.

9. The following deficiencies are identified by the officers of the department and need to be attended to by the management.

The Inspection Committee stated that the Management provided life and fire safety measures as per Table-3, 4, 7, Part-IV of NBC-2016 and tested fire fighting systems randomly and found working condition satisfactory. The sprinkler system around ENA Storage Tanks are yet to be provided by the management. The management has given Affidavit stating that the sprinkler system will be providing within 06 months as mandatory permissions required from the Excise Department to drain out EN alcohol completely from the tanks to carry out hot work. Therefore, the No Objection Certificate is issued based on the inspection committee recommendation with a condition to provide sprinkler system around ENA Tanks within 06 six months by the management lest the NOC will be automatically cancelled after six months.
1). This Occupancy NOC is issued form Fire Safety Point of view only basing on recommendation of the inspection Committee and this Occupancy NOC is not for claiming proprietary or ownership rights. Further, in case of any deviation noticed with respect to this Occupancy NOC after issuance of this Occupancy NOC, the same Occupancy NOC shall be liable for cancellation at any time.
2). The Management has to maintain Fire Safety Measures and other installations in good working condition at all times and the Responsibility of Fire Fighting equipment maintenance lies with the management as seen & tested by the committee at the time of inspection.

In view of the above, as per the recommendations of the NOC Committee, the No Objection Certificate for Occupancy is hereby issued to the Newly constructed Non Multi Storeyed Building subject to the above conditions.

14456/KRNL/DFO/2020

Your Sincerely,

District Fire Officer
Andhra Pradesh, Kurnool

Copy to sajjala sreedhar reddy, SPY Agro Industries Limited, NEW INDUSTRIAL ESTATE,Sy,No. 446 To 449,APIIC,UDUMALPUR,NANDYAL,KURNOOL
Copy to Assistant District Fire Officer concerned
Copy to Station Fire Officer concerned

TABLE OF CONTENTS

1. EXECUTIVE SUMMARY

M/s. S.P.Y. Agro Industries Limited had approached **M/s. Lumen Engineering Assocaites** to conduct Quantitative Risk Assessment study for their 500KL/Day ENA manufacturing and storage unit at Udumalpuram (V), Nandyal (M), Nandyal District, Andhra Pradesh-518502, INDIA.

S.P.Y Agro Industries Limited is modern grain based distillery unit located at Udumalpuram village near Nandyal. The site is 3 KM away from Nandyal on NH 18. The Plant is in area of 18 acres in APIIC Industrial town surrounded by Industries and by Lush green Paddy Fields. Plant operates continuously and the operations technology is capable to produce superior grade of Extra Neutral Alcohol (Grain Neutral Sprit) consistently. The management with the view of various expansions and new technologies being brought into the fold with setup a R & D center with senior and also young researchers with relevant qualification to study the various aspects of engineering and technology. This will help them in finding the solutions for various problems and do the troubleshooting in a better way. Most of the contract workmen are local people and it is their first choice to work in S.P.Y Agro. Management is supplying free of cost food to all the company employees, contract workmen, truck drivers and visitors. Daily about 500 people take food in the company; this initiative is very highly commendable and good gesture from the Management.

Approach

The report addresses quantitatively the risk posed by the ENA manufacturing and storage facility at the site along with other general hazards and their risks associated. Based on the quantities & nature of materials handled, plant layout and other relevant information, the potential scenarios which can cause significant consequence like thermal radiation was identified.

Quantitative Approach

A QRA is a formal and systematic approach to estimating the likelihood and consequences of hazardous events, and expressing the results quantitatively as risk to people, the environment or your business.

2. INTRODUCTION

2.1 INTRODUCTION ABOUT THE REPORT

The report addresses quantitatively the risk posed by the facilities at site. Based on the quantities & nature of materials handled, plant layout and other relevant information, the potential scenarios which can cause significant consequence like thermal radiation was identified.

The purpose of the study includes the following:

- To identify and assess hazards and risks of the ENA storage and other chemicals handling and also the pipelines carrying these chemicals to the plant. Which require management to comply with regulatory requirements, company policy and business requirements.

2.2 SCOPE OF THE STUDY

The scope of the QRA is given below:

- ❖ Identification of Hazards and credible accidental events
- ❖ Assessment of risk arising from the hazards and consideration of its tolerability to personnel, facility and the environment which includes the following:

a) Calculation of physical effects of accidental scenarios, which includes consequence analysis for the identified hazards covering impact on people and potential escalation.

b) Damage limits identification and quantification of the risks

c) Risk reduction measures to prevent incidents and to control accidents.

The Indian Standard IS-15656: 2006 Code of practice – Quantitative Risk Assessment has been adopted for this study.

2.3 ABOUT THE CONSULTANTS

Lumen Engineering Associates offers specialized safety consultancy services and innovative risk assessment and risk management solutions to clients all around India.

The team members have wide experience in risk assessment and risk management studies and have carried out studies for a number of industrial sectors including grain based distilleries located in India.

The following are the members of the team involved in conducting and preparation of the Quantitative Risk Assessment report during **26-08-2024.**

1. Mr. D.A. Narasimha Raju (Chartered Engineer & EHS Expert-Lumen Engineering associates)
2. Mr. K. Suribabu (Chemical Engineer & EHS expert-Lumen Engineering Associates)
3. Mr. D. Raghunath Varma (Mechanical Engineer-Lumen Engineering associates)

2.4 METHODOLOGY ADOPTED

Methodology to conduct the QRA study:

1. Risk Identification

Objective: Identify potential risks, hazards, or events that can negatively impact a project or system.

2. Data Collection

Objective: Gather relevant data to quantify risks. This includes historical data, expert opinions, and industry benchmarks.

Data Types:

Frequency data: How often an event may occur.

Consequence data: The severity of the outcome if the event happens.

Detailed data request for quantitative risk assessment study was submitted to the client. Based on the data given by the client, potential scenarios are identified.

3. Risk Assessment (Quantification)

Objective: Use software based models to estimate risk levels.

Risk Assessment calculations are based on the data given by the client and this study is carried out at **Lumen Engineering Associates** office using a risk management software.

4. Risk Mitigation Methods

Objective: Develop strategies to reduce identified risks to acceptable levels.

2.5 ACKNOWLEDGMENTS

Lumen Engineering Associates gratefully acknowledges the co-operation received from the management and all the HOD's of various sections of S.P.Y. Agro Industries Limited-Nandyal during the study.

3. ABOUT THE PLANT

1.	Name of the Organization	M/s. S.P.Y. Agro Industries Limited
2.	Address	Udumalpuram (V), Nandyal (M), Nandyal District, Andhra Pradesh-518502, INDIA.
3.	Phone Number	+91
4.	Name of the Occupier	Mr.
5.	Address of the Occupier	
6.	Name of the Plant Manager	
7.	★ Railway Station ★ Police Station ★ Nearest Fire Station ★ Nearest Hospital	
8.	Manufacturing Process	ENA Manufacturing and Storage
9.	The Plant Area is surrounded by other major industries like:	East : West : North : South:

LOCATION OF THE PLANT:

M/s. S.P.Y. Agro Industries Limitedis located at Udumalpuram Village, Nandyal Mandal, Nandyal District-518502, Andhra Pradesh, INDIA is about 3KM from Nandyal district. The plant is situated at 15^0 degrees North Latitude and 78^0 degrees East Longitude with an Altitude of 221 meters above sea level. The factory's built-up area spans 18 acres, encompassing manufacturing operations, offices, and utility buildings.

PLANT PERSONNEL:

Number of persons working in the site as category wise:

Staff	Contract Workers	Total Employees (Staff + Contract Workers)

Plant working Hours/ Shifts:

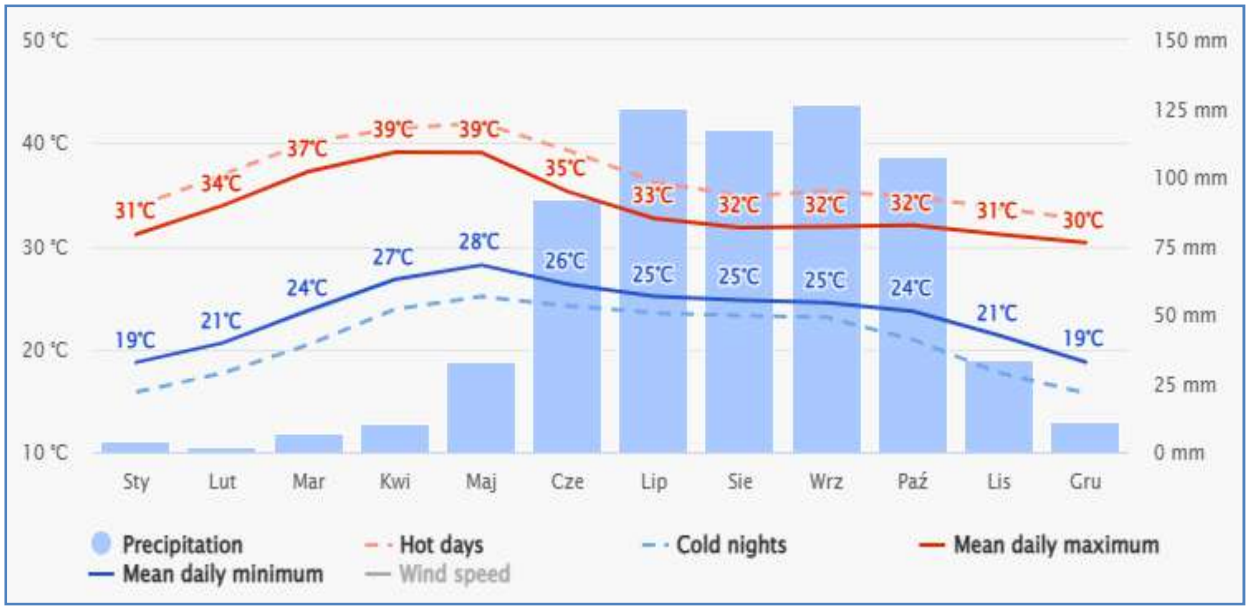
Sl. No	Shift	Working Hours
1	A-Shift	06.00 Hrs to 14.00 Hrs
2	B-Shift	14.00 Hrs to 22.00 Hrs
3	C-Shift	22.00 Hrs to 06.00 Hrs
4	General-Shift	09.00 Hrs to 18.00 Hrs

PLANT FACILITIES:

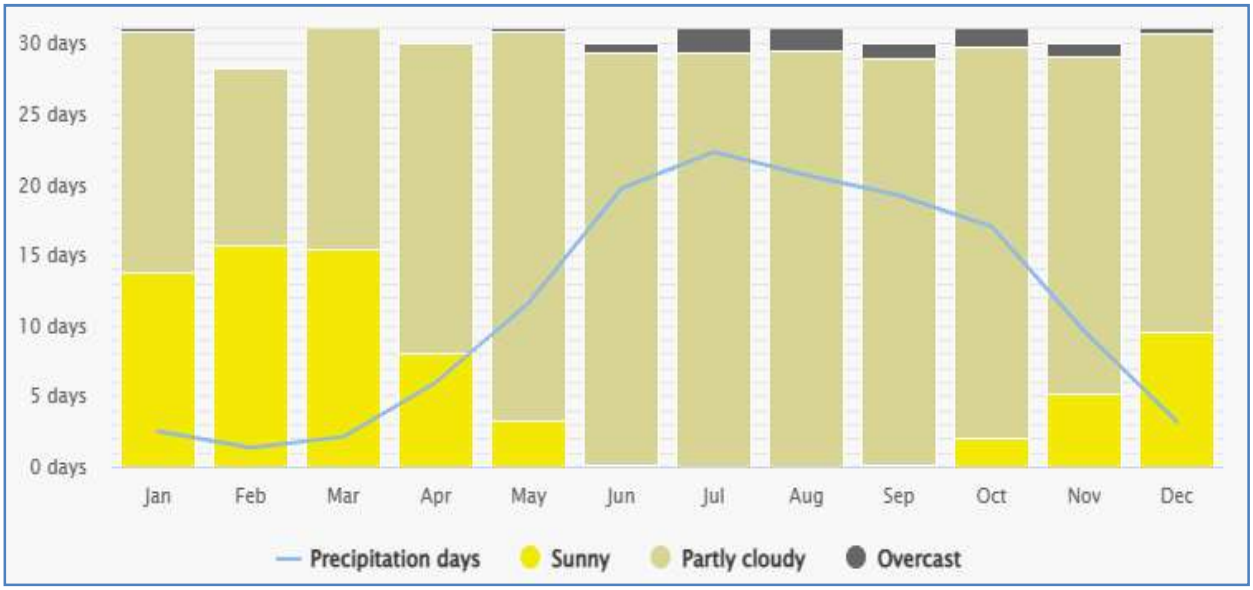
The Plant has the following facilities:

- Grain Godown
- Grain Silo
- Milling Section
- Liquefaction & Saccharification Section
- Fermentation Section
- Distillation
- Decanter
- Drying Section
- Stores
- Effluent Treatment Plant
- Main Panel Room
- Transformer yard
- Coal Storage Shed
- Husk Storage Shed
- Capitive Power Plant
- Boiler
- Fire Pump House
- QC Laboratory
- First Aid Center
- HR & Admin
- Security

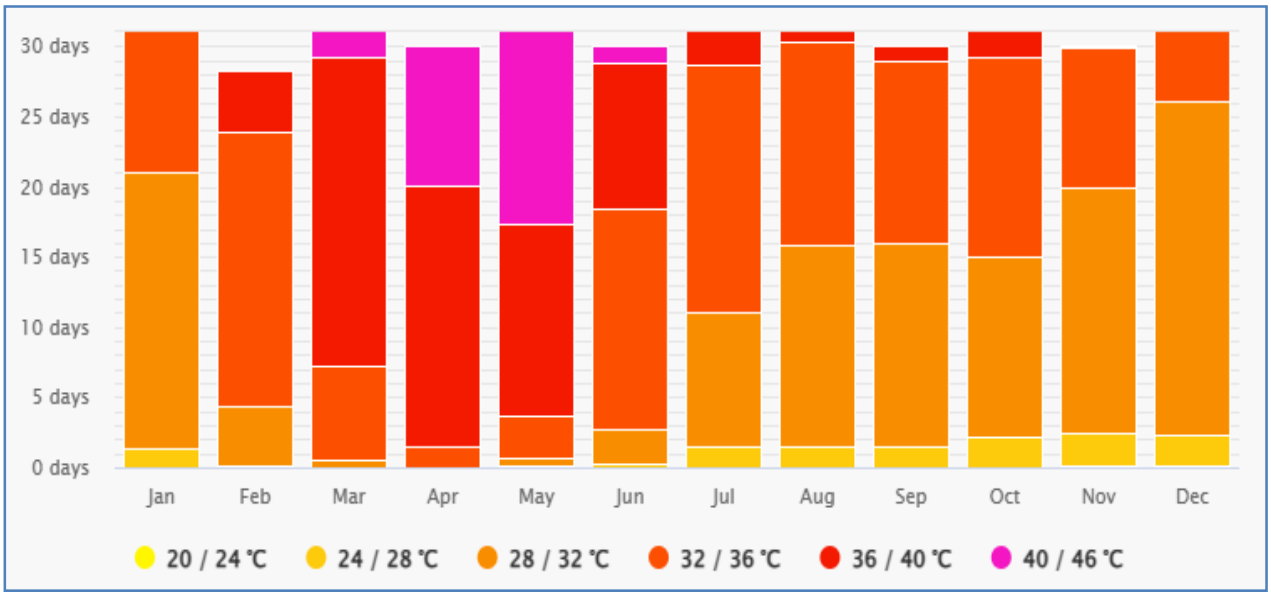
METEOROLOGICAL CONDITIONS AT THE PLANT:



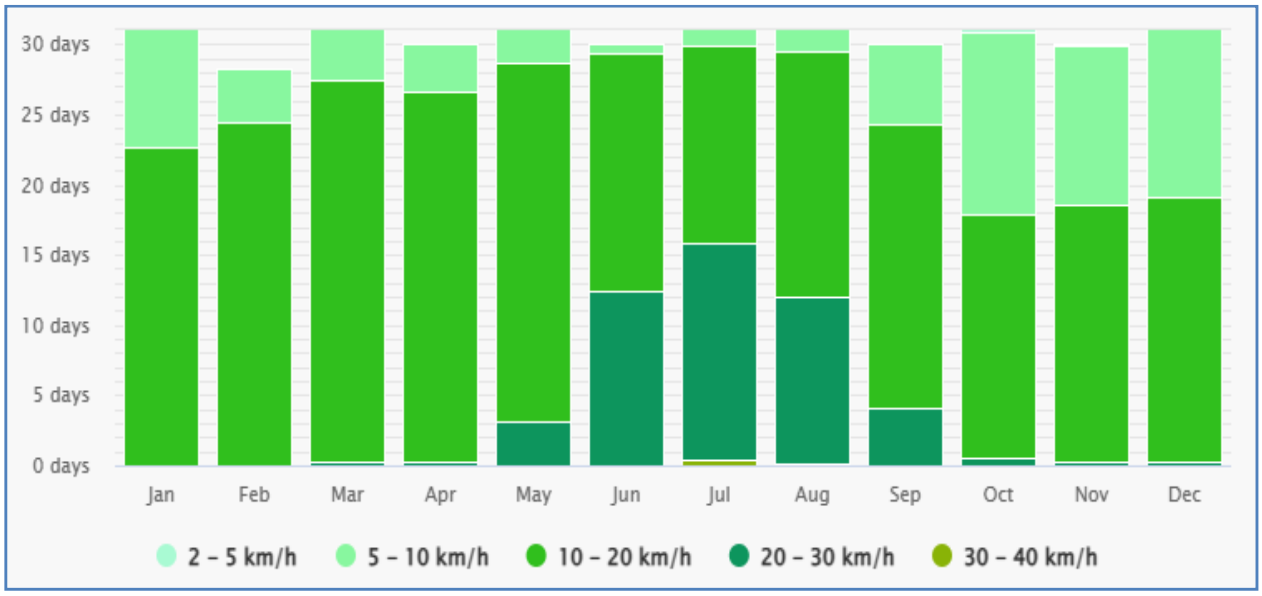
The "mean daily maximum" (solid red line) shows the maximum temperature of an average day for every month for Nandyal Likewise, "mean daily minimum" (solid blue line) shows the average minimum temperature. Hot days and cold nights (dashed red and blue lines) show the average of the hottest day and coldest night of each month of the last 30 years.



The graph shows the monthly number of sunny, partly cloudy, overcast and precipitation days. Days with less than 20% cloud cover are considered as sunny, with 20-80% cloud cover as partly cloudy and with more than 80% as overcast.

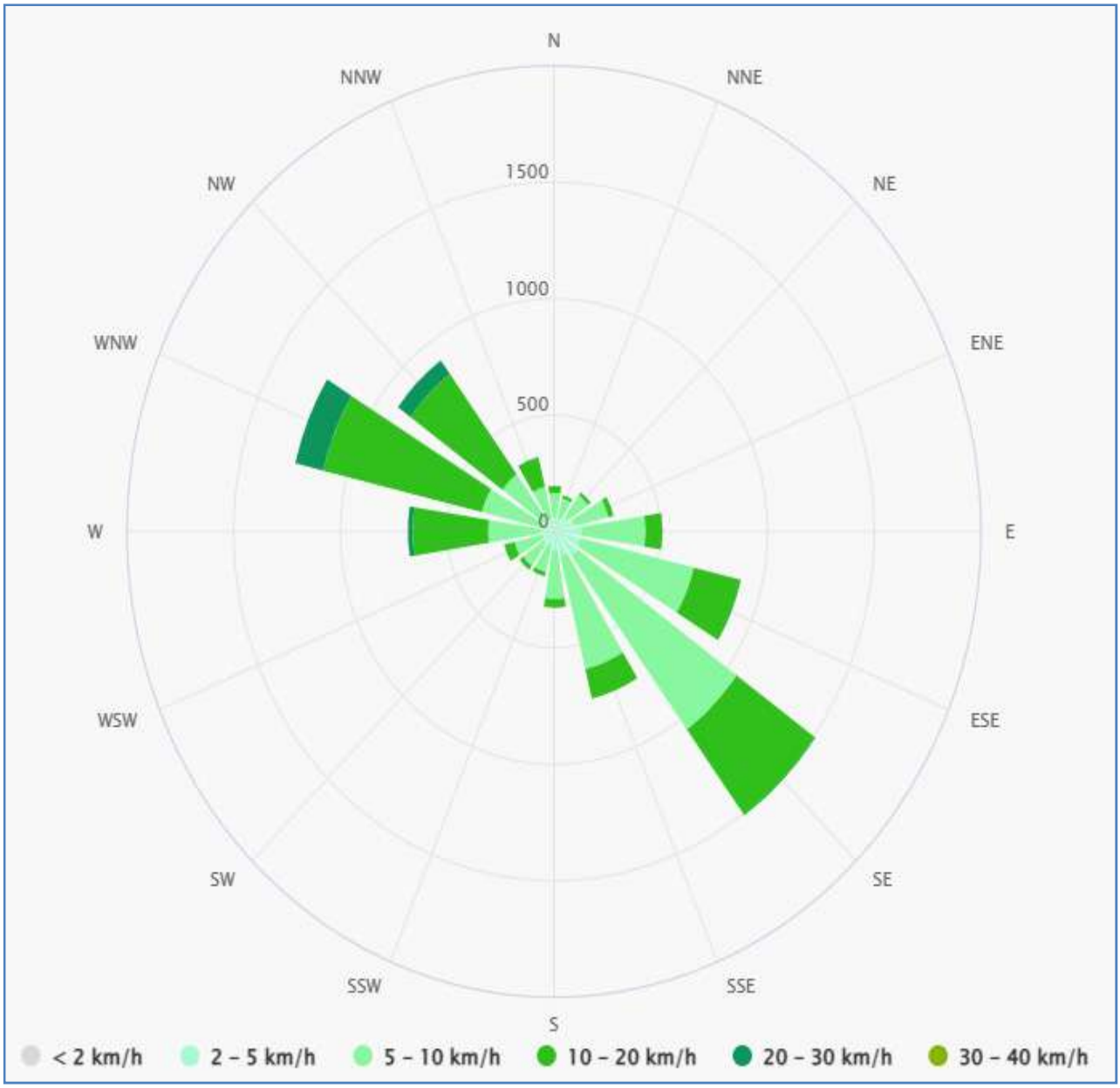


The maximum temperature diagram for Nandyal displays how many days per month reach certain temperatures.



The diagram for Nandyal shows the days per month, during which the wind reaches a certain speed.

WIND ROSE:



The wind rose for Nandyal shows how many hours per year the wind blows from the indicated direction. Example SW: Wind is blowing from South-West (SW) to North-East (NE).

BRIEF PROCESS DESCRIPTION OF THE PLANT

A grain-based distillery involves in several detailed steps. Below is a comprehensive process description:

1) Milling Section:

The grain received through Lorries is stored in Godown and milling is carried out in Hammer Mills to produce the flour for further processing. There are 4 Hammer Mills of 6 MT/Hr Capacity installed.

2) Liquefaction and saccharification Section:

The purpose of the Liquefaction and Saccharification is to bring the milled starch into a form where it can be used in the subsequent fermentation step. This is achieved by converting the starch, which comes from the grain into fermentable sugars.

This step is achieved by first preparing slurry of starch to thoroughly wet it in the Slurry Tank, the starch is also undergoing a heat treatment whereby it rapidly takes up water and gelatinizes the starch and is hereby converted from an insoluble to a soluble form. Only gelatinized starch can be broken down into smaller chemicals units called "Dextrins", by the action of enzymes during the conversion. The enzymes used in this processing step are called alpha-amylase and split the starch chains into smaller dextrin units, and by the further action of a second enzyme, called "Amyloglucosidase", into fermentable sugars.

As the enzymes work under different optimal conditions, the pH of the solution is adjusted, and also the temperature for the enzyme requirements is met by cooling the hot mash to a temperature of approx. 55 to 60℃. Before the saccharified mash containing fermentable sugars can be used in the fermentation, it has further to be cooled to the fermentation temperature of approx. 35℃.

Slurry Preparation:

The Milled Starch (Flour) from Milling Section is fed to the Batch Tipping Machine. The flour is weighed and continuously discharged by gravity to Pre-Masher.

In Pre-Masher flour is mixed with Hot Process Water and / Slurry vapours to form a hump free thoroughly wetted paste. This paste is discharged to Slurry Tank where it is again mixed with Hot Process Water. By the use of Hot Process Water in the preparation of slurry, it is possible to maintain the temperature at 55 to 60℃.

The main criterion in this step is the proper adjustment of the weight of milled starch and the ratio of hot process water addition.

A wrong adjustment will either result in a mixture which is lacking in fermentable sugars and will give low alcohol contents in the fermentation, or il will be too concentrated of solids and will have high viscosity and cannot be handled in the subsequent steps. It is important that the enzymes are added to the specification and the temperature as well as the pi l is controlled properly.

Also the slurry has to be kept at pH-value of 5.8 to 6.5 and this is achieved by adding the Dilute Caustic Solution caustic dosing metering pump.

Diluted Liquefying Enzyme (Alpha Amylase) is added continuously through by metering pump, while Diluted Viscozyme is added continuously by metering pump to Slurry Tank.

In Slurry Tank, slurry is continuously agitated with an agitator and kept in circulation by pump to keep whole mass in suspension. Level Controller controls the level of Slurry Tank. Residence time for slurry in Slurry Tank is 60 minutes.

Slurry Feed Pump continuously discharges slurry to Initial Liquefaction Tank.

Liquefaction:

In Initial Liquefaction Tank, steam is sparged through Steam Sparger and temperature is maintained at 88 to 90℃.

In Initial Liquefaction Tank the Slurry is constantly agitated with an agitator and kept in circulation by the pump to keep whole mass in suspension. Level controller controls the level of Initial Liquefaction Tank. Residence time for Pre-Liquefied Slurry in Initial Liquefaction Tank is 60 minutes.

Initial Liquefaction Tank Transfer Pump continuously discharges Pre-Liquefied Slurry to Jet Cooker through Mag-Flow meter, which measures as well as totalizes the slurry flow rate to Jet Cooker. In let Cooker this Pre-Liquefied Slurry is cooked by using live High Pressure Steam of 7.5 Kg/cm^2(g) pressure. The temperature of the cooking is controlled by temperature controller, which also controls the steam flow to the Jet Cooker.

The Cooked Slurry is retained in the Retention Vessel for 5 to 8 minutes; the pressure in the Retention Vessel is maintained by the pressure controller.

The Cooked Slurry is then flashed in the Flash Tank for reducing the temperature of the Slurry. Flashed Steam from this tank, is condensed by using a Vent Condenser and the condensate is taken to the Condensate Tank.

The Condensate Tank is used for generation of hot process water, wherein fresh Process Water is heated to 70 to 80℃ by using live steam injection through Steam Sparger. The temperature controller controls the temperature of this tank by controlling steam flow through steam flow controller. Generated hot process water is pumped to Slurry Tank by Condensate Pump, which is used for slurry preparation.

The Flashed Slurry from the Flash Tank is transferred to Liquefaction Tank by gravity. Diluted Liquefying Enzyme (Alpha Amylase) is added continuously by metering pump for the completion of Liquefaction reaction.

The main purpose of the Liquefaction Step is to reduce the viscosity of the slurry before subsequent cooling and to ensure proper pH-adjustment of the Slurry prior to the following Saccharification step.

In Liquefaction Tank the Liquefied Slurry is constantly agitated with an agitator and kept in circulation by the pump to keep whole mass in suspension. Level controller Controls the level of Liquefaction Tank. Residence time for Liquefied Slurry in Liquefaction Tank is 60 minutes.

After insuring the complete Liquefaction, the Liquefied Slurry is pumped to Mash Cooler-1 by pump. Cooling Water is used in Mash Cooler -1 to cool the Liquefied Slurry to 60 to 65℃.

Saccharification:

The cooled liquefied slurry comes into Partial Pre-Saccharification Tank through the Liquefaction Tank Transfer Pump.

In the Partial Pre-saccharification Tank Diluted Saccharifying Enzyme (Amyloglucosidase) is continuously added by a metering pump. Again, Diluted Protease Enzyme (Neutrase) is added continuously through by metering Pump.

The pH of the Saccharified Mash has to be adjusted to a value of 4.0 to 4.5.

In Partial Pre-saccharification Tank the Saccharified Mash is constantly agitated with an agitator and kept in circulation by the pump to keep whole mass in suspension. Level controller controls the level of Liquefaction Tank. Residence time for Saccharified Mash in Partial Pre-Saccharification Tank is 60 minutes.

The Partially Saccharified Mash in the Partial Pre-Saccharification Tank continuously drawn off by pump and is fed to Mash Cooler-II. Cooling Water is used in both the Mash Coolers to cool the Partially Saccharified Mash to 32 to 33℃. The cooled Saccharified Mash is continuously fed to the Fermentation stage.

The Saccharified Mash going to Yeast Activation Vessel & Fermentor, while Saccharified Mash going to Fermentors is measured and totalizes by Mag-Flow Meter.

3) Fermentation Section:

The purpose of fermentation is to convert the fermentable sugars into alcohol. This is achieved by the activity of yeast, which converts fermentable sugars into alcohol and carbon dioxide, which is released as a gas. During this reaction of yeast with sugars a quantity of heat is generated which would lead to a rapid rise of fermentation temperature. Therefore fermentors have to be cooled to a constant temperature by the use of Plate type Heat Exchangers with Cooling Water as a Cooling Media.

The alcohol concentration in the mash increases as the reaction proceeds. During fermentation a certain amount of carbon dioxide is produced. It is scrubbed with water in CO2 scrubber for alcohol recovery.

Fresh saccharified mash is continuously pumped to fermentation. Fermentors are filled in a batch wise manner one after another. The batch timings are adjusted in such a manner that the filling process is not disrupted.

In fermentation partially saccharified mash, process water is introduced. Agitators to avoid sludge settling keep the mass in the fermentors in agitated state and re-circulated through fermented mash Recirculation pump through fermentor coolers to maintain uniform temperature throughout the fermentor.

Fermented mash from the Fermentors after the completion of fermentation reaction is introduced to the Beer Well. This is a surge tank for feed to distillation.

Yeast Activation / Pre Fermentation:

For each batch, active dry / compressed yeast or cultured yeast grown or is activated in Yeast Activation Vessel in batch wise manner.

Slurry of Yeast is prepared by mixing it with Saccharified Mash and Water in this vessel.

For Yeast Activation, Process Air is sparged in Yeast Activation Vessel through Air Sparger. The Heat Generated during Yeast Activation & small amount of alcohol formation is removed by circulating this activated cell mass through Yeast Activation Cooler. Yeast Activation Cooler is a Plate Type Heat Exchanger in which Cooling Water is used as a cooling media.

Yeast Activation Vessel Re-Circulation Pump is used for circulation of Activated Cell Mass as well as transfer of it to Fermentors.

Fermentation:

The cooled Saccharified Mash, Process water is entering the fermentor. An agitator is provided to avoid the settling of suspended matter. Plate Type Heat Exchanger is used as Fermentor Cooler to remove the heat generated during alcohol formation in the fermentor. Cooling Water is used as a cooling media for this Fermentor Cooler.

During Fermentation along with alcohol CO2 gas is formed which is fed to CO2 Scrubber for alcohol recovery. In CO2 Scrubber CO2 gas is scrubbed with process water and then pumped to CO2 bottling section, while scrubbed water is added to activation vessel for dilution purpose.

After completion of Fermentation Reaction, Fermentor Wash Recirculation Pump transfers the fermented mash to Beer Well. In Beer Well Agitator is provided to avoid the settling of suspended matter. Fermented Mash is pumped to Distillation by pump.

The filling in fermentors should be maintained to control the final level by manual checking (dip checking).

4) Distillation:

Fermented mash with 8.0% v/v alcohol concentration from Wash Holding Tank preheated in two stages, first in Simmering Condenser-I where heat from vapour of Simmering Column is used. Then it is heated in fermented Wash Pre-heater by using the heat of spent wash coming out from the bottom of the Analyser Column. The preheated Fermented wash is then fed at the top of Analyser Column.

Analyser Column:

Analyser Column strips off all the alcohol from the fermented mash before discharging the rest of the material as spent wash. Analyser Column is operated under vacuum.

Fermented Wash is fed to the Analyser Column through the fermented wash pre-heater. Fermented Wash feed to column is measured and is controlled by using a flow control valve. The vapours from the top of the Analyser Column are fed to the Pre-Rectifier Column. The vapour concentration at the column top will be in the range of 40-45% w/w. This alcohol concentration in the vapours depends upon the alcohol concentration in the' Fermented wash feed. Spent wash from the Analyser Column bottom is sent to Effluent Treatment Plant for further treatment. The level in the column bottom is controlled by level control valve, which is installed on the Spent Wash Transfer Pump discharge line.

Rectifier Column vapour is used to heat the Analyser Column. Measured quantity of Soft water is fed to flash tank. Flash tank is provided with thermo siphon reboiler. Vapours from Rectifier cum Exhaust Column are fed to the Reboiler for Analyser Column. Flash steam from the Flash Tank is used to heat the Analyser Column. Make-up steam line is provided to Analyser Column.

Pre-Rectifier Column / Stripper Column:

Pre-Rectifier Column is operated under vacuum. The purpose of this column is to concentrate low boiling impurities and also to concentrate alcohol, which will be fed to ED Column for further processing.

Analyser Column vapours are fed to the bottom of the Pre-Rectifier Column.

The vapour from column top is condensed in three condensers and the part of condensed liquid is removed as TA cut collected in TA mixing bottle and rest condensed liquid fed back to column as a reflux.

Rectified Spirit is drawn from this column and is collected in the draw tank. The flow rate is measured by using flow meter and is also controlled. Rectified spirit is fed to ED Column by Pre-Rectifier draw transfer Pump.

LFO and HFO are drawn from the Pre-rectifier Column at the required rate to FO Draw Tank. These draws are cooled in the pre-rectifier LFO / HFO Cooler and fed to Fusel Oil Decanter. Fusel oil is taken out from the FO decanter and the washings are collected in FO washing tank from where it is fed back to Stripper Column with the help of Fusel oil washing transfer pump.

Dilute alcohol from column bottom is fed to Stripper Column for PRC where alcohol is recovered and liquid from column bottom is drained as spent lees. The liquid level in the column bottom is maintained by the Level control valve, which is provided on the discharge line of the PRC Stripper bottom transfer Pump. Stripper Column is provided with steam feeding arrangement with control valve and is used for heating purpose.

Analyser Column, Pre-Rectifier Column and PRCStripper Column for PRC are maintained under vacuum. The pressure in these columns is maintained by pressure control Valve, which bleeds air in the system. The vapours are passed through the Alcohol Scrubber before going to Vacuum Pump. Vapours are scrubbed with soft water and alcohol if any present and is taken to the FO Washing Tank and fed back to Stripper column.

Extractive Distillation Column:

Extractive distillation Column is operated under Atmospheric pressure. This column is principally used for removal of close boiling impurities and high boiling impurities. This column is operated with extractive mode of operation.

The RS from the Pre-Rectifier Column is fed in the middle part of the column and dilution water is fed on the top tray of Extractive Distillation Column. Steam is provided to heat the column.

Thermo siphon reboiler is provided at the bottom section of column. Steam is supplied to this reboiler. Steam condensate is collected in condensate pot. Steam flow to reboiler is regulated by Temp control valve.

Alcohol water mixture from ED Column bottom is fed to the Rectifier cum Exhaust Column by using ED Bottom Transfer Pump. The level in the column bottom is controlled by level control valve, which is on the discharge line of the ED Bottom Transfer Pump.

Rectifier Cum Exhaust Column:

This column is operated under pressure. This column is principally used to concentrate the alcohol and to draw ENA. The pre-heated feed from ED Column is fed to Rectifier cum Exhaust Column. The feed is heated with the spent lees coming out from the Rectifier cum Exhaust Column bottoms in the Rectifier Feed Pre-heater.

Steam is fed to the Rectifier cum. Exhaust Column Reboiler in a controlled manner. Control valve is used to control flow rate of steam. The vapours from column top are used to heat the Analyser Column. These vapours are fed to Reboiler for Analyser Column. These vapours are partially condensed by passing the hot soft water on the tube side. Balance alcohol vapours are condensed in the Analyser Reboiler vent Condenser. Cooling water is used for condensing the vapours in the Vent Condenser. The condensate is collected in the Rectifier Reflux Tank.

Condensed liquid is pumped back to the Rectifier cum Exhaust Column from the Reflux Tank for Rectifier Column as reflux. Level of Rectifier Reflux Tank is maintained with Level Control Valve. RS/ENA is drawn from the Rectifier cum Exhaust Column from the upper trays, which is cooled in the Rectifier ENA Cooler and sent to the Simmering column. Flow meter is provided to measure the ENA draw flow rate and is controlled. TA draw is collected in the TA Mixing bottle.

High boiling impurity i.e. Light fusel oil and Heavy fusel oil are drawn from the Rectter cum Exhaust Column at the required flow rate, which is controlled by observing flow rates in rotameters. LFO and HFO are fed to the Fusel Oil Column.

Heat from spent lees coming out of the Rectifier cum Exhaust Column bottom is used to heat the feed to the Rectifier cum Exhaust Column in the Rectifier Feed Preheater and remaining heat is utilised to heat Soft water in Soft water Pre-heater. Spent lees from Column bottom recycled back to ED Column as dilution water. 30% spent lees quantity is purged from the Rectifier Column. The percentage of spent lees purge quantity will depend upon the TDS/Impurity level in the spent lees. Column bottom level is maintained with the level control valve.

Pressure in the column is maintained by Pressure control valve. When pressure increases above set point, PCV will open to maintain the pressure. In this case alcohol vapours coming out of PCV are condensed and collected in TA mixing Bottle as a TA.

Fusel Oil Concentration Column:

FOC Column is operated under Atmospheric pressure. This column principally used for concentration of Fusel Oils, low boiling impurities and recycle of balance alcohol in the system. Alcohol water mixture from ED Column is directly fed to FOC Column. Low-pressure steam is fed through to FOC column. Re-boiler Vapors from FOC Column are condensed in FOC Condenser-I and FOC Condenser-II. Condensed liquid is sent to column as reflux. Technical Alcohol draw is taken to T. A. Mixing bottle.

LFO / HFO draws are taken from FOC column. These draws are cooled separately in Shell and tube heat exchangers with cooling water in the inner tube and fed to Fusel Oil Decanter. The separated Fusel oil from the decanter is taken to storage and Fusel Oil Washing is fed back to FOC Column. Lees from FOC Column bottom is drained to gutter through FOC Column siphon.

Simmering Column:

Simmering Column is operated under Atmospheric pressure. This column is principally used for removal of Methanol and Diacetyl from ENA.

The column is operated at very high reflux ratio at around 100-150 since the concentration of the low boiling impurities is very low as compared to the main product.

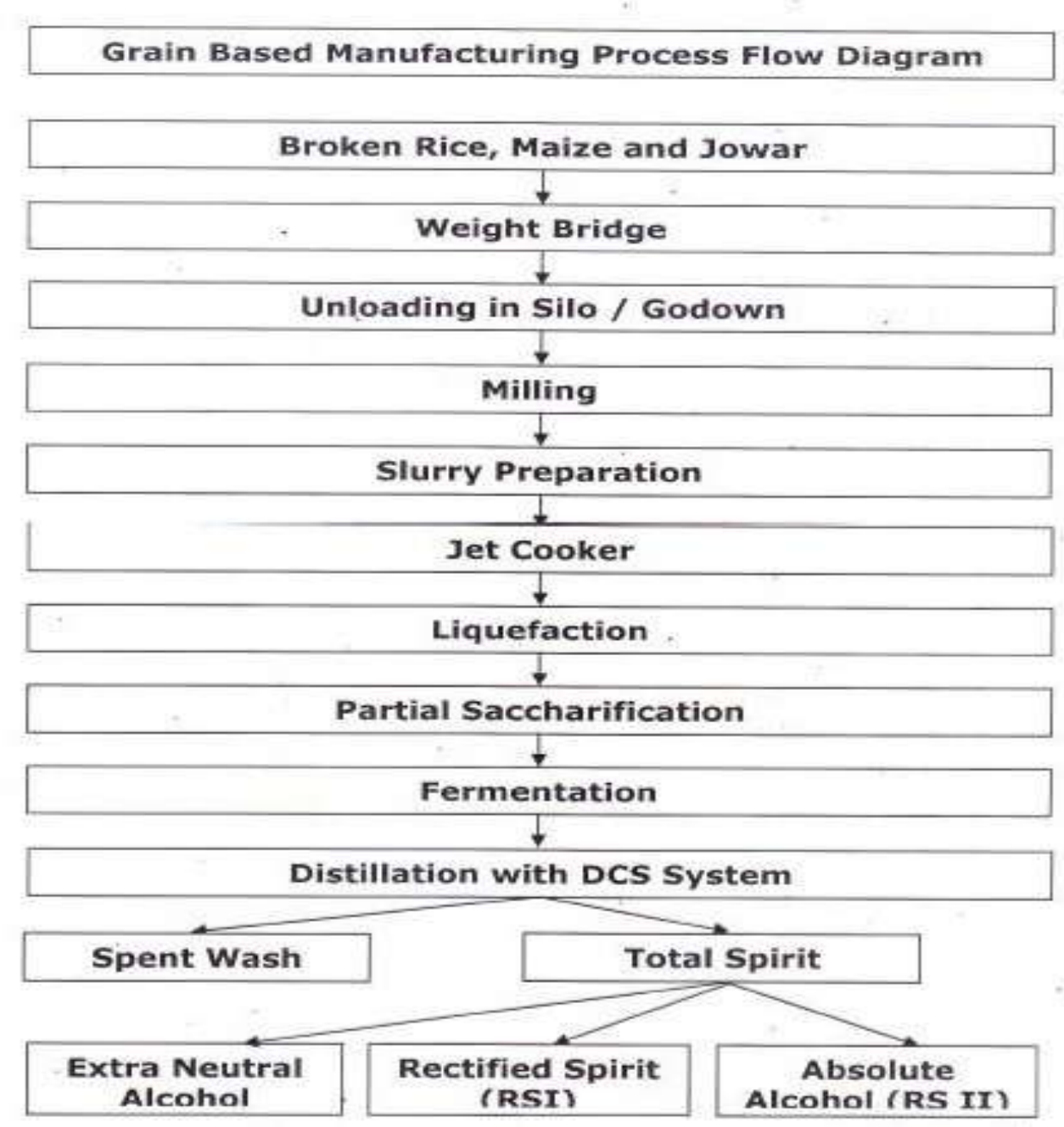
ED Column vapour is provided through thermo siphon re-boiler and will supply heat to Simmering Column. Vapours from column top are condensed in Simmering Condenser-I and Simmering Condenser-II. Condensed liquid is sent to column as reflux. Technical

Alcohol draw is taken to T. A. Mixing bottle. The collected TA is cooled in to TA Cooler and is sent to T. A. Storage tank.

ENA/RS is drawn from Simmering Column bottom and after cooling in ENA Cooler sent to Daily receivers.

The above whole process system is auto operated with DCS (Distributed Control System).

PROCESS FLOW CHART:



LIST OF CRITICAL EQUIPMENT USED FOR MANUFACTURING PROCESS

The list of equipment being used in the site for the manufacturing process:

- Chillers
- DG sets
- Air Compressors
- Pumps
- Boilers

LIST OF CHEMICALS USED IN THE PROCESS

TANK FARM CAPACITY

S.P.Y.AGRO INDUSTRIES LTD

AGRO STORAGE TANK DETAILS

S NO	DESCRIPTION	QTY	CAPACITY	TANK HEIGHT	TANK INNER DIA	VALIDITY
1	E.N.A RECEIVER TANKS	05 NO'S	177.5KL	680 cm	516.5 cm	5-YEAR
2	E.N.A.STORAGE TANKS	04 NO'S	1843.8KL	975 cm	1541 cm	5-YEAR
3	RECTIFIED SPIRIT RECEIVER TANKS	02 NO'S	12.4KL	310 cm	225.1 cm	5-YEAR
4	RECTIFIED SPIRIT RECEIVER TANKS	01 NO	177.5KL	680 cm	1571.7 cm	5-YEAR
5	RECTIFIED SPIRIT STORAGE TANKS	02 NO'S	1848.47KL	975 cm	1542.9 cm	5-YEAR
6	ABSOLUTE ALCOHOL RECEIVER TANKS	03 NO'S	39.7KL	370 cm	369.99 cm	5-YEAR
7	ABSOLUTE ALCOHOL STORAGE TANKS	02 NO'S	584.7KL	584.7 cm	873.8 cm	5-YEAR
8	IMPURE SPIRIT STORAGE TANK	01 NO	369KL	800 cm	766.48 cm	5-YEAR
9	FUSEL OIL STORAGE TANK	01NO	39.9KL	370 cm	369.46 cm	5-YEAR
10	PRE-FERMENTORS STORAGE TANKS	02 NO'S	97.6KL	498 cm	488.4 cm	5-YEAR
11	FERMENTORS STORAGE TANKS	07 NO'S	996.2KL	928 cm	1133 cm	5-YEAR
TOTAL TANKS		30 NO'S	6186.8KL			

4. QUANTITATIVE RISK ASSESSMENT

4.1 AN OVERVIEW

Risk Analysis 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 Analysis techniques provide advanced quantitative means to supplement other hazard identification, analysis, assessment, control and management methods to identify the potential for such incidents and to evaluate control strategies.

The underlying basis of Risk Analysis 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?

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.

4.2 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 Analysis 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 and
- Ignition of hydrocarbon,
- The vulnerability of the person to the event,
- The proportion of time the person will be exposed to the event (which is termed 'occupancy' in the QRA terminology).

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.

4.3 QUANTITATIVE RISK ASSESSMENT PROCEDURE

Quantitative risk assessment involves a series of steps as follows:

Step 1: Identification of the Hazard

Based upon consideration of factors such as the physical & chemical properties of the fluids being handled, the arrangement of equipment, operating & maintenance procedures and process conditions.

Step 2: Assessment of the Risk

Arising from the hazards and consideration of its tolerability to personnel, the facility and the environment. This involves the identification of initiating events, possible accident sequences, and likelihood of occurrence and assessment of the consequences. The acceptability of the estimated risk must then be judged based upon criteria appropriate to the particular situation.

5. HAZARD IDENTIFICATION

Hazard identification is the first step in hazard analysis and needs collecting information on

i) The types and quantities of hazardous chemicals in production, storage, processing, transportation and disposal in an installation.

ii) The location of the facilities process, storage, product or use

iii) Potential hazards associated with spills or releases.

PRELIMINARY HAZARD IDENTIFICATION

Preliminary Hazard Identification is used to identify typical and often relatively apparent hazards and damage events in a system. Hazards of significant nature whose consequence potential is of worth consideration and wherein a specified area or where more number of personnel likely to be present etc., are considered in identifying the hazards.

The following are such hazards considered for detailed study:

- Hazards Related to Unit Processes
- Hazards Related to Unit Operations
- Health Hazards
- Storage and Handling Hazards
- Fire Hazards and Explosion Hazards
- Corrosive Hazards

FIRE, EXPLOSION AND TOXICITY INDEX (FETI)

The Fire Explosion and Toxicity Index (FETI) is a risk assessment tool used in process industries, especially in chemical and petroleum industries, to quantify the potential hazards associated with chemical substances and processes. This index is crucial for assessing the risk of fire, explosion, and toxic releases in industrial facilities, helping to implement safety measures and minimize the risk to personnel, property, and the environment.

Components of FETI

The Fire Explosion and Toxicity Index (FETI) comprises two primary indices:

1. Fire and Explosion Index (F&EI)
2. Toxicity Index (TI)

1. Fire and Explosion Index (F&EI)

This index measures the potential for fire and explosion in a process. It is calculated based on various factors related to the chemicals involved, operating conditions, and the design of the facility.

2. Toxicity Index (TI)

The Toxicity Index assesses the potential for toxic effects from hazardous materials. It focuses on the health hazards posed by the release of toxic chemicals, considering the toxicity of the material, concentration, and the potential for exposure.

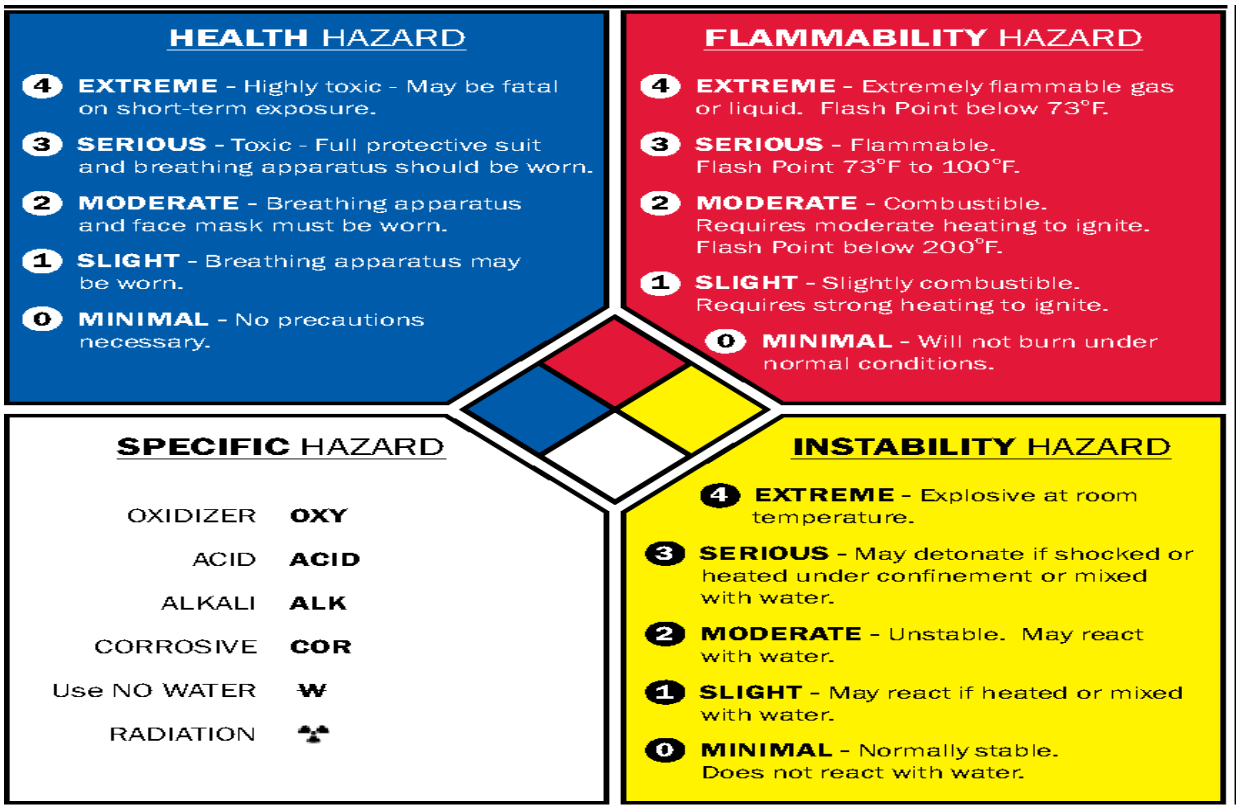
However, it is to be clearly accepted that all chemicals are inherently harmful in nature. Yet they are inseparable requirements of any chemical Industry. They vary in their effects only by their relative characteristics of Flammability, Health hazard and Reactivity. In short, by their Flammability, Explosively, Toxicity and Corrosiveness, handled with built-in safeguards, standard and well established operating procedures based on best industrial practices, and enforcing use of required personal protective equipment with due diligence exercised in their storage, handling, transportation, processing, their use should not imply a forbidden risk.

The National Fire Protection Association (NFPA) is a global self-funded nonprofit organization, established in 1896, devoted to eliminating death, injury, property and economic loss due to fire, electrical and related hazards.NFPA delivers information and knowledge through more than 300 consensus codes and standards.

"NFPA 704: Standard System for the Identification of the Hazards of Materials for Emergency Response" it defines the colloquial "fire diamond" used by emergency personnel to quickly and easily identify the risks posed by hazardous materials. This helps determine what, if any, special equipment should be used, procedures followed, or precautions taken during the initial stages of an emergency response.

The four divisions are typically color-coded with red on top indicating flammability, blue on the left indicating level of health hazard, yellow on the right for chemical reactivity, and white containing codes for special hazards. Each of health, flammability and reactivity is rated on a scale from 0 (minimal hazard) to 4 (severe hazard). The numeric values in the first column are designated in the standard by "Degree of Hazard" using numerals (0, 1, 2, 3, 4), not to be confused with other

classification systems, such as that in the NFPA 30 Flammable and Combustible Liquids Code, where flammable and combustible liquid categories are designated by "Class", using Roman numerals (I, II, III).



PROTECTIVE ACTION ZONE is defined as the area in which people are at risk of harmful exposure. This zone assumes that random changes in wind direction confines the vapour plume to an area within 30 degrees on either side of the predominant wind direction, resulting in a crosswind protective action distance equal to the downwind protective action distance.

PROTECTIVE ACTIONS should be initiated to the extent possible, beginning with those closest to the spill and working away from the site in the downwind direction. Within the protective action zone a level of vapour concentration may exist resulting in nearly all unprotected persons becoming incapacitated and unable to take protective action and/or incurring serious or irreversible health effects.

INITIAL ISOLATION ZONE is determined as an area, including upwind of the incident, within which a high probability of localised wind reversal may expose nearly all persons without appropriate protection to life-threatening concentrations of the material.

6. GENERAL HAZARDS

6.1 MECHANICAL HAZARDS

Mechanical hazards arise from relative movements between parts of the human body and objects such as work equipment or work objects, which lead to their contact. The result of this contact can be accidents that lead to injuries.

1. Conveyors and Augers

Hazard: Moving parts such as conveyor belts and screw augers can entangle clothing, limbs, or hair, leading to serious injuries.

Risk: Crushing, amputation, or entrapment.

Mitigation:

a) Install appropriate guards and shields over moving parts.
b) Use lockout/tagout (LOTO) procedures during maintenance.
c) Provide personal protective equipment (PPE) and safety training.

2. Grain Milling Equipment

Hazard: Mills and crushers can lead to flying debris, dust generation, or unexpected mechanical failures.

Risk: Eye injuries, inhalation of dust, or impact injuries.

Mitigation:

a) Use dust collection systems to manage dust.
b) Install machine guards and barriers to contain debris.
c) Provide dust masks and goggles for workers.

3. Fermentation Tanks and Stills

Hazard: Moving parts (such as agitators) inside fermentation tanks, and pressure hazards associated with stills.

Risk: Agitator entrapment, over-pressurization, or explosion.

Mitigation:

a) Ensure all agitators are shielded.
b) Regularly inspect and maintain pressure valves and gauges.
c) Use automated pressure-relief systems.

4. Pumps and Piping System

Hazard: Leakage, rupture, or blockage in the piping systems that transport liquids.

Risk: Burns from hot liquids or caustic chemicals, explosion risks.

Mitigation:

a) Use pressure-relief systems to avoid buildup.
b) Conduct routine inspections and maintenance of pipes and pumps.
c) Train workers on emergency shutdown procedures.

5. Grain Dust Explosion

Hazard: Grain dust is highly combustible, and accumulation in confined areas can lead to explosions.

Risk: Fire, explosion, structural damage, and injury or death.

Mitigation:

a) Install dust extraction and ventilation systems.
b) Regularly clean and remove dust buildup.
c) Use explosion-proof electrical equipment.

6. Loading and Unloading Equipment (Hoppers and Silos)

Hazard: Moving grains into or out of storage containers using mechanical equipment.

Risk: Suffocation, engulfment, and falls.

Mitigation:

a) Provide fall protection when working near open hoppers or silos.
b) Install barriers and guardrails.
c) Train workers on proper entry and exit procedures for confined spaces.

7. Rotating Equipment

Hazard: Motors, fans, and mixers used throughout the distillery.

Risk: Caught-in, struck-by, or entanglement injuries.

Mitigation:

a) Shield and guard rotating parts.
b) Implement proper lockout/tagout procedures for maintenance.

8. Grain Handling Equipment

Hazard: Moving large quantities of grain with mechanical devices like elevators, conveyors, or blowers.

Risk: Mechanical failures, falls, or entrapment.

Mitigation:

a) Install safety guards and perform regular maintenance.
b) Implement safety procedures for working near or with grain handling equipment.

6.2 THERMAL HAZARDS

Accidents involving cold or hot media usually have acute and lasting health effects for those affected. In addition to the high immediate pain, injuries with difficult-to-heal wounds, risk of infection and scarring are possible consequences. Also, severe burn injuries often lead to serious psychological impairments with depression and long periods of incapacity to work. Shock reactions due to touch can furthermore cause secondary damage such as falling and impact accidents. Contact with cold surfaces or media can cause pain sensation, numbness or local frostbite on exposed skin areas. Depending on the severity, frostbite can damage the skin and underlying tissue, often associated with slow healing of wounds and possible death of tissue.

1. Hot Surfaces and Equipment

Hazards: Boilers, distillation columns, piping, and steam systems operate at high temperatures, which can lead to burns or heat-related injuries if accidentally touched.

Risks: Direct contact with hot surfaces may cause skin burns, scalding from hot liquids, or fire hazards.

Mitigation:

a) Install thermal insulation on hot surfaces and equipment.
b) Clearly label high-temperature equipment with warning signs.
c) Use protective barriers or guardrails to prevent accidental contact.
d) Require the use of personal protective equipment (PPE) like heat-resistant gloves and face shields in areas with high-temperature equipment.

2. Steam and High-Pressure Systems

Hazards: Steam is used for heating mash or other grain products, and any failure in the steam system can result in sudden release of hot steam.

Risks: Exposure to steam can cause serious burns, scalding, or even respiratory damage. Inadequate maintenance can lead to explosions or ruptures in steam lines.

Mitigation:

a) Conduct regular inspections and maintenance of boilers, steam lines, and pressure vessels.
b) Install pressure relief valves and ensure they are operational.
c) Train workers on emergency shutdown procedures for steam and high-pressure equipment.
d) Require wearing appropriate PPE, such as heat-resistant clothing and face shields, when working near steam systems.

3. Combustible Dust

Hazards: Grain dust is highly combustible and can form explosive dust clouds when dispersed in air and ignited by heat or flame. The dust may accumulate on hot surfaces, increasing the risk of ignition.

Risks: Dust explosions can result in severe fires, equipment damage, and injuries. Hot surfaces or sparks can ignite dust in enclosed spaces, causing a thermal explosion.

Mitigation:

a) Install proper dust collection and ventilation systems to minimize dust accumulation.
b) Regularly clean surfaces and equipment to remove dust buildup.
c) Use intrinsically safe electrical equipment and grounding to prevent sparks.
d) Implement explosion-proof lighting and motors in dust-prone areas.
e) Conduct regular dust hazard assessments and follow NFPA standards for dust control.

4. Flammable Vapors

Hazards: The distillation process generates alcohol vapors, which are flammable and can ignite if they come into contact with hot surfaces or sparks.

Risks: A leak in the distillation system or improper handling of alcohol-containing liquids can lead to fire or explosion in areas with high heat.

Mitigation:

a) Maintain proper ventilation in distillation areas to prevent vapor buildup.
b) Regularly inspect and maintain distillation equipment to prevent leaks.
c) Use flame arrestors and explosion-proof electrical systems in distillation areas.
d) Store alcohol-containing liquids in sealed, properly labeled containers away from heat sources.

5. Heat Stress

Hazards: Workers operating in environments with high temperatures may experience heat stress, dehydration, or heat exhaustion.

Risks: Prolonged exposure to high temperatures can lead to heat-related illnesses, fatigue, reduced concentration, and accidents.

Mitigation:

a) Implement engineering controls like ventilation and air conditioning in hot areas.
b) Rotate shifts to limit worker exposure to high temperatures.
c) Provide workers with access to cool drinking water and encourage regular hydration.
d) Train employees on recognizing signs of heat stress and heat-related illnesses.
e) Ensure workers wear appropriate lightweight, breathable PPE that protects from heat but minimizes heat retention.

6. Fire and Explosion Risks

Hazards: Flammable grain dust, alcohol vapors, and high temperatures increase the risk of fires and explosions. Malfunctioning equipment or hot surfaces can ignite combustible materials.

Risks: Fire or explosion can lead to serious injuries, loss of life, and extensive damage to property.

Mitigation:

a) Install fire detection and suppression systems (e.g., sprinklers, fire extinguishers) in all high-risk areas.
b) Conduct regular fire drills and ensure emergency exits are accessible.
c) Use flame-resistant materials for equipment and structures.
d) Train workers on fire safety protocols, including how to handle flammable substances and how to operate firefighting equipment.
e) Conduct regular maintenance checks of electrical wiring and equipment to prevent short circuits or sparks.

6.3 HAZARDS DUE TO PHYSICAL AGENTS

Hazards due to physical agents are still of central importance in occupational safety and health, as they occur at numerous workplaces and/or sometimes have enormous hazard potential.

1.Dust Explosion

Hazards: Grain dust is highly combustible and can lead to explosions when dispersed into the air and exposed to an ignition source (static electricity, machinery sparks, etc.).

Risks: Potential for devastating explosions causing structural damage, severe injuries, and fatalities.

Mitigation:

a) Install dust collection systems at key points (e.g., grain handling, milling, and mixing areas).
b) Regularly clean to reduce dust accumulation.
c) Use explosion-proof equipment and maintain proper ventilation.
d) Implement grounding and bonding to prevent static electricity buildup.
e) Conduct routine safety audits for dust accumulation.

2.Noise Exposure

Hazards: Grain handling, milling, and distillation equipment can generate high noise levels, leading to hearing damage.

Risks: Long-term exposure to excessive noise can result in hearing loss.

Mitigation:

a) Provide workers with personal protective equipment (PPE) such as earplugs or earmuffs.
b) Install noise-dampening barriers around loud machinery.
c) Rotate employees to minimize prolonged exposure in high-noise areas.
d) Conduct regular noise level assessments to ensure compliance with permissible exposure limits.

3.Slips, Trips, and Falls

Hazards: Spills from liquids (e.g., water, alcohol) or grain can make floors slippery, leading to accidents.

Risks: Workers may suffer fractures, sprains, or other injuries from slipping or tripping.

Mitigation:

a) Ensure proper drainage and non-slip flooring.
b) Clean up spills immediately and place signage to warn of wet areas.
c) Provide anti-slip footwear for employees.
d) Maintain clear, uncluttered walkways.

4.Heat and Burns

Hazards: Distillation processes often involve high temperatures, with workers exposed to hot surfaces, steam, or boiling liquids.

Risks: Direct contact with hot equipment or steam can cause burns or heat stress.

Mitigation:

a) Insulate hot surfaces and provide barriers around heat-generating equipment.
b) Provide heat-resistant gloves and clothing for workers.
c) Implement heat stress management programs, including regular breaks and hydration.
d) Install emergency eyewash stations and showers near areas with hot materials.

5.Confined Spaces

Hazards: Workers may need to enter confined spaces such as fermentation tanks or storage silos, which can pose risks related to oxygen deficiency, toxic gases, or grain engulfment.

Risks: Asphyxiation, poisoning, or suffocation from grain entrapment.

Mitigation:

a) Follow confined space entry procedures with atmospheric testing.
b) Use harnesses and lifelines for workers entering confined spaces.
c) Provide continuous ventilation in confined spaces to ensure safe air quality.
d) Ensure that at least one trained attendant is present when workers enter confined spaces.

6.Machinery Hazards

Hazards: Grain milling, mixing, and conveying machinery with moving parts can cause entanglement, crushing, or amputations.

Risks: Serious injuries from coming into contact with machinery.

Mitigation:

a) Install machine guards and safety interlocks on all equipment.
b) Conduct regular maintenance and inspections of machinery.
c) Provide proper training to workers on the safe operation of equipment.
d) Implement lockout/tagout (LOTO) procedures during maintenance.

7.Ergonomic Hazards

Hazards: Repetitive tasks such as lifting, bending, or working in awkward positions can lead to musculoskeletal injuries.

Risks: Workers may suffer from strains, sprains, or long-term musculoskeletal disorders.

Mitigation:

a) Provide mechanical aids or lifting equipment to reduce manual handling.
b) Train workers in proper lifting techniques.
c) Redesign tasks or workstations to reduce ergonomic strain.
d) Rotate workers to minimize repetitive motions.

8.Chemical Hazards

Hazards: Workers may be exposed to chemicals such as cleaning agents, sanitizers, or ethanol vapors during fermentation and distillation.

Risks: Inhalation or skin contact with chemicals can lead to respiratory issues, skin irritation, or intoxication.

Mitigation:

a) Provide appropriate PPE, including gloves, goggles, and respirators.
b) Ensure proper ventilation in areas where chemicals are used.
c) Store chemicals in well-marked, ventilated areas and ensure proper labeling.
d) Train workers on chemical safety and handling procedures, including spill response.

9.Fire Hazards

Hazards: Ethanol produced during distillation is highly flammable, and the distillery's operations involve heat sources and potential ignition points.

Risks: Fires can spread rapidly, causing extensive damage to facilities and endangering workers.

Mitigation:

a) Use fire-resistant materials and ensure proper fire suppression systems (e.g., sprinklers, fire extinguishers).
b) Conduct regular fire drills and train workers on evacuation procedures.
c) Store ethanol in fireproof and explosion-proof containment units.
d) Keep flammable materials away from ignition sources.

10.Exposure to Biological Agents

Hazards: Grain handling may expose workers to mold, bacteria, or fungi, leading to respiratory or allergic reactions.

Risks: Inhalation of bioaerosols can lead to respiratory issues such as asthma or hypersensitivity pneumonitis.

Mitigation:

a) Use proper ventilation and air filtration systems.
b) Provide PPE such as dust masks or respirators to workers in grain handling areas.
c) Regularly inspect and clean storage areas to prevent mold growth.
d) Rotate workers in high-exposure areas to reduce prolonged exposure.

6.4 ELECTRICAL HAZARDS

An Electrical Hazard can be defined as a serious workplace hazard that exposes severely to burns, electrocution, shock, arc flash / arc blast, fire, or explosions. Fault currents at MCC panels, unauthorized person operations, Transformer area, Process areas and Wet floor are the major areas of hazard.

1. Grain Dust Explosion

Hazard: Electrical sparks or malfunctioning equipment can provide an ignition source for dust explosions.

Risk: Fine grain dust can become airborne, and when ignited by electrical equipment, it can lead to devastating explosions.

Mitigation:

a) Use explosion-proof electrical equipment and enclosures in areas prone to dust accumulation.
b) Install dust extraction and ventilation systems to minimize airborne dust.
c) Implement regular cleaning schedules to prevent dust buildup on surfaces and equipment.

2. Flammable Vapors and Gases

Hazard: The ignition of these vapors can result in fires or explosions.

Risk: Flammable vapors (such as ethanol) generated during fermentation and distillation can ignite due to faulty wiring or sparking electrical systems.

Mitigation:

a) Ensure that all electrical installations meet ATEX (Atmosphere Explosive) or similar safety standards.
b) Use intrinsically safe equipment and control systems in areas where flammable vapors are present.
c) Implement gas detection systems and alarms for early detection of vapor buildup.

3. Moisture Ingress

Hazard: Water or moisture ingress into electrical systems can cause equipment to malfunction, potentially resulting in electrical shocks or fires.

Risk: Moisture from fermentation processes and washing down equipment can infiltrate electrical systems, leading to short circuits or equipment failures.

Mitigation:

a) Install moisture-proof or sealed electrical enclosures (IP65 or higher rating) in wet or wash-down areas.
b) Use ground fault circuit interrupters (GFCIs) to prevent electrical shocks.
c) Regularly inspect and maintain electrical installations for signs of corrosion or water damage.

4. Overloading of Electrical Systems

Hazard: Overheating electrical systems can lead to fires or equipment breakdown.

Risk: Overloading electrical circuits with high-power machinery such as milling equipment, pumps, and heating systems can cause overheating.

Mitigation:

a) Conduct load assessments to ensure circuits and electrical panels can handle the power demands.
b) Install surge protectors and circuit breakers to prevent overloads.
c) Regularly inspect electrical systems for signs of wear or malfunction.

5. Static Electricity

Hazard: Sparks caused by static discharge can cause explosions in dust-laden areas or fires in areas with ethanol vapors.

Risk: Grain movement, especially during milling and transportation, can generate static electricity, which can spark and ignite flammable dust or vapors.

Mitigation:

1. Ground all equipment and install static discharge systems to prevent the buildup of static electricity.
2. Use anti-static materials and ensure workers wear anti-static footwear in high-risk areas.
3. Regularly test and maintain grounding systems.

6. Poor Maintenance and Wear

Hazard: Equipment failure can cause electrical shocks, fires, or unplanned shutdowns.

Risk: Electrical equipment used in distilleries can degrade over time due to harsh operating conditions (dust, heat, moisture), leading to short circuits or failure.

Mitigation:

1. Implement a preventive maintenance program to inspect, clean, and replace worn electrical components.
2. Train workers to identify early signs of electrical faults (e.g., flickering lights, tripping breakers, unusual noises).
3. Ensure proper training for all personnel handling electrical equipment.

6.5 CORROSIVE HAZARDS

A corrosive Hazard can be defined as “a chemical that causes visible destruction or irreversible alterations in living tissue by chemical action at the site of contact.

Corrosives (liquids, solids, and gases) are chemicals that cause visible destruction or irreversible alterations in, living tissue by chemical action at the site of contact. Corrosive effects can occur not only to the skin and eyes, but also to the respiratory tract through inhalation and to the gastrointestinal tract through ingestion.

1. Corrosive Chemicals

Hazards:

a) Distilleries use various chemicals, such as sulfuric acid (for pH adjustments), caustic soda (for cleaning), and other acidic or basic agents.
b) These chemicals can corrode equipment made of certain metals, as well as harm workers exposed to them.

Risks:

a) Equipment Damage: Corrosive chemicals can lead to degradation of metal surfaces, pipelines, and storage tanks, resulting in leaks or failures.
b) Health Hazards: Contact with corrosive substances can cause severe skin burns, respiratory issues, eye damage, or even chemical poisoning if inhaled or ingested.

Mitigation:

a) Use corrosion-resistant materials such as stainless steel, glass-lined equipment, or special coatings on equipment.
b) Implement closed-system handling for transferring and storing chemicals to reduce the chance of human contact.

c) Use personal protective equipment (PPE) like gloves, goggles, and face shields for workers handling chemicals.
d) Regularly inspect and maintain equipment to check for signs of corrosion and repair them promptly.

2. Ethanol and By-Product Corrosion

Hazards:

a) Ethanol itself can be corrosive to certain materials, especially when mixed with water and other impurities.
b) By-products like distillers' grains, CO2, and spent wash (wastewater) may also contain corrosive compounds that degrade equipment over time.

Risks:

a) Equipment Failure: Prolonged exposure to ethanol or by-products can lead to degradation of gaskets, seals, pumps, and storage tanks.
b) Environmental Hazards: Leakage of ethanol or corrosive by-products can pose fire hazards, environmental contamination, and equipment downtime.

Mitigation:

a) Use ethanol-compatible materials such as high-grade stainless steel, polyethylene, or Teflon seals in equipment that handles ethanol.
b) Implement effective waste management to properly treat and neutralize spent wash and other corrosive by-products.
c) Regularly clean and remove residue from surfaces exposed to by-products to reduce corrosion buildup.

3. Fermentation Tanks and CO2 Corrosion

Hazards:

a) During fermentation, CO2 is produced, which can create an acidic environment when dissolved in water, forming carbonic acid.
b) Carbonic acid can corrode the inner surfaces of fermentation tanks and other equipment.

Risks:

a) Tank Corrosion: Corrosion of fermentation tanks can cause structural damage, leading to leaks or reduced lifespan.
b) Air Quality Concerns: CO2 accumulation in confined spaces poses health risks to workers (asphyxiation) in addition to its corrosive effects.

Mitigation:

a) Use corrosion-resistant fermentation tanks, such as those made of stainless steel.
b) Ensure adequate ventilation and CO2 monitoring systems in fermentation areas to protect workers from exposure.
c) Conduct regular inspections of fermentation tanks and piping systems for signs of corrosion.

4. High-Temperature Corrosion

Hazards:

a) Grain-based distilleries often operate at high temperatures, especially in processes like cooking and distillation.
b) High temperatures can accelerate the rate of corrosion, particularly in the presence of acidic or basic compounds.

Risks:

a) Thermal Stress: Equipment exposed to both high temperatures and corrosive materials is at risk of accelerated wear, increasing the likelihood of failure.
b) Worker Safety: High-temperature processes combined with corrosive chemicals can increase the danger of accidental exposure.

Mitigation:

a) Use high-temperature corrosion-resistant materials like specialty alloys or ceramics for heat exchangers and distillation columns.
b) Monitor and maintain temperature controls to prevent overheating, which can exacerbate corrosion.
c) Regularly schedule maintenance shutdowns for equipment to inspect and replace parts before failure occurs.

5. Water and Moisture Corrosion

Hazards:

a) The presence of water, especially in the form of moisture or humidity, can accelerate corrosion in storage tanks, pipelines, and other metal components.
b) In grain-based distilleries, water is used in multiple stages of the process, and if untreated, it can lead to rusting and pitting.

Risks:

a) Rust and Oxidation: Prolonged exposure to moisture can result in rusting of equipment, which weakens structures.
b) Cross-contamination: Corroded pipes and tanks may introduce contaminants into the distillation process, affecting product quality.

Mitigation:

a) Implement water treatment systems to remove corrosive agents like salts and other impurities from process water.
b) Use moisture control systems like dehumidifiers in storage areas to reduce humidity.
c) Ensure that all equipment is properly drained and dried after cleaning to prevent residual moisture from accumulating.

6. Biological Corrosion

Hazards:

a) Microbial growth, especially in wet environments or in residual grain and organic material, can lead to Microbiologically Induced Corrosion (MIC).
b) MIC can cause pitting and degradation in metal tanks and pipelines.

Risks:

a) Equipment Corrosion: Microbial activity can accelerate the formation of pits and crevices in equipment.
b) Contamination: Microbial growth can contaminate the production process, affecting ethanol quality.

Mitigation:

a) Implement biocides or other microbial control agents to prevent microbial growth in storage tanks and pipelines.
b) Clean and sanitize equipment regularly to prevent the accumulation of organic materials that can harbor microbial growth.
c) Use coatings or linings that inhibit microbial attachment on metal surfaces.

6.6 FIRE HAZARDS

Fire hazard means any situation, process, material or condition which may cause a fire or explosion or provide a ready fuel supply to increase the spread or intensity of the fire or explosion and which poses a threat to life or property.

1. Combustible Dust

Hazard: Grain dust, generated during handling, milling, or drying, is highly combustible. Accumulations of dust in the air or on surfaces can create an explosive atmosphere if ignited.

Risks: Grain dust explosions can occur if dust particles become suspended in the air and contact an ignition source, such as static electricity, mechanical sparks, or open flames.

Mitigation:

a) Implement dust collection systems, such as dust extractors or filters, to reduce dust accumulation in the facility.
b) Conduct regular cleaning and maintenance to prevent the buildup of dust on surfaces, equipment, and in hard-to-reach areas.
c) Install explosion vents and suppression systems in areas where dust explosions could occur, such as silos and mills.

2. Flammable Liquids and Vapors (Ethanol)

Hazard: Ethanol, a key product of distillation, is highly flammable. Vapors can accumulate in confined spaces, posing explosion risks.

Risks: Leaks or spills of ethanol and its vapors can easily ignite when exposed to heat or sparks, leading to fires or explosions.

Mitigation:

a) Ensure proper ventilation in areas where ethanol is stored or handled to prevent vapor accumulation.
b) Use intrinsically safe equipment and flameproof electrical fittings in ethanol processing areas.
c) Install spill containment systems and ensure all storage tanks are appropriately sealed and monitored for leaks.

3. Heat Sources

a) **Hazard:** Heat is required for distillation, and equipment such as boilers, heaters, and dryers can become ignition sources.
b) **Risks:** If heat sources are not properly managed, they can ignite combustible materials or flammable vapors.

Mitigation:

a) Regularly inspect and maintain all heat-producing equipment, including boilers, heaters, and distillation units, to ensure they are functioning safely.
b) Ensure that combustible materials and flammable liquids are stored away from heat sources.
c) Use temperature monitoring systems to detect overheating in equipment or materials.

4. Static Electricity

Hazard: Grain handling and alcohol production processes can generate static electricity, which can ignite dust or vapors.

Risks: Inadequate grounding or bonding can lead to sparks capable of causing fires or explosions.

Mitigation:

a) Install proper grounding and bonding systems for all equipment, particularly in areas where grains are handled and ethanol is processed.
b) Use anti-static clothing and footwear for workers to prevent the buildup of static electricity.
c) Incorporate humidification systems to reduce static electricity in areas where dust is present.

5. Storage of Raw Materials and Finished Products

Hazard: Grain storage silos and ethanol storage tanks pose fire risks if not properly designed and managed.

Risks: Improper storage can lead to spontaneous combustion of grain, leaks of flammable liquids, or accumulation of flammable vapors.

Mitigation:

a) Regularly inspect grain silos and ethanol storage tanks for integrity and leaks.
b) Store grains in cool, dry conditions to prevent spontaneous combustion, and monitor for signs of fermentation or heat buildup.
c) Ensure that ethanol storage tanks are equipped with pressure relief systems and are located away from potential ignition sources.

6. Fire Suppression and Emergency Response

Mitigation:

a) Install automatic fire detection and suppression systems, such as sprinklers and foam systems, particularly in high-risk areas.
b) Train staff on fire prevention, detection, and emergency response procedures, including the use of fire extinguishers and evacuation protocols.
c) Conduct regular fire risk assessments and drills to ensure preparedness.

7. CONSEQUENCE ANALYSIS WITH THREAT ZONES

Accidents begin with an incident, which usually results in the loss of containment of material from the process. The material has hazardous properties, which might include toxic properties and energy content. Typical incidents might include the rupture or break of a pipeline, a hole in a tank or pipe, runaway reaction, fire external to the vessel etc.

Once the incident is known, source models are selected to describe how materials are discharged from the process. The source model provides a description of the rate of discharge, the total quantity discharged (or total time of discharge), and the state of the discharge-solid, liquid, vapor, or a combination. A dispersion model is subsequently used to describe how the material is transported downwind and dispersed to some concentration levels. For flammable releases, fire and explosion models convert the source model information on the release into energy hazard potentials such as thermal radiation and explosion overpressures. Effect models convert these incident-specific results into effects on people (injury or death) and structures.

Few Hazards, event sequences, incident outcomes and consequences

Process hazards	Event Sequences			Incident outcomes
	Initiating events	Intermediate events		
Significant inventories of: Flammable materials Combustible materials Unstable materials Corrosive materials Asphyxiants Shock sensitive materials Highly reactive materials Toxic materials Inerting gases Combustible dusts Pyrophoric materials Extreme physical conditions High temperatures Cryogenic temperatures High pressures Vacuum Pressure cycling Temperature cycling Vibration/liquid hammering	Process upsets Process deviations Pressure Temperature Flow rate Concentration Phase/state change Impurities Reaction rate/heat of reaction Spontaneous reaction Polymerization Runaway reaction Internal explosion Decomposition Containment failures Pipes, tanks, vessels, gaskets/seals Equipment malfunctions Pumps, valves, instruments, sensors, interlock failures Loss of utilities Electrical, nitrogen, water, refrigeration, air heat transfer, fluids, steam, ventilation Management systems failure Human error Design Construction Operations Maintenance Testing and inspection External events Extreme weather conditions Earthquakes Nearby accidents' impacts Vandalism/sabotage	Propagating factors Equipment failure safety system failure Ignition sources Furnaces, flares, incinerators Vehicles Electrical switches Static electricity Hot surfaces Cigarettes Management systems failure Human errors Omission Commission Fault diagnosis Decision-making Domino effects Other containment failures Other material release External conditions Meteorology Visibility	Risk reduction factors Control/operator responses Alarms Control system response Manual and automatic ESD Fire/gas detection system Safety system responses Relief valves Depressurization systems Isolation systems High reliability trips Back-up systems Mitigation system responses Dikes and drainage Flares Fire protection systems (active and passive) Explosion vents Toxic gas absorption Emergency plan responses Sirens/warnings Emergency procedures Personnel safety equipment Sheltering Escape and evacuation External events Early detection Early warning Specially designed structures Training Other management systems	Analysis Discharge Flash and evaporation Dispersion Neutral or positively buoyant gas Dense gas Fires Pool fires Jet fires BLEVES Flash fires Explosions Confined explosions Unconfined vapor cloud explosions (UVCE) Physical explosions (PV) Dust explosions Detonations Condensed phase detonations Missiles Consequences Effect analysis Toxic effects Thermal effects Overpressure effects Damage assessments Community Workforce Environment Company assets

Consequence modelling was done for the highly hazardous chemicals by assuming the parameters which were relevant to the industry. In this assumption generally the vertical tanks were considered where there was a major storage of teh hydrocarbons i.e "Class-A" chemicals and its consequence was modelled.

7.1 ETHANOL (1843.8 KL Tank-1 inch Hole)

SITE DATA:

Location: SPY AGRO INDUSTRIES LTD, INDIA
Building Air Exchanges Per Hour: 0.50 (enclosed office)
Time: August 29, 2024 1702 hours ST (using computer's clock)

CHEMICAL DATA:

Chemical Name: ETHANOL
CAS Number: 64-17-5 Molecular Weight: 46.07 g/mol
ERPG-1: 1800 ppmERPG-2: 3300 ppm ERPG-3: N/A
IDLH: 3300 ppm LEL: 33000 ppmUEL: 190000 ppm
Ambient Boiling Point: 77.6° C
Vapor Pressure at Ambient Temperature: 0.12 atm
Ambient Saturation Concentration: 119,120 ppm or 11.9%

ATMOSPHERIC DATA: (MANUAL INPUT OF DATA)

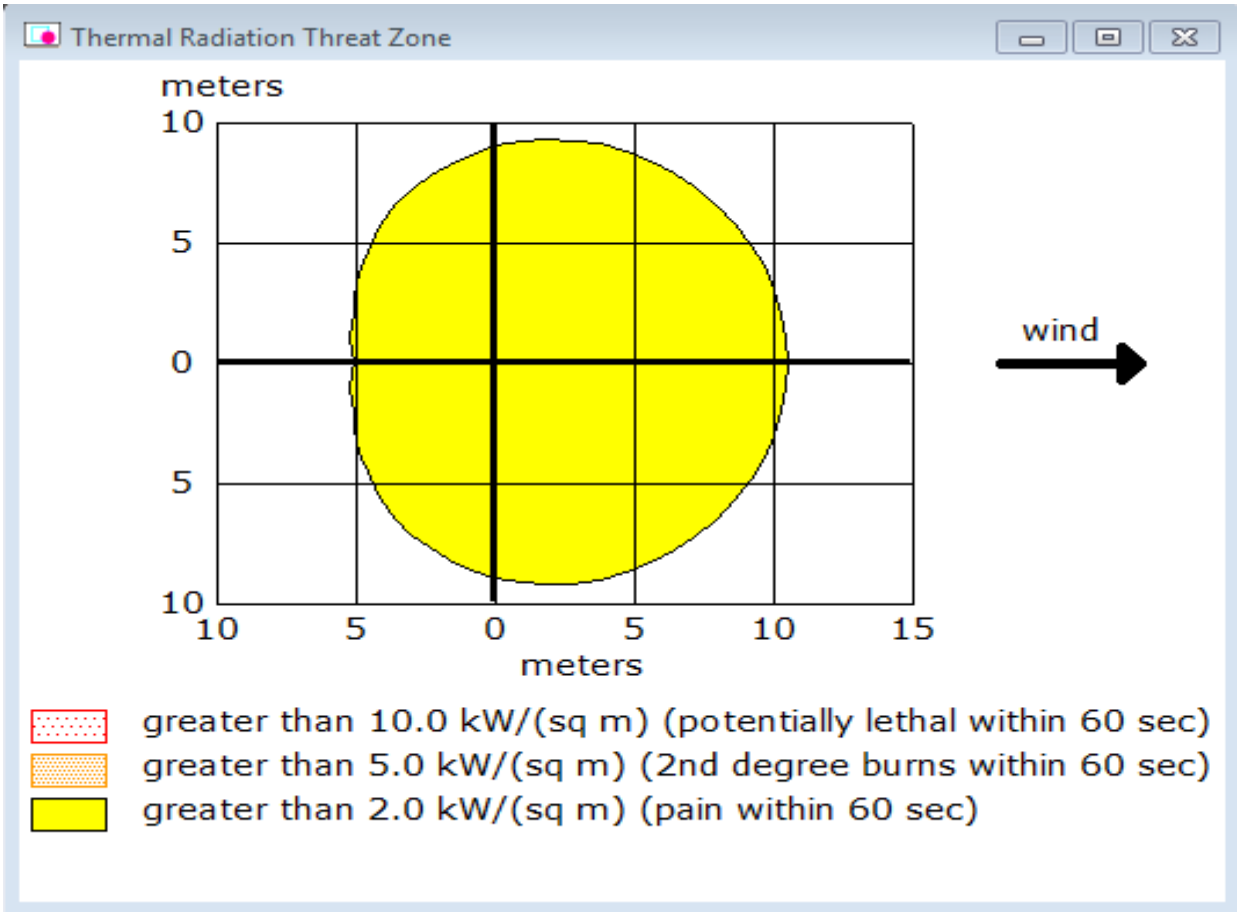
Wind: 14.3 miles/hour from SE at 3 meters
Ground Roughness: open countryCloud Cover: 3 tenths
Air Temperature: 32° C Stability Class: D
No Inversion Height Relative Humidity: 25%

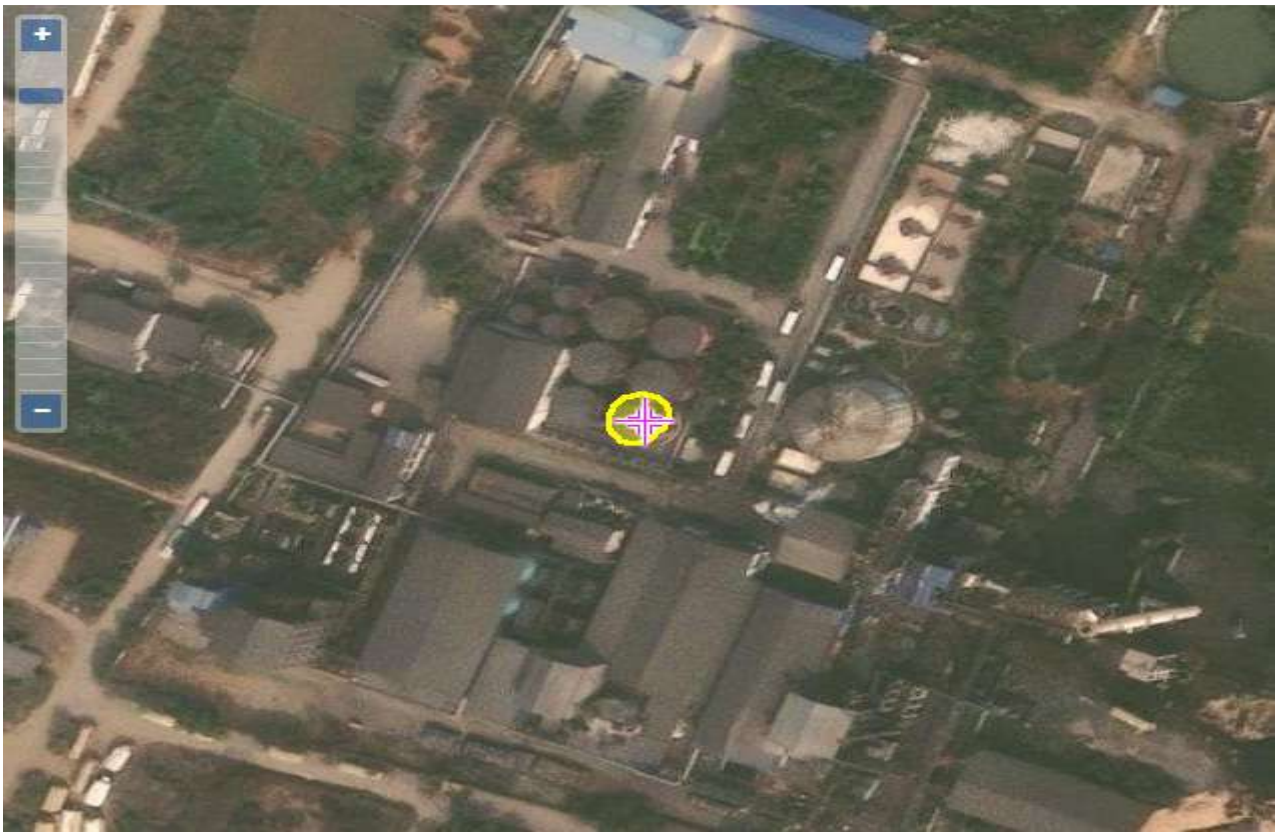
SOURCE STRENGTH:

Leak from hole in vertical cylindrical tank
Flammable chemical is burning as it escapes from tank
Tank Diameter: 15.41 metersTank Length: 9.75 meters
Tank Volume: 1,818 cubic meters
Tank contains liquid Internal Temperature: 32° C
Chemical Mass in Tank: 1,250 tonsTank is 80% full
Circular Opening Diameter: 1 inches
Opening is 0.5 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: 23.3 kilograms/min
Total Amount Burned: 1,348 kilograms
Note: The chemical escaped as a liquid and formed a burning puddle.
The puddle spread to a diameter of 4.2 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: 11 meters --- (2.0 kW/(sq m) = pain within 60 sec)


Thermal Radiation Threat Zone
meters
10
5
0
5
10
10
5
0
5
10
15
meters
wind
greater than 10.0 kW/(sq m) (potentially lethal within 60 sec)
greater than 5.0 kW/(sq m) (2nd degree burns within 60 sec)
greater than 2.0 kW/(sq m) (pain within 60 sec)



7.2 ETHANOL (1843.8 KL Tank- 2 inch Hole)

SITE DATA:

Location: SPY AGRO INDUSTRIES LTD, INDIA
Building Air Exchanges Per Hour: 0.50 (enclosed office)
Time: August 29, 2024 1702 hours ST (using computer's clock)

CHEMICAL DATA:

Chemical Name: ETHANOL
CAS Number: 64-17-5 Molecular Weight: 46.07 g/mol
ERPG-1: 1800 ppmERPG-2: 3300 ppm ERPG-3: N/A
IDLH: 3300 ppm LEL: 33000 ppmUEL: 190000 ppm
Ambient Boiling Point: 77.6° C
Vapor Pressure at Ambient Temperature: 0.12 atm
Ambient Saturation Concentration: 119,120 ppm or 11.9%

ATMOSPHERIC DATA: (MANUAL INPUT OF DATA)

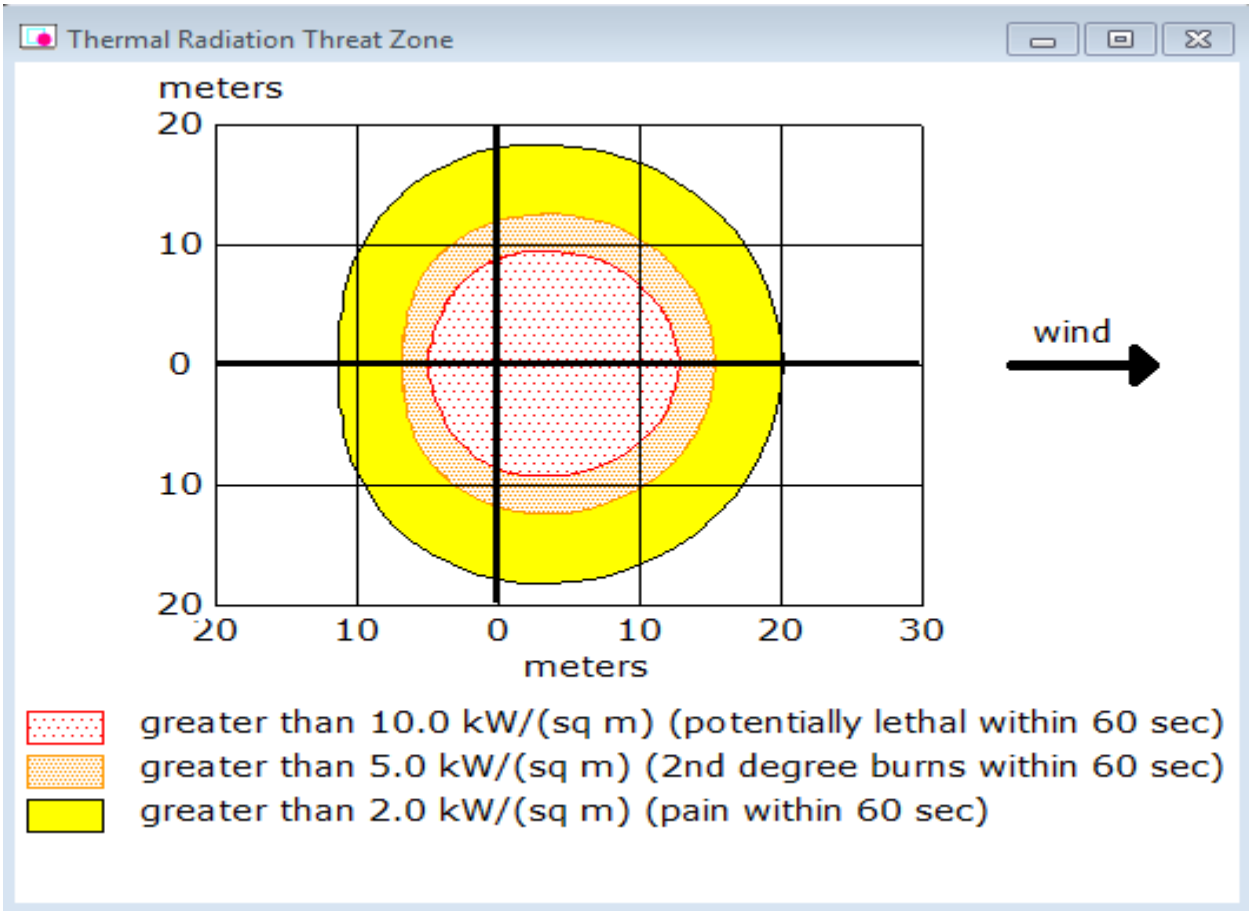
Wind: 14.3 miles/hour from SE at 3 meters
Ground Roughness: open countryCloud Cover: 3 tenths
Air Temperature: 32° C Stability Class: D
No Inversion Height Relative Humidity: 25%

SOURCE STRENGTH:

Leak from hole in vertical cylindrical tank
Flammable chemical is burning as it escapes from tank
Tank Diameter: 15.41 metersTank Length: 9.75 meters
Tank Volume: 1,818 cubic meters
Tank contains liquid Internal Temperature: 32° C
Chemical Mass in Tank: 1,250 tonsTank is 80% full
Circular Opening Diameter: 2 inches
Opening is 0.5 meters from tank bottom
Max Puddle Diameter: Unknown
Max Flame Length: 6 meters
Burn Duration: ALOHA limited the duration to 1 hour
Max Burn Rate: 93.2 kilograms/min
Total Amount Burned: 5,392 kilograms
Note: The chemical escaped as a liquid and formed a burning puddle.
The puddle spread to a diameter of 8.4 meters.

THREAT ZONE:

Threat Modeled: Thermal radiation from pool fire
Red: 13 meters --- (10.0 kW/(sq m) = potentially lethal within 60 sec)
Orange: 15 meters --- (5.0 kW/(sq m) = 2nd degree burns within 60 sec)
Yellow: 20 meters --- (2.0 kW/(sq m) = pain within 60 sec)


Thermal Radiation Threat Zone
meters
20
10
0
10
20
20
10
0
10
20
30
meters
wind
greater than 10.0 kW/(sq m) (potentially lethal within 60 sec)
greater than 5.0 kW/(sq m) (2nd degree burns within 60 sec)
greater than 2.0 kW/(sq m) (pain within 60 sec)

7.3 ETHANOL (1843.8 KL Tank-3 inch Hole)

SITE DATA:

Location: SPY AGRO INDUSTRIES LTD, INDIA
Building Air Exchanges Per Hour: 0.50 (enclosed office)
Time: August 29, 2024 1702 hours ST (using computer's clock)

CHEMICAL DATA:

Chemical Name: ETHANOL
CAS Number: 64-17-5 Molecular Weight: 46.07 g/mol
ERPG-1: 1800 ppmERPG-2: 3300 ppm ERPG-3: N/A
IDLH: 3300 ppm LEL: 33000 ppmUEL: 190000 ppm
Ambient Boiling Point: 77.6° C
Vapor Pressure at Ambient Temperature: 0.12 atm
Ambient Saturation Concentration: 119,120 ppm or 11.9%

ATMOSPHERIC DATA: (MANUAL INPUT OF DATA)

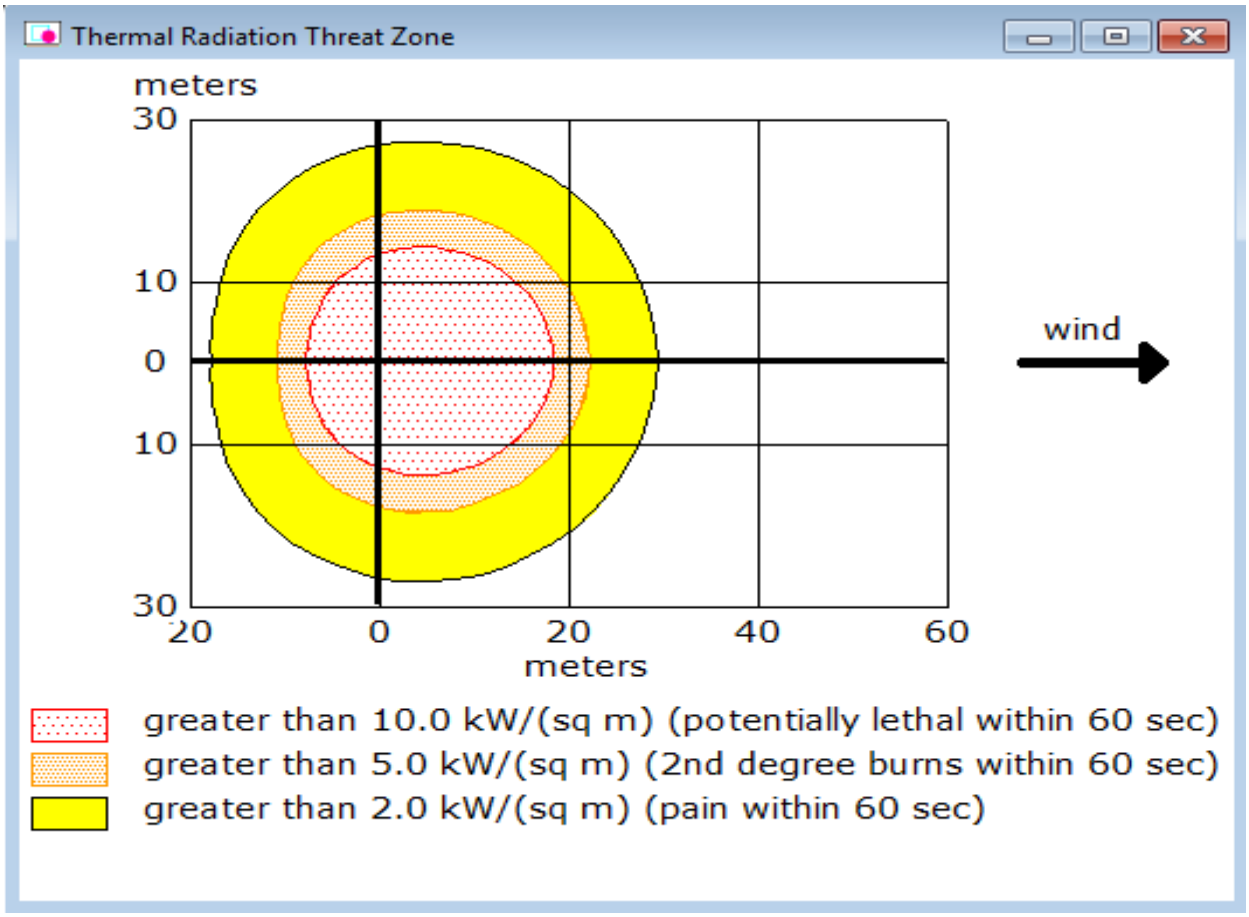
Wind: 14.3 miles/hour from SE at 3 meters
Ground Roughness: open countryCloud Cover: 3 tenths
Air Temperature: 32° C Stability Class: D
No Inversion Height Relative Humidity: 25%

SOURCE STRENGTH:

Leak from hole in vertical cylindrical tank
Flammable chemical is burning as it escapes from tank
Tank Diameter: 15.41 metersTank Length: 9.75 meters
Tank Volume: 1,818 cubic meters
Tank contains liquid Internal Temperature: 32° C
Chemical Mass in Tank: 1,250 tonsTank is 80% full
Circular Opening Diameter: 2 inches
Opening is 0.5 meters from tank bottom
Max Puddle Diameter: Unknown
Max Flame Length: 6 meters
Burn Duration: ALOHA limited the duration to 1 hour
Max Burn Rate: 93.2 kilograms/min
Total Amount Burned: 5,392 kilograms
Note: The chemical escaped as a liquid and formed a burning puddle.
The puddle spread to a diameter of 8.4 meters.

THREAT ZONE:

Threat Modeled: Thermal radiation from pool fire
Red: 13 meters --- (10.0 kW/(sq m) = potentially lethal within 60 sec)
Orange: 15 meters --- (5.0 kW/(sq m) = 2nd degree burns within 60 sec)
Yellow: 20 meters --- (2.0 kW/(sq m) = pain within 60 sec)


Thermal Radiation Threat Zone
meters
30
10
0
10
30
20
0
20
40
60
meters
wind
greater than 10.0 kW/(sq m) (potentially lethal within 60 sec)
greater than 5.0 kW/(sq m) (2nd degree burns within 60 sec)
greater than 2.0 kW/(sq m) (pain within 60 sec)

7.4 ETHANOL (1843.8 KL Tank-5 inch Hole)

SITE DATA:

Location: SPY AGRO INDUSTRIES LTD, INDIA
Building Air Exchanges Per Hour: 0.50 (enclosed office)
Time: August 29, 2024 1702 hours ST (using computer's clock)

CHEMICAL DATA:

Chemical Name: ETHANOL
CAS Number: 64-17-5 Molecular Weight: 46.07 g/mol
ERPG-1: 1800 ppmERPG-2: 3300 ppm ERPG-3: N/A
IDLH: 3300 ppm LEL: 33000 ppmUEL: 190000 ppm
Ambient Boiling Point: 77.6° C
Vapor Pressure at Ambient Temperature: 0.12 atm
Ambient Saturation Concentration: 119,120 ppm or 11.9%

ATMOSPHERIC DATA: (MANUAL INPUT OF DATA)

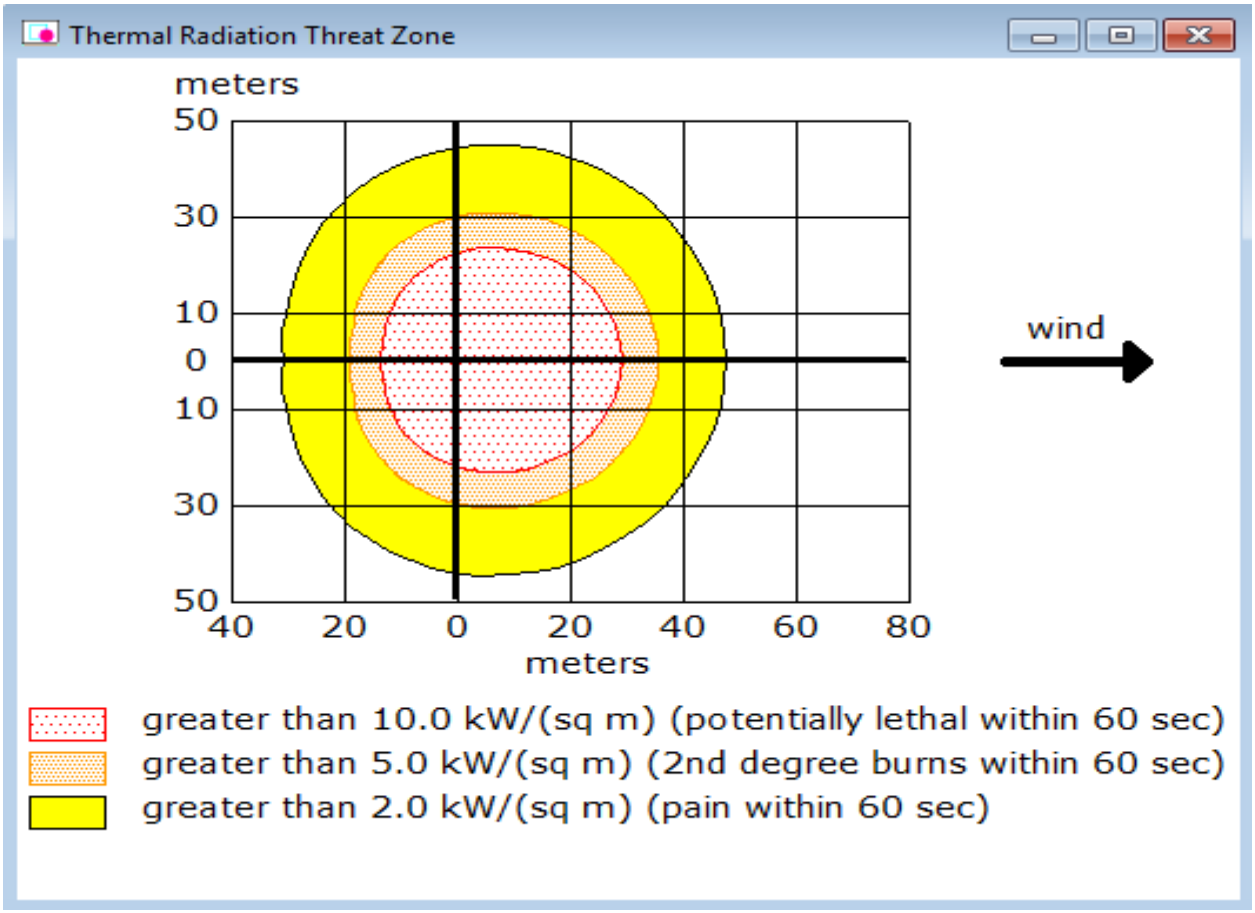
Wind: 14.3 miles/hour from SE at 3 meters
Ground Roughness: open countryCloud Cover: 3 tenths
Air Temperature: 32° C Stability Class: D
No Inversion Height Relative Humidity: 25%

SOURCE STRENGTH:

Leak from hole in vertical cylindrical tank
Flammable chemical is burning as it escapes from tank
Tank Diameter: 15.41 metersTank Length: 9.75 meters
Tank Volume: 1,818 cubic meters
Tank contains liquid Internal Temperature: 32° C
Chemical Mass in Tank: 1,250 tonsTank is 80% full
Circular Opening Diameter: 5 inches
Opening is 0.5 meters from tank bottom
Max Puddle Diameter: Unknown
Max Flame Length: 13 meters
Burn Duration: ALOHA limited the duration to 1 hour
Max Burn Rate: 583 kilograms/min
Total Amount Burned: 33,699 kilograms
Note: The chemical escaped as a liquid and formed a burning puddle.
The puddle spread to a diameter of 21 meters.

THREAT ZONE:

Threat Modeled: Thermal radiation from pool fire
Red: 29 meters --- (10.0 kW/(sq m) = potentially lethal within 60 sec)
Orange: 36 meters --- (5.0 kW/(sq m) = 2nd degree burns within 60 sec)
Yellow: 48 meters --- (2.0 kW/(sq m) = pain within 60 sec)


Thermal Radiation Threat Zone
meters
50
30
10
0
10
30
50
40
20
0
20
40
60
80
meters
wind
greater than 10.0 kW/(sq m) (potentially lethal within 60 sec)
greater than 5.0 kW/(sq m) (2nd degree burns within 60 sec)
greater than 2.0 kW/(sq m) (pain within 60 sec)

7.5 ETHANOL (1843.8 KL Bleve)

SITE DATA:

Location: SPY AGRO INDUSTRIES LTD, INDIA
Building Air Exchanges Per Hour: 0.50 (enclosed office)
Time: August 29, 2024 1702 hours ST (using computer's clock)

CHEMICAL DATA:

Chemical Name: ETHANOL
CAS Number: 64-17-5 Molecular Weight: 46.07 g/mol
ERPG-1: 1800 ppmERPG-2: 3300 ppm ERPG-3: N/A
IDLH: 3300 ppm LEL: 33000 ppmUEL: 190000 ppm
Ambient Boiling Point: 77.6° C
Vapor Pressure at Ambient Temperature: 0.12 atm
Ambient Saturation Concentration: 119,120 ppm or 11.9%

ATMOSPHERIC DATA: (MANUAL INPUT OF DATA)

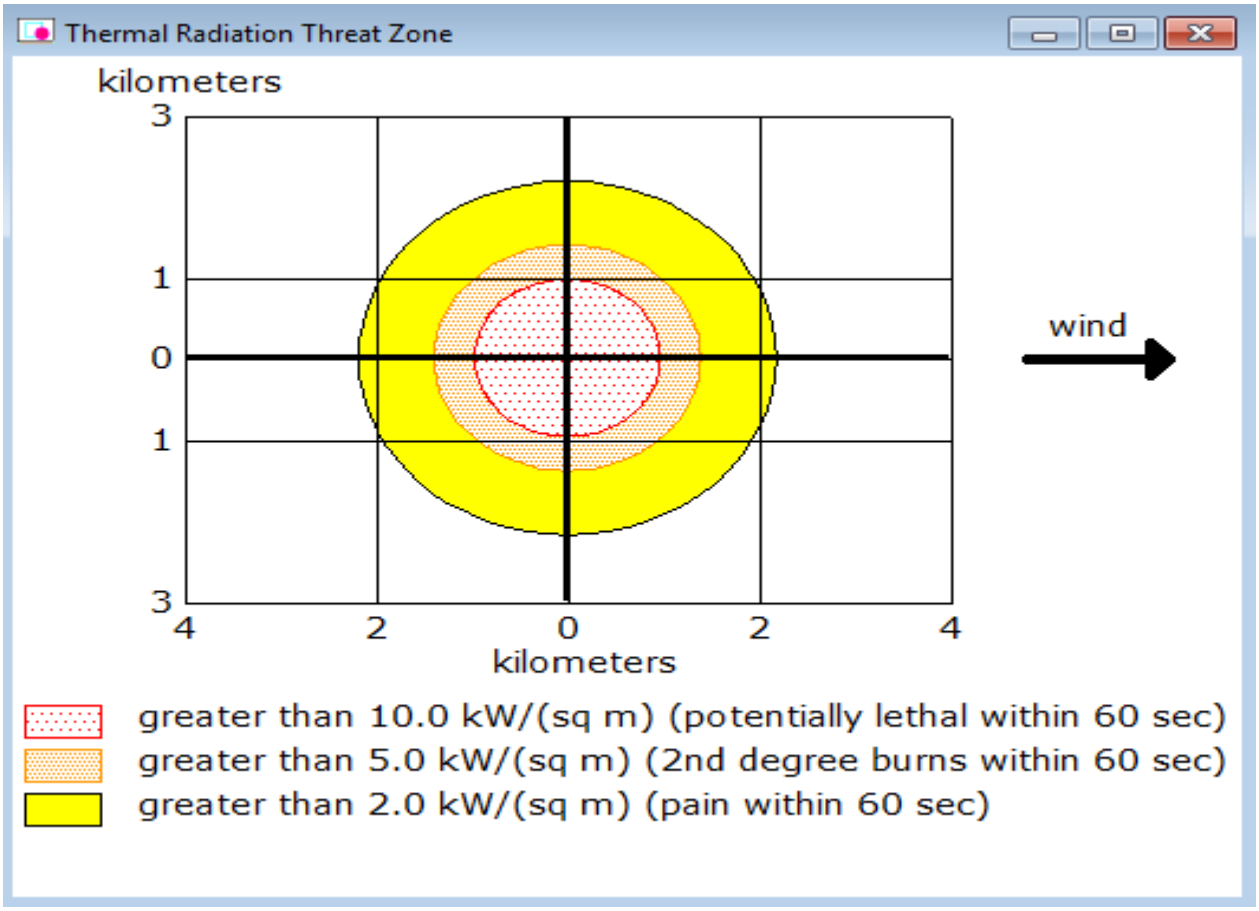
Wind: 14.3 miles/hour from SE at 3 meters
Ground Roughness: open countryCloud Cover: 3 tenths
Air Temperature: 32° C Stability Class: D
No Inversion Height Relative Humidity: 25%

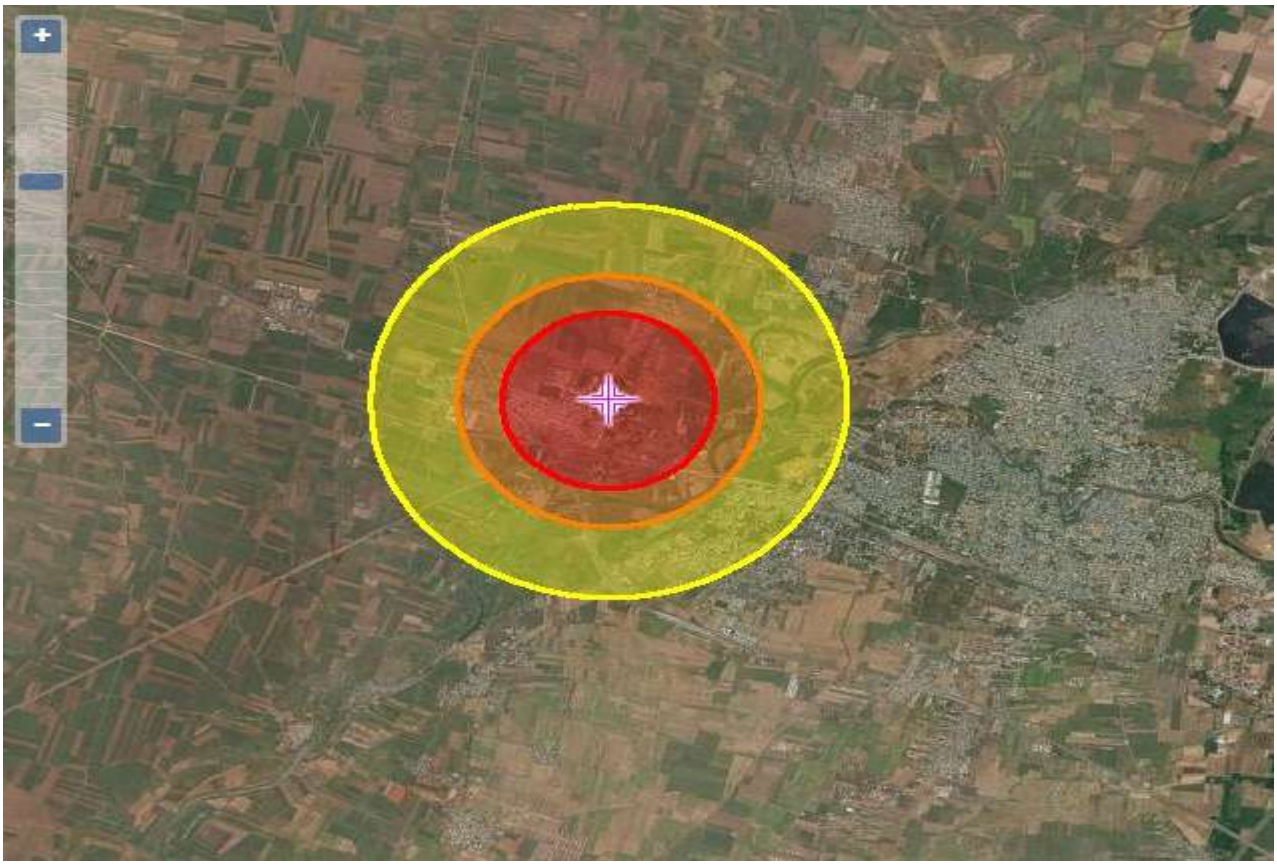
SOURCE STRENGTH:

BLEVE of flammable liquid in vertical cylindrical tank
Tank Diameter: 15.41 metersTank Length: 9.75 meters
Tank Volume: 1,818 cubic meters
Tank contains liquid
Internal Storage Temperature: 32° C
Chemical Mass in Tank: 1,250 tonsTank is 80% full
Percentage of Tank Mass in Fireball: 100%
Fireball Diameter: 605 meters Burn Duration: 29 seconds

THREAT ZONE:

Threat Modeled: Thermal radiation from fireball
Red: 974 meters --- (10.0 kW/(sq m) = potentially lethal within 60 sec)
Orange: 1.4 kilometers --- (5.0 kW/(sq m) = 2nd degree burns within 60 sec)
Yellow: 2.2 kilometers --- (2.0 kW/(sq m) = pain within 60 sec)


Thermal Radiation Threat Zone
kilometers
3
1
0
1
3
4
2
0
2
4
kilometers
wind
greater than 10.0 kW/(sq m) (potentially lethal within 60 sec)
greater than 5.0 kW/(sq m) (2nd degree burns within 60 sec)
greater than 2.0 kW/(sq m) (pain within 60 sec)



7.6 ETHANOL (1848.47 KL Tank-1 inch Hole)

SITE DATA:

Location: SPY AGRO INDUSTRIES LTD, INDIA
Building Air Exchanges Per Hour: 0.50 (enclosed office)
Time: August 29, 2024 1702 hours ST (using computer's clock)

CHEMICAL DATA:

Chemical Name: ETHANOL
CAS Number: 64-17-5 Molecular Weight: 46.07 g/mol
ERPG-1: 1800 ppmERPG-2: 3300 ppm ERPG-3: N/A
IDLH: 3300 ppm LEL: 33000 ppmUEL: 190000 ppm
Ambient Boiling Point: 77.6° C
Vapor Pressure at Ambient Temperature: 0.12 atm
Ambient Saturation Concentration: 119,120 ppm or 11.9%

ATMOSPHERIC DATA: (MANUAL INPUT OF DATA)

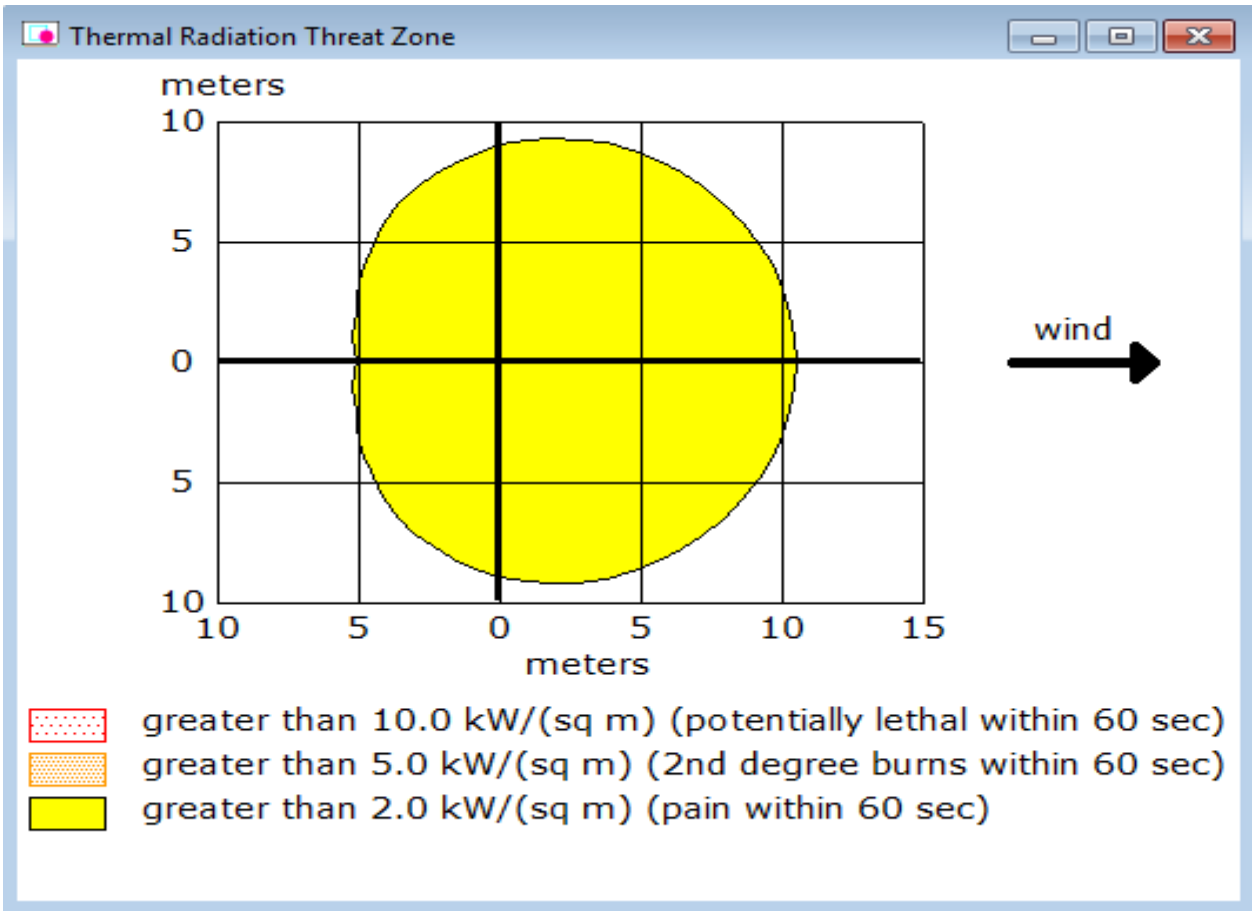
Wind: 14.3 miles/hour from SE at 3 meters
Ground Roughness: open countryCloud Cover: 3 tenths
Air Temperature: 32° C Stability Class: D
No Inversion Height Relative Humidity: 25%

SOURCE STRENGTH:

Leak from hole in vertical cylindrical tank
Flammable chemical is burning as it escapes from tank
Tank Diameter: 15.429 meters Tank Length: 9.75 meters
Tank Volume: 1,823 cubic meters
Tank contains liquid Internal Temperature: 32° C
Chemical Mass in Tank: 1,253 tonsTank is 80% full
Circular Opening Diameter: 1 inches
Opening is 0.5 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: 23.3 kilograms/min
Total Amount Burned: 1,348 kilograms
Note: The chemical escaped as a liquid and formed a burning puddle.
The puddle spread to a diameter of 4.2 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: 11 meters --- (2.0 kW/(sq m) = pain within 60 sec)


Thermal Radiation Threat Zone
meters
10
5
0
5
10
10
5
0
5
10
15
meters
wind
greater than 10.0 kW/(sq m) (potentially lethal within 60 sec)
greater than 5.0 kW/(sq m) (2nd degree burns within 60 sec)
greater than 2.0 kW/(sq m) (pain within 60 sec)

7.7 ETHANOL (1848.47 KL Tank-2 inch Hole)

SITE DATA:

Location: SPY AGRO INDUSTRIES LTD, INDIA
Building Air Exchanges Per Hour: 0.50 (enclosed office)
Time: August 29, 2024 1702 hours ST (using computer's clock)

CHEMICAL DATA:

Chemical Name: ETHANOL
CAS Number: 64-17-5 Molecular Weight: 46.07 g/mol
ERPG-1: 1800 ppmERPG-2: 3300 ppm ERPG-3: N/A
IDLH: 3300 ppm LEL: 33000 ppmUEL: 190000 ppm
Ambient Boiling Point: 77.6° C
Vapor Pressure at Ambient Temperature: 0.12 atm
Ambient Saturation Concentration: 119,120 ppm or 11.9%

ATMOSPHERIC DATA: (MANUAL INPUT OF DATA)

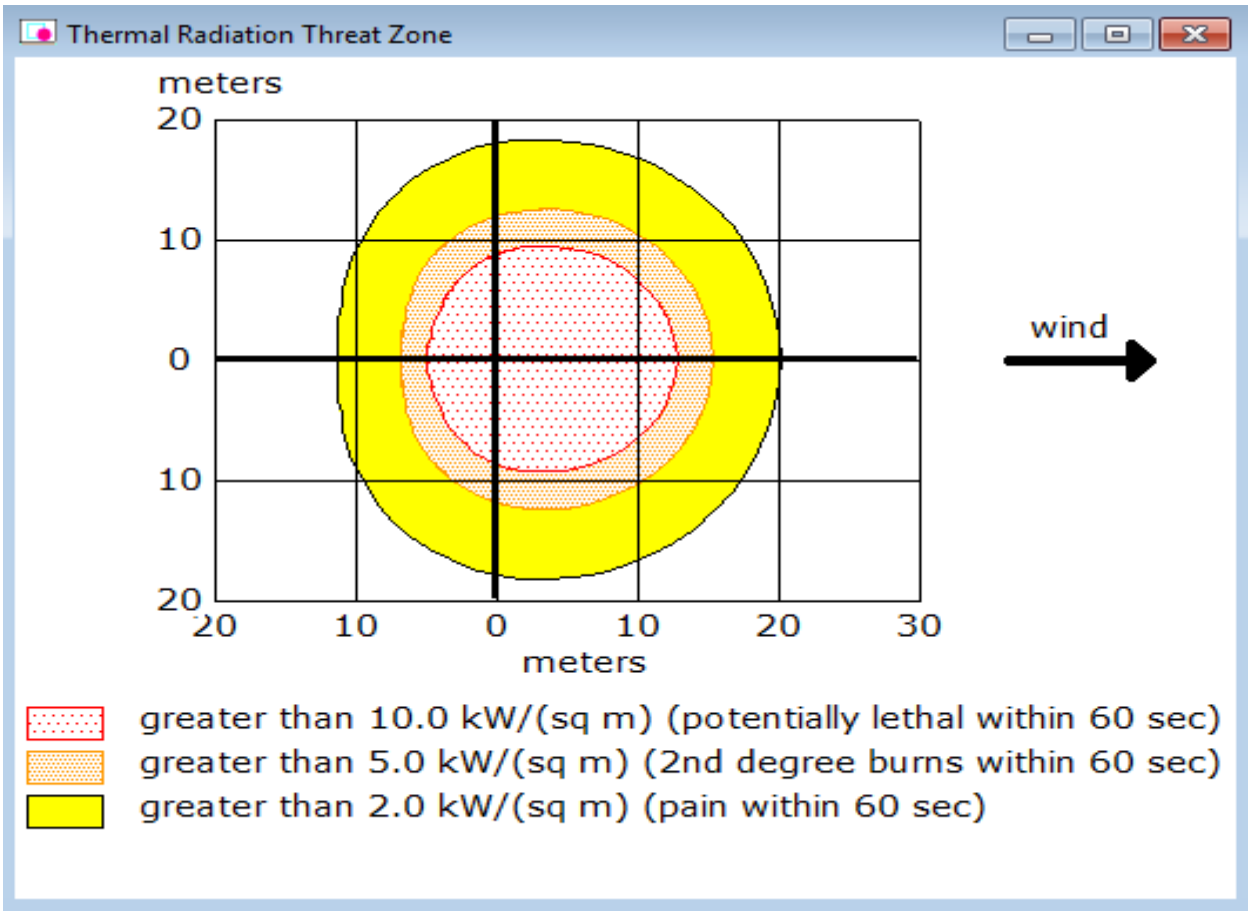
Wind: 14.3 miles/hour from SE at 3 meters
Ground Roughness: open countryCloud Cover: 3 tenths
Air Temperature: 32° C Stability Class: D
No Inversion Height Relative Humidity: 25%

SOURCE STRENGTH:

Leak from hole in vertical cylindrical tank
Flammable chemical is burning as it escapes from tank
Tank Diameter: 15.429 meters Tank Length: 9.75 meters
Tank Volume: 1,823 cubic meters
Tank contains liquid Internal Temperature: 32° C
Chemical Mass in Tank: 1,253 tonsTank is 80% full
Circular Opening Diameter: 2 inches
Opening is 0.5 meters from tank bottom
Max Puddle Diameter: Unknown
Max Flame Length: 6 meters
Burn Duration: ALOHA limited the duration to 1 hour
Max Burn Rate: 93.2 kilograms/min
Total Amount Burned: 5,392 kilograms
Note: The chemical escaped as a liquid and formed a burning puddle.
The puddle spread to a diameter of 8.4 meters.

THREAT ZONE:

Threat Modeled: Thermal radiation from pool fire
Red: 13 meters --- (10.0 kW/(sq m) = potentially lethal within 60 sec)
Orange: 15 meters --- (5.0 kW/(sq m) = 2nd degree burns within 60 sec)
Yellow: 20 meters --- (2.0 kW/(sq m) = pain within 60 sec)


Thermal Radiation Threat Zone
meters
20
10
0
10
20
20
10
0
10
20
30
meters
wind
greater than 10.0 kW/(sq m) (potentially lethal within 60 sec)
greater than 5.0 kW/(sq m) (2nd degree burns within 60 sec)
greater than 2.0 kW/(sq m) (pain within 60 sec)

7.8 ETHANOL (1848.47 KL Tank-3 inch Hole)

SITE DATA:

Location: SPY AGRO INDUSTRIES LTD, INDIA
Building Air Exchanges Per Hour: 0.50 (enclosed office)
Time: August 29, 2024 1702 hours ST (using computer's clock)

CHEMICAL DATA:

Chemical Name: ETHANOL
CAS Number: 64-17-5 Molecular Weight: 46.07 g/mol
ERPG-1: 1800 ppmERPG-2: 3300 ppm ERPG-3: N/A
IDLH: 3300 ppm LEL: 33000 ppmUEL: 190000 ppm
Ambient Boiling Point: 77.6° C
Vapor Pressure at Ambient Temperature: 0.12 atm
Ambient Saturation Concentration: 119,120 ppm or 11.9%

ATMOSPHERIC DATA: (MANUAL INPUT OF DATA)

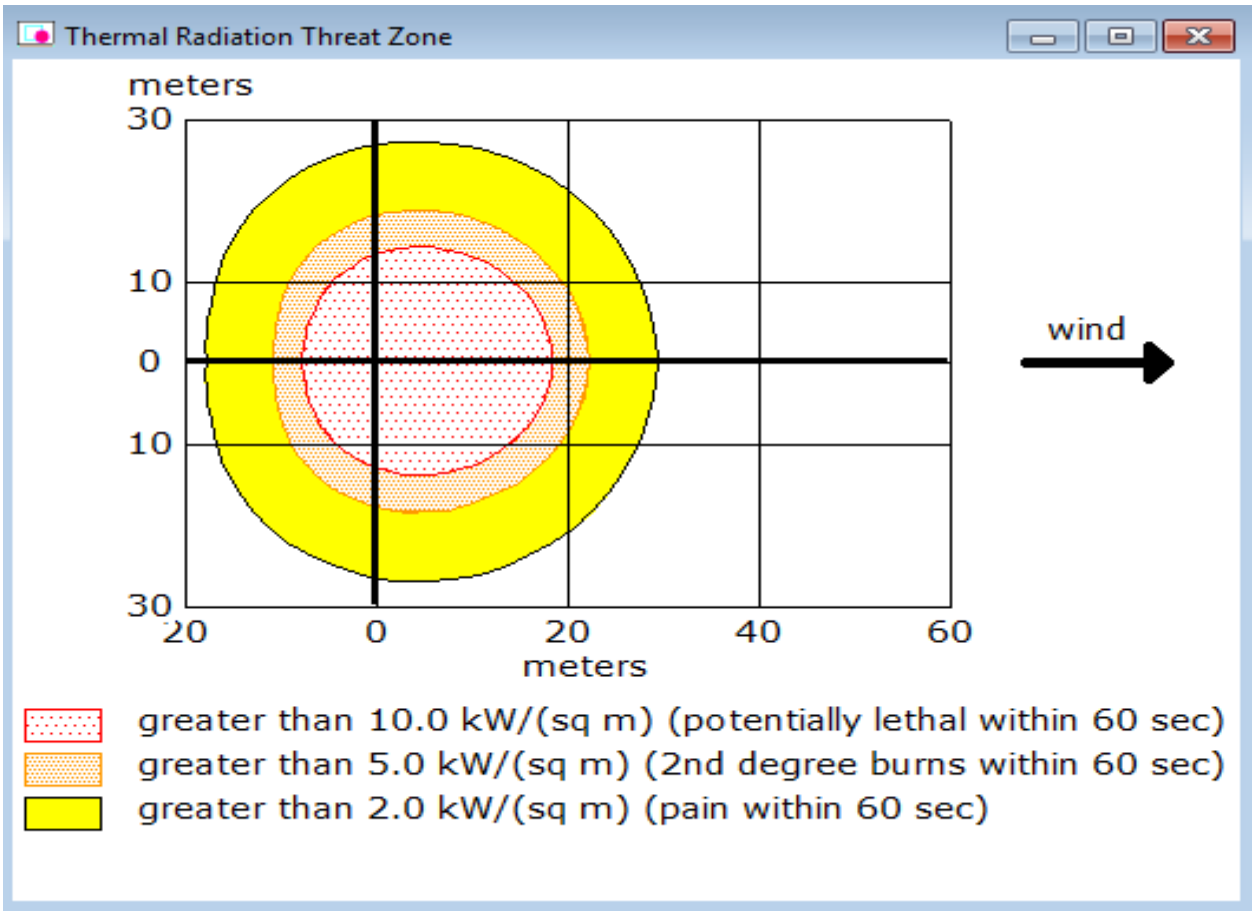
Wind: 14.3 miles/hour from SE at 3 meters
Ground Roughness: open countryCloud Cover: 3 tenths
Air Temperature: 32° C Stability Class: D
No Inversion Height Relative Humidity: 25%

SOURCE STRENGTH:

Leak from hole in vertical cylindrical tank
Flammable chemical is burning as it escapes from tank
Tank Diameter: 15.429 meters Tank Length: 9.75 meters
Tank Volume: 1,823 cubic meters
Tank contains liquid Internal Temperature: 32° C
Chemical Mass in Tank: 1,253 tonsTank is 80% full
Circular Opening Diameter: 3 inches
Opening is 0.5 meters from tank bottom
Max Puddle Diameter: Unknown
Max Flame Length: 9 meters
Burn Duration: ALOHA limited the duration to 1 hour
Max Burn Rate: 210 kilograms/min
Total Amount Burned: 12,131 kilograms
Note: The chemical escaped as a liquid and formed a burning puddle.
The puddle spread to a diameter of 12.7 meters.

THREAT ZONE:

Threat Modeled: Thermal radiation from pool fire
Red: 19 meters --- (10.0 kW/(sq m) = potentially lethal within 60 sec)
Orange: 22 meters --- (5.0 kW/(sq m) = 2nd degree burns within 60 sec)
Yellow: 29 meters --- (2.0 kW/(sq m) = pain within 60 sec)


Thermal Radiation Threat Zone
meters
30
10
0
10
30
20
0
20
40
60
meters
wind
greater than 10.0 kW/(sq m) (potentially lethal within 60 sec)
greater than 5.0 kW/(sq m) (2nd degree burns within 60 sec)
greater than 2.0 kW/(sq m) (pain within 60 sec)

7.9 ETHANOL (1848.47 KL Tank-5 inch Hole)

SITE DATA:

Location: SPY AGRO INDUSTRIES LTD, INDIA
Building Air Exchanges Per Hour: 0.50 (enclosed office)
Time: August 29, 2024 1702 hours ST (using computer's clock)

CHEMICAL DATA:

Chemical Name: ETHANOL
CAS Number: 64-17-5 Molecular Weight: 46.07 g/mol
ERPG-1: 1800 ppmERPG-2: 3300 ppm ERPG-3: N/A
IDLH: 3300 ppm LEL: 33000 ppmUEL: 190000 ppm
Ambient Boiling Point: 77.6° C
Vapor Pressure at Ambient Temperature: 0.12 atm
Ambient Saturation Concentration: 119,120 ppm or 11.9%

ATMOSPHERIC DATA: (MANUAL INPUT OF DATA)

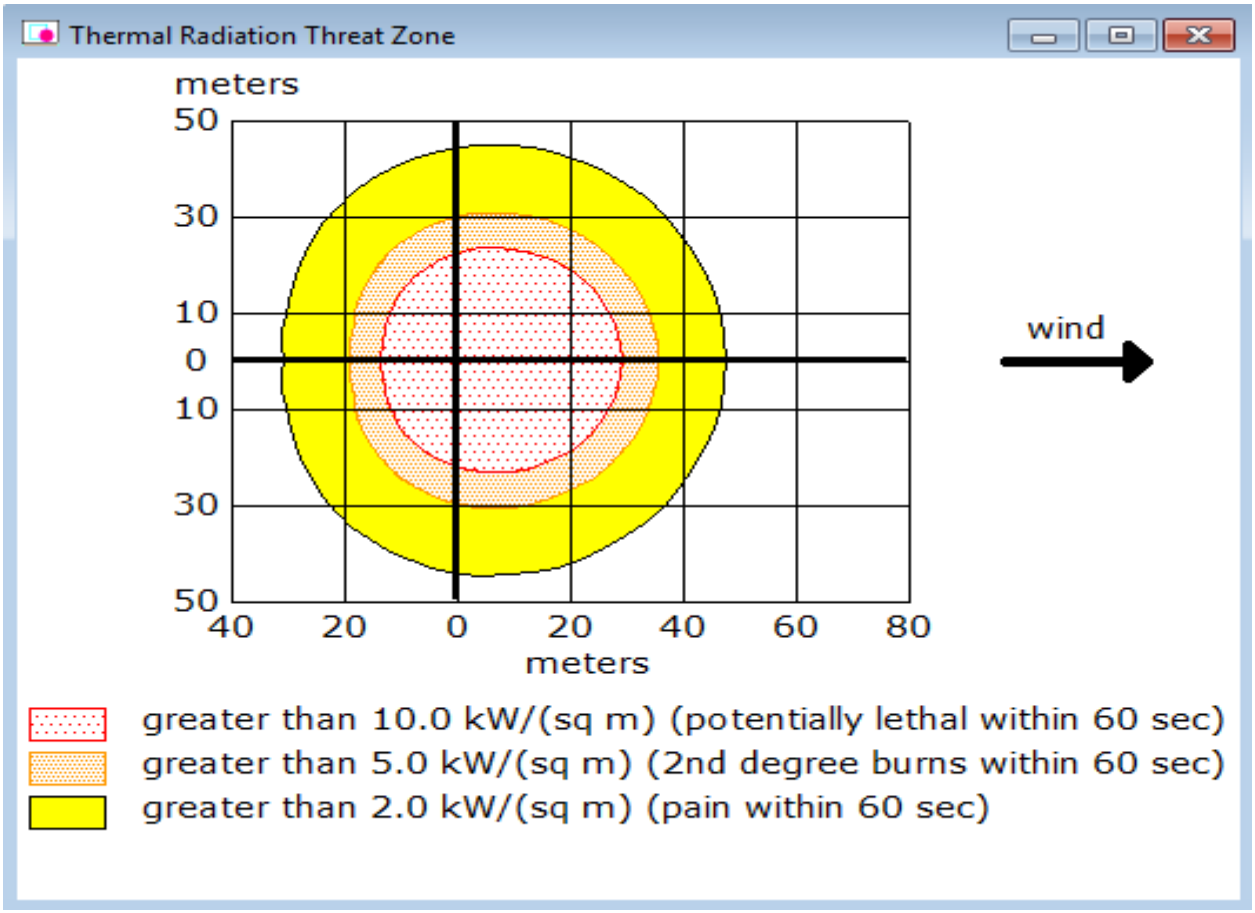
Wind: 14.3 miles/hour from SE at 3 meters
Ground Roughness: open countryCloud Cover: 3 tenths
Air Temperature: 32° C Stability Class: D
No Inversion Height Relative Humidity: 25%

SOURCE STRENGTH:

Leak from hole in vertical cylindrical tank
Flammable chemical is burning as it escapes from tank
Tank Diameter: 15.429 meters Tank Length: 9.75 meters
Tank Volume: 1,823 cubic meters
Tank contains liquid Internal Temperature: 32° C
Chemical Mass in Tank: 1,253 tonsTank is 80% full
Circular Opening Diameter: 5 inches
Opening is 0.5 meters from tank bottom
Max Puddle Diameter: Unknown
Max Flame Length: 13 meters
Burn Duration: ALOHA limited the duration to 1 hour
Max Burn Rate: 583 kilograms/min
Total Amount Burned: 33,699 kilograms
Note: The chemical escaped as a liquid and formed a burning puddle.
The puddle spread to a diameter of 21 meters.

THREAT ZONE:

Threat Modeled: Thermal radiation from pool fire
Red: 29 meters --- (10.0 kW/(sq m) = potentially lethal within 60 sec)
Orange: 36 meters --- (5.0 kW/(sq m) = 2nd degree burns within 60 sec)
Yellow: 48 meters --- (2.0 kW/(sq m) = pain within 60 sec)


Thermal Radiation Threat Zone
meters
50
30
10
0
10
30
50
40
20
0
20
40
60
80
meters
wind
greater than 10.0 kW/(sq m) (potentially lethal within 60 sec)
greater than 5.0 kW/(sq m) (2nd degree burns within 60 sec)
greater than 2.0 kW/(sq m) (pain within 60 sec)

7.10 ETHANOL (1848.47 KL Bleve)

SITE DATA:

Location: SPY AGRO INDUSTRIES LTD, INDIA
Building Air Exchanges Per Hour: 0.50 (enclosed office)
Time: August 29, 2024 1702 hours ST (using computer's clock)

CHEMICAL DATA:

Chemical Name: ETHANOL
CAS Number: 64-17-5 Molecular Weight: 46.07 g/mol
ERPG-1: 1800 ppmERPG-2: 3300 ppm ERPG-3: N/A
IDLH: 3300 ppm LEL: 33000 ppmUEL: 190000 ppm
Ambient Boiling Point: 77.6° C
Vapor Pressure at Ambient Temperature: 0.12 atm
Ambient Saturation Concentration: 119,120 ppm or 11.9%

ATMOSPHERIC DATA: (MANUAL INPUT OF DATA)

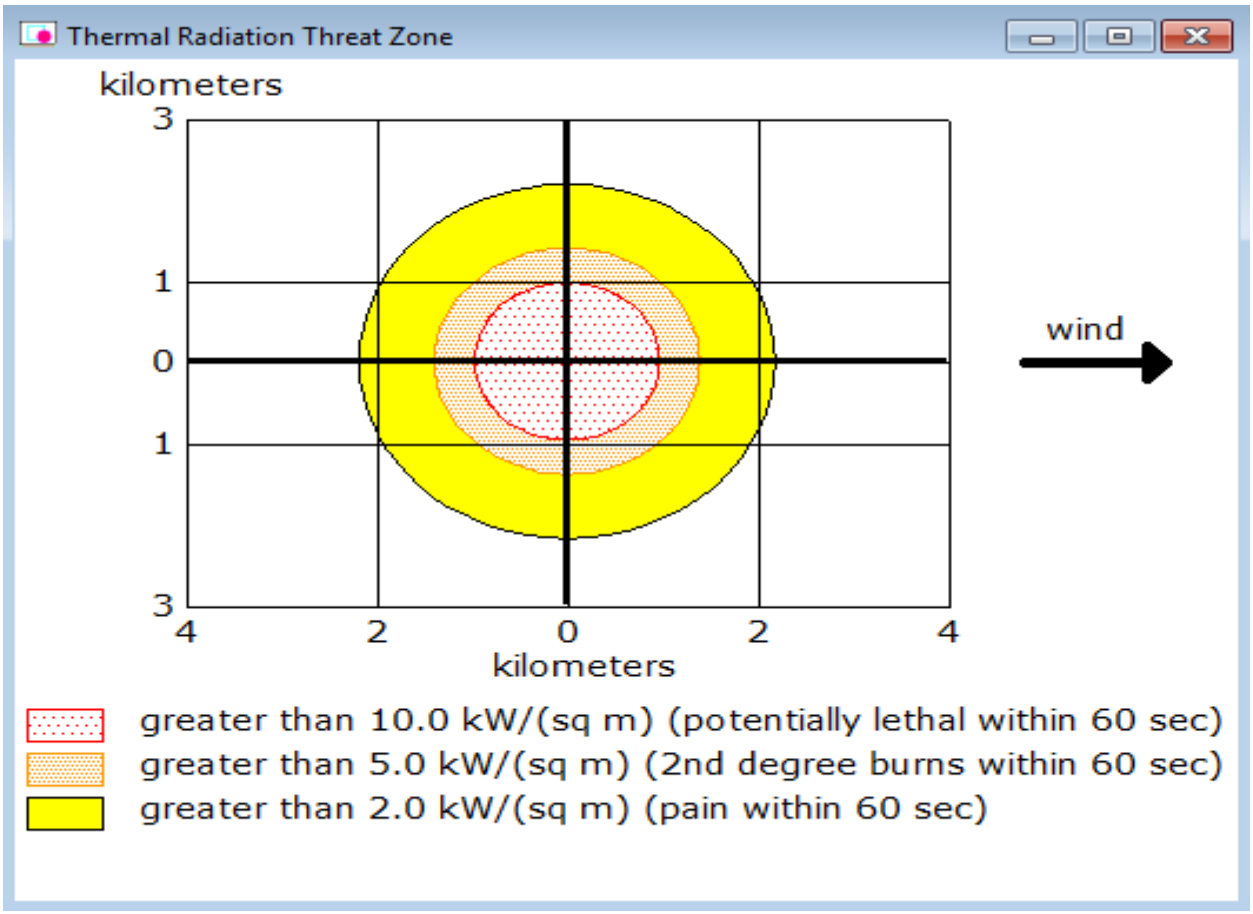
Wind: 14.3 miles/hour from SE at 3 meters
Ground Roughness: open countryCloud Cover: 3 tenths
Air Temperature: 32° C Stability Class: D
No Inversion Height Relative Humidity: 25%

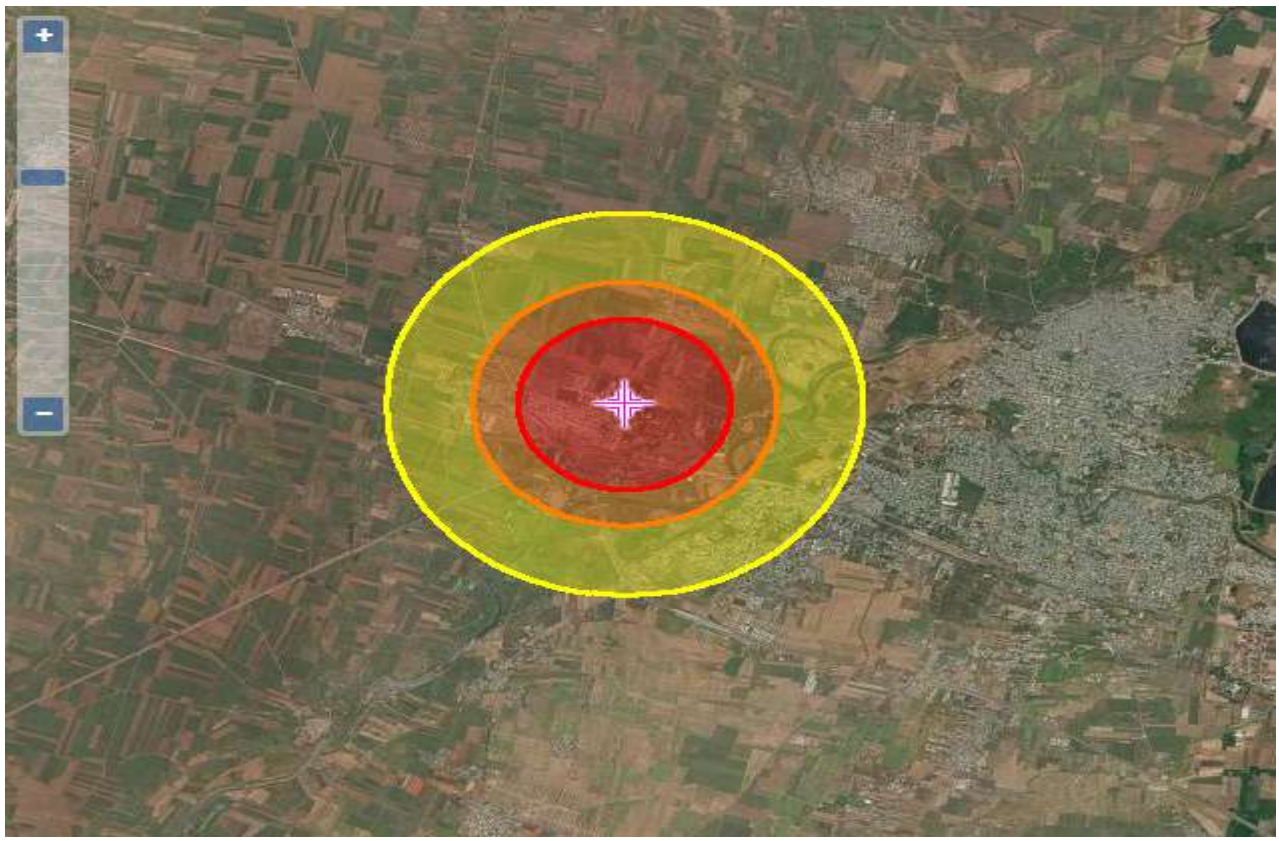
SOURCE STRENGTH:

Leak from hole in vertical cylindrical tank
Flammable chemical is burning as it escapes from tank
Tank Diameter: 15.429 meters Tank Length: 9.75 meters
Tank Volume: 1,823 cubic meters
Tank contains liquid Internal Temperature: 32° C
Chemical Mass in Tank: 1,253 tonsTank is 80% full
Circular Opening Diameter: 5 inches
Opening is 0.5 meters from tank bottom
Max Puddle Diameter: Unknown
Max Flame Length: 13 meters
Burn Duration: ALOHA limited the duration to 1 hour
Max Burn Rate: 583 kilograms/min
Total Amount Burned: 33,699 kilograms
Note: The chemical escaped as a liquid and formed a burning puddle.
The puddle spread to a diameter of 21 meters.

THREAT ZONE:

Threat Modeled: Thermal radiation from pool fire
Red: 29 meters --- (10.0 kW/(sq m) = potentially lethal within 60 sec)
Orange: 36 meters --- (5.0 kW/(sq m) = 2nd degree burns within 60 sec)
Yellow: 48 meters --- (2.0 kW/(sq m) = pain within 60 sec)


Thermal Radiation Threat Zone
kilometers
3
1
0
1
3
4
2
0
2
4
kilometers
wind
greater than 10.0 kW/(sq m) (potentially lethal within 60 sec)
greater than 5.0 kW/(sq m) (2nd degree burns within 60 sec)
greater than 2.0 kW/(sq m) (pain within 60 sec)



7.11 ETHANOL (584.7 KL Tank-1 inch Hole)

SITE DATA:

Location: SPY AGRO INDUSTRIES LTD, INDIA
Building Air Exchanges Per Hour: 0.50 (enclosed office)
Time: August 29, 2024 1702 hours ST (using computer's clock)

CHEMICAL DATA:

Chemical Name: ETHANOL
CAS Number: 64-17-5 Molecular Weight: 46.07 g/mol
ERPG-1: 1800 ppmERPG-2: 3300 ppm ERPG-3: N/A
IDLH: 3300 ppm LEL: 33000 ppmUEL: 190000 ppm
Ambient Boiling Point: 77.6° C
Vapor Pressure at Ambient Temperature: 0.12 atm
Ambient Saturation Concentration: 119,120 ppm or 11.9%

ATMOSPHERIC DATA: (MANUAL INPUT OF DATA)

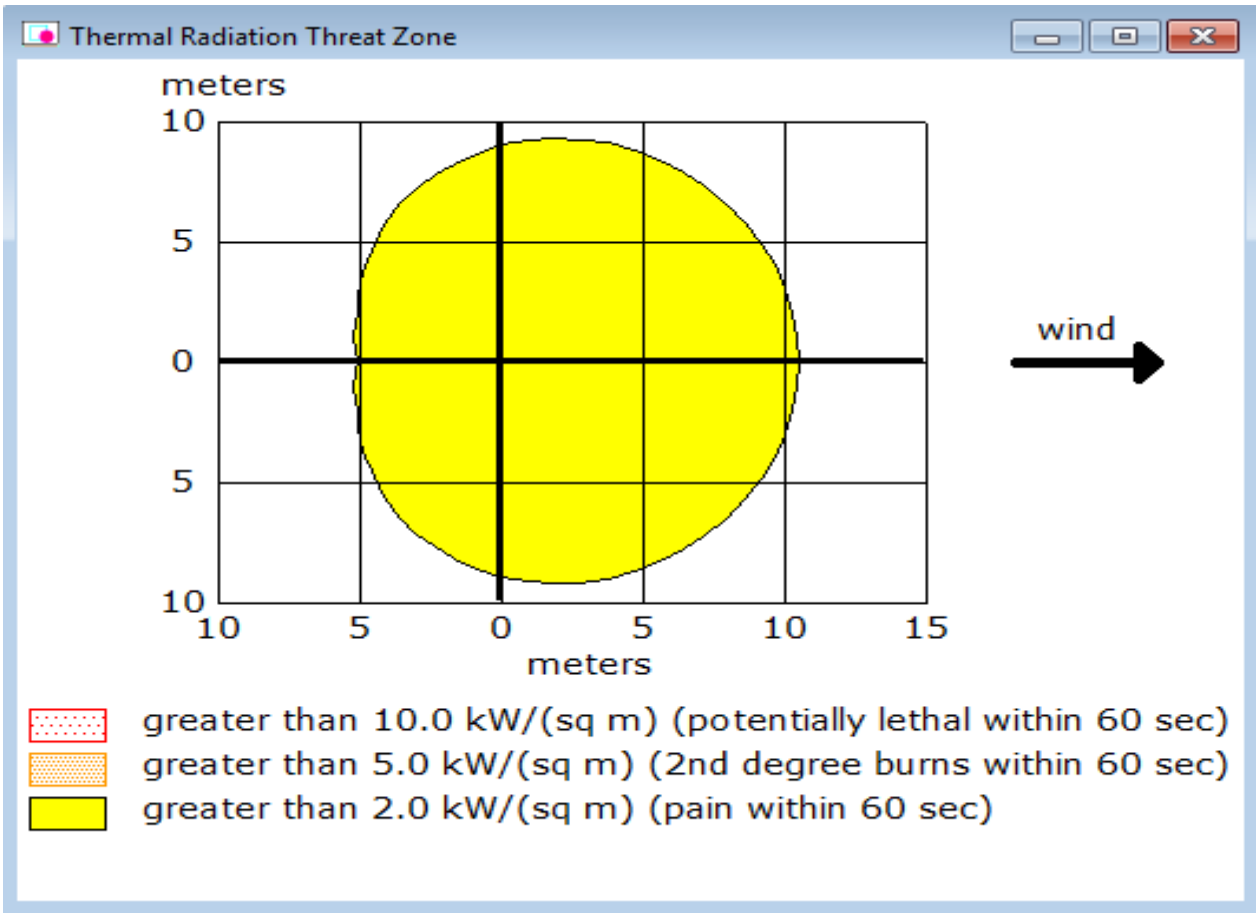
Wind: 14.3 miles/hour from SE at 3 meters
Ground Roughness: open countryCloud Cover: 3 tenths
Air Temperature: 32° C Stability Class: D
No Inversion Height Relative Humidity: 25%

SOURCE STRENGTH:

Leak from hole in vertical cylindrical tank
Flammable chemical is burning as it escapes from tank
Tank Diameter: 8.738 metersTank Length: 5.874 meters
Tank Volume: 352 cubic meters
Tank contains liquid Internal Temperature: 32° C
Chemical Mass in Tank: 242 tons Tank is 80% full
Circular Opening Diameter: 1 inches
Opening is 0.5 meters from tank bottom
Max Flame Length: 4 meters
Burn Duration: ALOHA limited the duration to 1 hour
Max Burn Rate: 23.3 kilograms/min
Total Amount Burned: 1,348 kilograms
Note: The chemical escaped as a liquid and formed a burning puddle.
The puddle spread to a diameter of 4.2 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: 11 meters --- (2.0 kW/(sq m) = pain within 60 sec)


Thermal Radiation Threat Zone
meters
10
5
0
5
10
10
5
0
5
10
15
meters
wind
greater than 10.0 kW/(sq m) (potentially lethal within 60 sec)
greater than 5.0 kW/(sq m) (2nd degree burns within 60 sec)
greater than 2.0 kW/(sq m) (pain within 60 sec)

7.12 ETHANOL (584.7 KL Tank-2 inch Hole)

SITE DATA:

Location: SPY AGRO INDUSTRIES LTD, INDIA
Building Air Exchanges Per Hour: 0.50 (enclosed office)
Time: August 29, 2024 1702 hours ST (using computer's clock)

CHEMICAL DATA:

Chemical Name: ETHANOL
CAS Number: 64-17-5 Molecular Weight: 46.07 g/mol
ERPG-1: 1800 ppmERPG-2: 3300 ppm ERPG-3: N/A
IDLH: 3300 ppm LEL: 33000 ppmUEL: 190000 ppm
Ambient Boiling Point: 77.6° C
Vapor Pressure at Ambient Temperature: 0.12 atm
Ambient Saturation Concentration: 119,120 ppm or 11.9%

ATMOSPHERIC DATA: (MANUAL INPUT OF DATA)

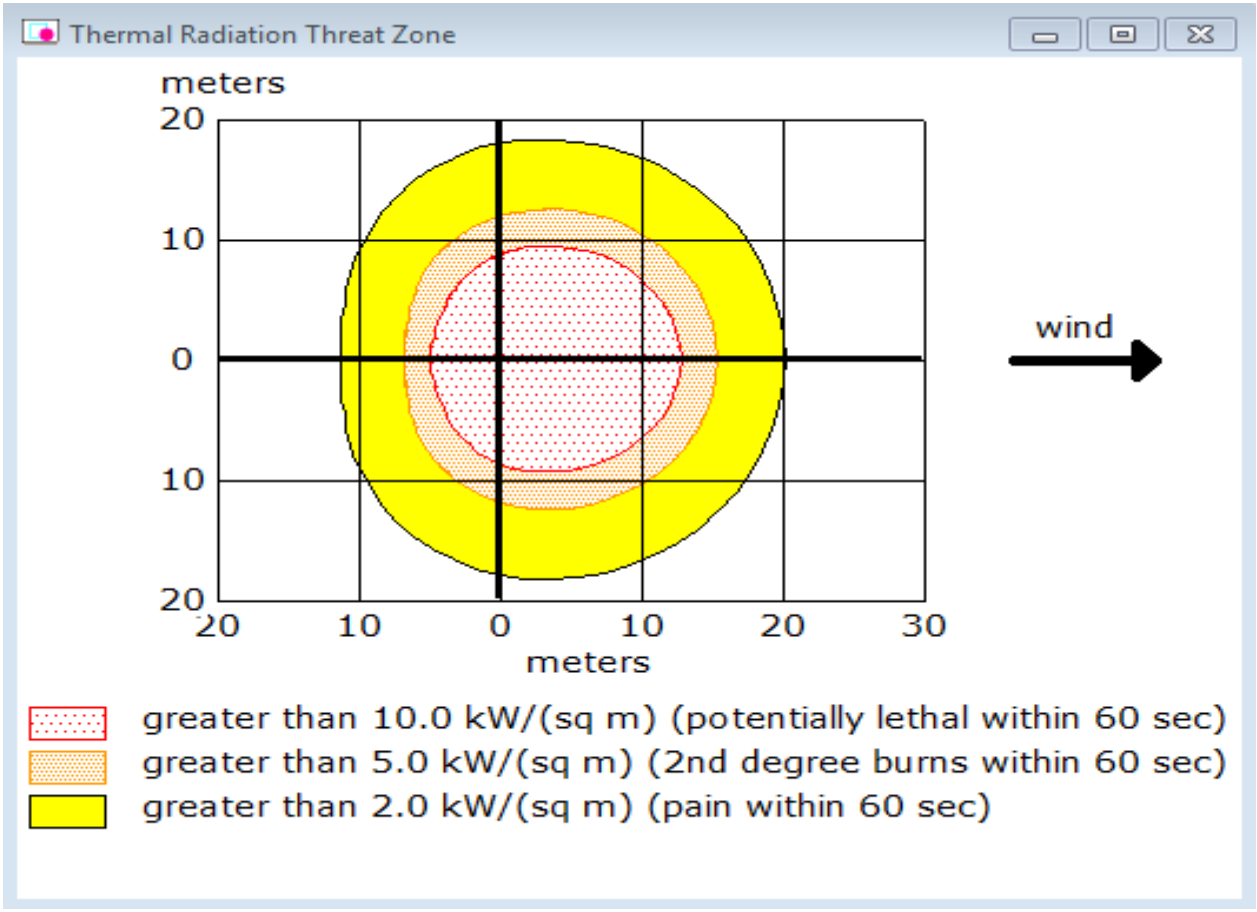
Wind: 14.3 miles/hour from SE at 3 meters
Ground Roughness: open countryCloud Cover: 3 tenths
Air Temperature: 32° C Stability Class: D
No Inversion Height Relative Humidity: 25%

SOURCE STRENGTH:

Leak from hole in vertical cylindrical tank
Flammable chemical is burning as it escapes from tank
Tank Diameter: 8.738 metersTank Length: 5.874 meters
Tank Volume: 352 cubic meters
Tank contains liquid Internal Temperature: 32° C
Chemical Mass in Tank: 242 tons Tank is 80% full
Circular Opening Diameter: 2 inches
Opening is 0.5 meters from tank bottom
Max Flame Length: 6 meters
Burn Duration: ALOHA limited the duration to 1 hour
Max Burn Rate: 93.2 kilograms/min
Total Amount Burned: 5,392 kilograms
Note: The chemical escaped as a liquid and formed a burning puddle.
The puddle spread to a diameter of 8.4 meters.

THREAT ZONE:

Threat Modeled: Thermal radiation from pool fire
Red: 13 meters --- (10.0 kW/(sq m) = potentially lethal within 60 sec)
Orange: 15 meters --- (5.0 kW/(sq m) = 2nd degree burns within 60 sec)
Yellow: 20 meters --- (2.0 kW/(sq m) = pain within 60 sec)


Thermal Radiation Threat Zone
meters
20
10
0
10
20
20
10
0
10
20
30
meters
wind
greater than 10.0 kW/(sq m) (potentially lethal within 60 sec)
greater than 5.0 kW/(sq m) (2nd degree burns within 60 sec)
greater than 2.0 kW/(sq m) (pain within 60 sec)

7.13 ETHANOL (584.7 KL Tank-3 inch Hole)

SITE DATA:

Location: SPY AGRO INDUSTRIES LTD, INDIA
Building Air Exchanges Per Hour: 0.50 (enclosed office)
Time: August 29, 2024 1702 hours ST (using computer's clock)

CHEMICAL DATA:

Chemical Name: ETHANOL
CAS Number: 64-17-5 Molecular Weight: 46.07 g/mol
ERPG-1: 1800 ppmERPG-2: 3300 ppm ERPG-3: N/A
IDLH: 3300 ppm LEL: 33000 ppmUEL: 190000 ppm
Ambient Boiling Point: 77.6° C
Vapor Pressure at Ambient Temperature: 0.12 atm
Ambient Saturation Concentration: 119,120 ppm or 11.9%

ATMOSPHERIC DATA: (MANUAL INPUT OF DATA)

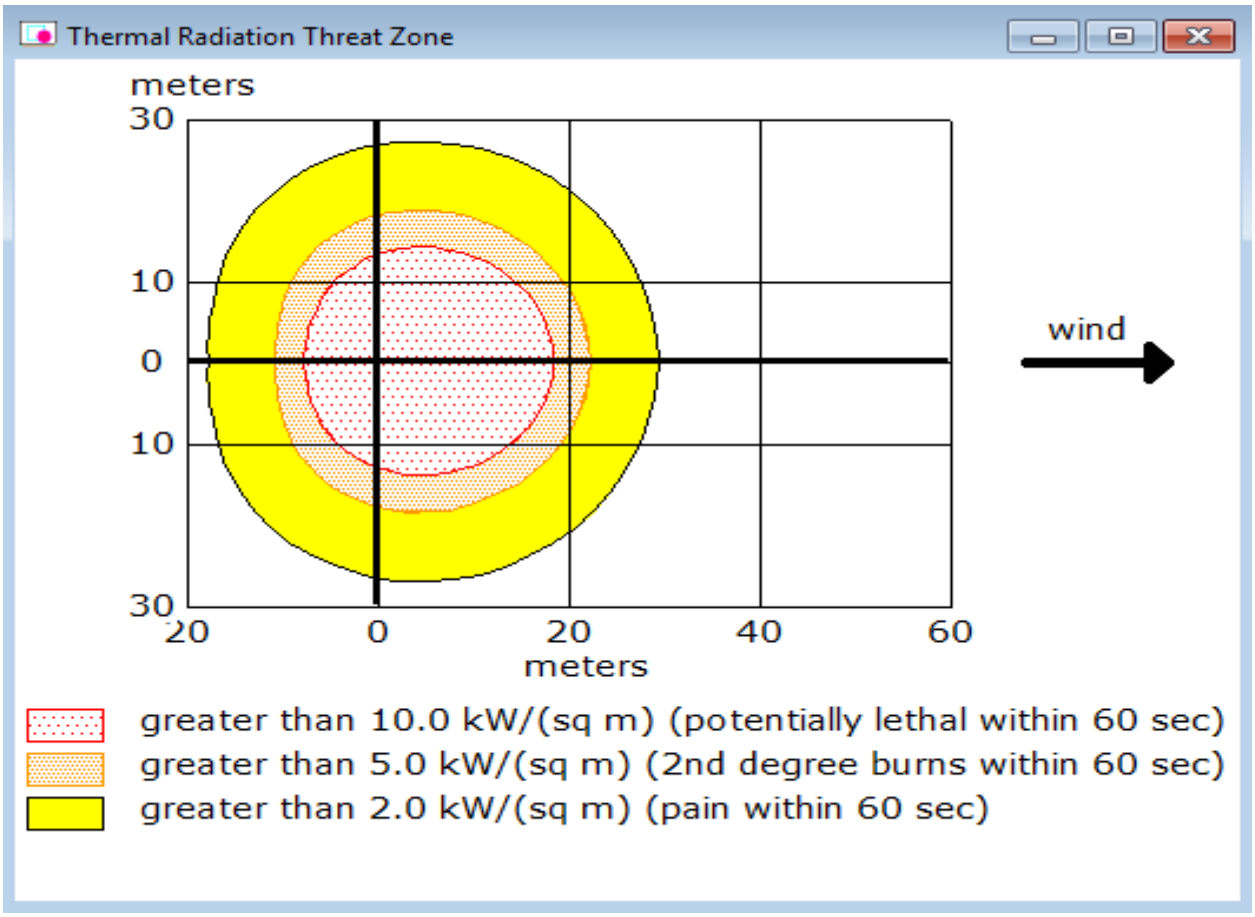
Wind: 14.3 miles/hour from SE at 3 meters
Ground Roughness: open countryCloud Cover: 3 tenths
Air Temperature: 32° C Stability Class: D
No Inversion Height Relative Humidity: 25%

SOURCE STRENGTH:

Leak from hole in vertical cylindrical tank
Flammable chemical is burning as it escapes from tank
Tank Diameter: 8.738 metersTank Length: 5.874 meters
Tank Volume: 352 cubic meters
Tank contains liquid Internal Temperature: 32° C
Chemical Mass in Tank: 242 tons Tank is 80% full
Circular Opening Diameter: 3 inches
Opening is 0.5 meters from tank bottom
Max Flame Length: 9 meters
Burn Duration: ALOHA limited the duration to 1 hour
Max Burn Rate: 210 kilograms/min
Total Amount Burned: 12,131 kilograms
Note: The chemical escaped as a liquid and formed a burning puddle.
The puddle spread to a diameter of 12.7 meters.

THREAT ZONE:

Threat Modeled: Thermal radiation from pool fire
Red: 19 meters --- (10.0 kW/(sq m) = potentially lethal within 60 sec)
Orange: 22 meters --- (5.0 kW/(sq m) = 2nd degree burns within 60 sec)
Yellow: 29 meters --- (2.0 kW/(sq m) = pain within 60 sec)


Thermal Radiation Threat Zone
meters
30
10
0
10
30
20
0
20
40
60
meters
wind
greater than 10.0 kW/(sq m) (potentially lethal within 60 sec)
greater than 5.0 kW/(sq m) (2nd degree burns within 60 sec)
greater than 2.0 kW/(sq m) (pain within 60 sec)

7.14 ETHANOL (584.7 KL Tank-5 inch Hole)

SITE DATA:

Location: SPY AGRO INDUSTRIES LTD, INDIA
Building Air Exchanges Per Hour: 0.50 (enclosed office)
Time: August 29, 2024 1702 hours ST (using computer's clock)

CHEMICAL DATA:

Chemical Name: ETHANOL
CAS Number: 64-17-5 Molecular Weight: 46.07 g/mol
ERPG-1: 1800 ppmERPG-2: 3300 ppm ERPG-3: N/A
IDLH: 3300 ppm LEL: 33000 ppmUEL: 190000 ppm
Ambient Boiling Point: 77.6° C
Vapor Pressure at Ambient Temperature: 0.12 atm
Ambient Saturation Concentration: 119,120 ppm or 11.9%

ATMOSPHERIC DATA: (MANUAL INPUT OF DATA)

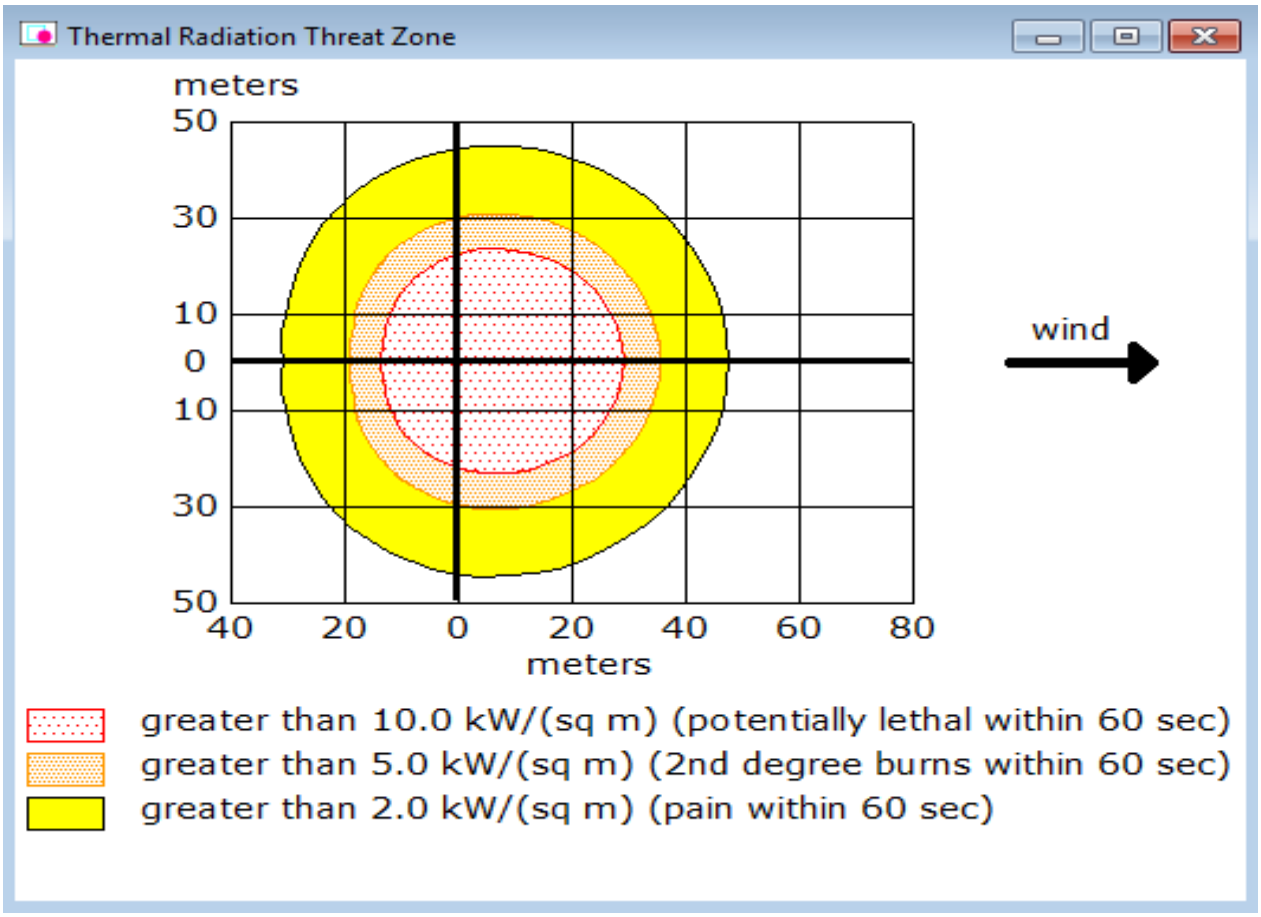
Wind: 14.3 miles/hour from SE at 3 meters
Ground Roughness: open countryCloud Cover: 3 tenths
Air Temperature: 32° C Stability Class: D
No Inversion Height Relative Humidity: 25%

SOURCE STRENGTH:

Leak from hole in vertical cylindrical tank
Flammable chemical is burning as it escapes from tank
Tank Diameter: 8.738 metersTank Length: 5.874 meters
Tank Volume: 352 cubic meters
Tank contains liquid Internal Temperature: 32° C
Chemical Mass in Tank: 242 tons Tank is 80% full
Circular Opening Diameter: 5 inches
Opening is 0.5 meters from tank bottom
Max Flame Length: 13 meters
Burn Duration: ALOHA limited the duration to 1 hour
Max Burn Rate: 583 kilograms/min
Total Amount Burned: 33,699 kilograms
Note: The chemical escaped as a liquid and formed a burning puddle.
The puddle spread to a diameter of 21 meters.

THREAT ZONE:

Threat Modeled: Thermal radiation from pool fire
Red: 29 meters --- (10.0 kW/(sq m) = potentially lethal within 60 sec)
Orange: 36 meters --- (5.0 kW/(sq m) = 2nd degree burns within 60 sec)
Yellow: 48 meters --- (2.0 kW/(sq m) = pain within 60 sec)


Thermal Radiation Threat Zone
meters
50
30
10
0
10
30
50
40
20
0
20
40
60
80
meters
wind
greater than 10.0 kW/(sq m) (potentially lethal within 60 sec)
greater than 5.0 kW/(sq m) (2nd degree burns within 60 sec)
greater than 2.0 kW/(sq m) (pain within 60 sec)

7.15 ETHANOL (584.7 KL Bleve)

SITE DATA:

Location: SPY AGRO INDUSTRIES LTD, INDIA
Building Air Exchanges Per Hour: 0.50 (enclosed office)
Time: August 29, 2024 1702 hours ST (using computer's clock)

CHEMICAL DATA:

Chemical Name: ETHANOL
CAS Number: 64-17-5 Molecular Weight: 46.07 g/mol
ERPG-1: 1800 ppmERPG-2: 3300 ppm ERPG-3: N/A
IDLH: 3300 ppm LEL: 33000 ppmUEL: 190000 ppm
Ambient Boiling Point: 77.6° C
Vapor Pressure at Ambient Temperature: 0.12 atm
Ambient Saturation Concentration: 119,120 ppm or 11.9%

ATMOSPHERIC DATA: (MANUAL INPUT OF DATA)

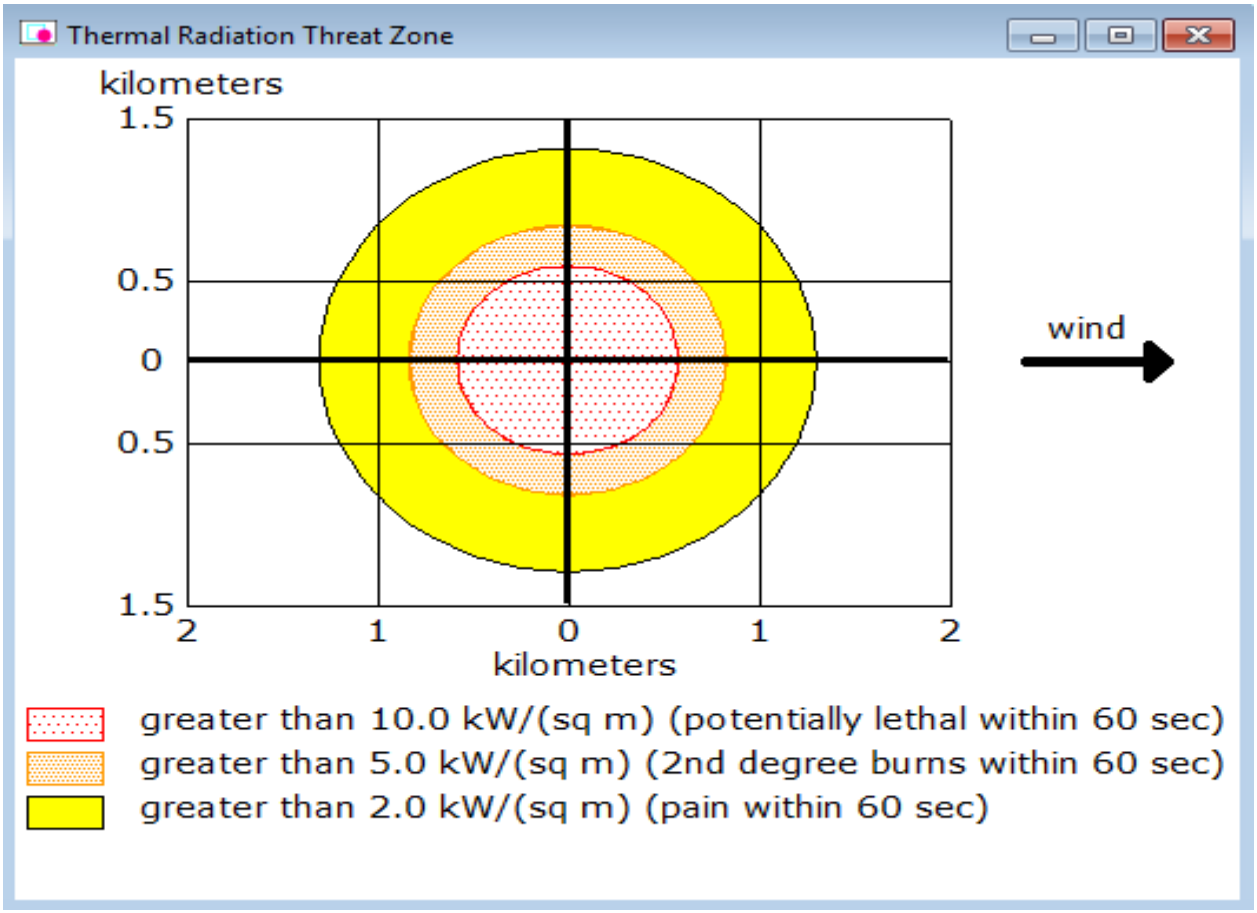
Wind: 14.3 miles/hour from SE at 3 meters
Ground Roughness: open countryCloud Cover: 3 tenths
Air Temperature: 32° C Stability Class: D
No Inversion Height Relative Humidity: 25%

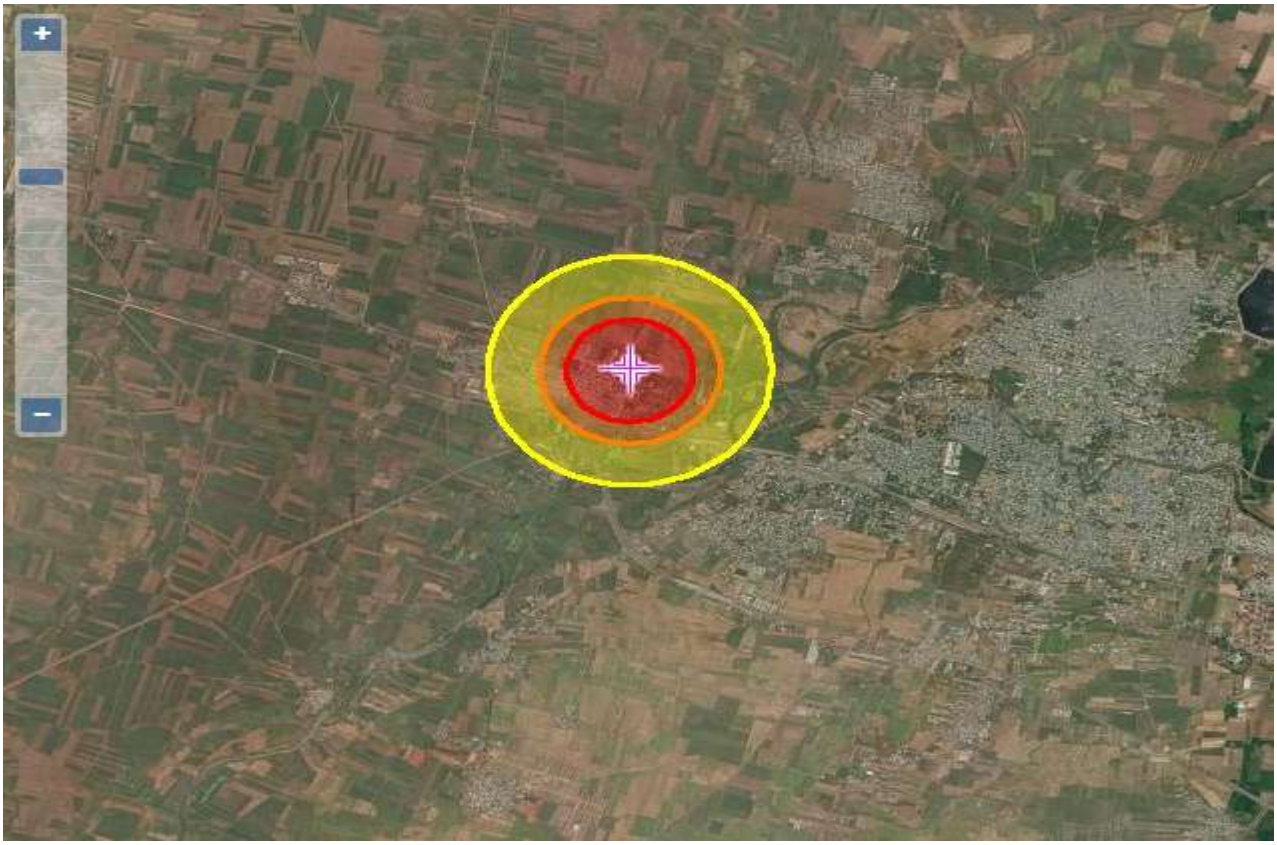
SOURCE STRENGTH:

BLEVE of flammable liquid in vertical cylindrical tank
Tank Diameter: 8.738 metersTank Length: 5.874 meters
Tank Volume: 352 cubic meters
Tank contains liquid
Internal Storage Temperature: 32° C
Chemical Mass in Tank: 242 tons Tank is 80% full
Percentage of Tank Mass in Fireball: 100%
Fireball Diameter: 350 meters Burn Duration: 19 seconds

THREAT ZONE:

Threat Modeled: Thermal radiation from fireball
Red: 580 meters --- (10.0 kW/(sq m) = potentially lethal within 60 sec)
Orange: 829 meters --- (5.0 kW/(sq m) = 2nd degree burns within 60 sec)
Yellow: 1.3 kilometers --- (2.0 kW/(sq m) = pain within 60 sec)


Thermal Radiation Threat Zone
kilometers
1.5
0.5
0
0.5
1.5
2
1
0
1
2
kilometers
wind
greater than 10.0 kW/(sq m) (potentially lethal within 60 sec)
greater than 5.0 kW/(sq m) (2nd degree burns within 60 sec)
greater than 2.0 kW/(sq m) (pain within 60 sec)



7.16 COAL STORAGE, VOLUME-1000T

Risk Category	Risk Description	Likelihood (1-5)	Impact (1-5)	Risk Rating (L x I)	Mitigation Measures
Coal Spillage	Coal spillage from storage or handling equipment	3	3	Medium	Regular inspection and maintenance of equipment, use of containment barriers, and training for staff
Dust Generation	Dust from coal affecting air quality and health	4	4	Extreme	Implement dust suppression systems, such as water sprays or dust collectors, and ensure proper ventilation
Fire Risk	Risk of fire from spontaneous combustion or other sources	3	5	High	Maintain proper storage conditions, regular inspections, and install fire suppression systems
Explosion Risk	Risk of explosion due to coal dust or methane accumulation	2	5	Medium	Use explosion-proof equipment, implement regular dust monitoring, and ensure proper ventilation
Structural Failure	Risk of structural failure of storage facilities	2	4	Medium	Regular maintenance and inspection of structural integrity, and design adherence to safety standards
Environmental Pollution	Risk of contamination of surrounding environment	3	3	Medium	Implement proper containment measures and spill response plans
Health Risks to Workers	Risks related to exposure to coal dust and handling	4	3	High	Provide personal protective equipment (PPE), conduct regular health checks, and enforce safety protocols
Logistics and Transport Issues	Risks related to the transportation and handling of coal	3	2	Medium	Optimize transport routes, regular maintenance of vehicles, and ensure proper handling procedures
Water Ingress	Risk of water entering the coal storage	2	3	Medium	Ensure proper drainage systems and waterproofing of storage

	area and causing problems				areas

Definitions:

Likelihood: Probability of the risk occurring 1 (Rare), 2 (Unlikely), 3 (Possible), 4 (Likely), 5 (Almost Certain).

Impact: Severity of the risk if it occurs 1 (Insignificant), 2 (Minor), 3 (Moderate), 4 (Major), 5 (Catastrophic).

Risk Rating: Combined score of Likelihood and Impact, used to prioritize risks Low (1-4), Medium (5-10), High (11-15), Extreme (16-25).

7.17 HUSK STORAGE, VOLUME-800T

Risk Category	Risk Description	Likelihood (1-5)	Impact (1-5)	Risk Rating (L x I)	Mitigation Measures
Fire	Fire due to spontaneous combustion of husk	4	5	Extreme	Install fire suppression systems, regularly inspect and maintain storage conditions, train staff in fire safety
Explosion	Explosion from dust accumulation	3	5	High	Implement dust control measures, use explosion-proof equipment, regularly clean storage area
Structural Failure	Collapse of storage structure	2	4	Medium	Conduct regular structural inspections, ensure proper design and maintenance, reinforce weak structures
Spillage	Spillage of husk during handling or transfer	3	3	Medium	Use appropriate handling equipment, train personnel in proper handling techniques, install containment systems
Pest Infestation	Infestation by pests affecting husk quality	3	2	Medium	Implement pest control measures, regularly inspect for signs of infestation, maintain cleanliness
Health Hazards	Dust inhalation causing respiratory issues	4	4	Extreme	Provide personal protective equipment (PPE), ensure proper ventilation, conduct health screenings

Environmental Impact	Environmental contamination from storage practices	2	3	Medium	Implement proper waste management, use environmental protection measures, regularly monitor environmental impact
Operational Downtime	Downtime due to equipment failure	3	3	Medium	Implement regular maintenance schedules, keep spare parts readily available, train staff in equipment repair

Definitions:

Likelihood: Probability of the risk occurring 1 (Rare), 2 (Unlikely), 3 (Possible), 4 (Likely), 5 (Almost Certain).

Impact: Severity of the risk if it occurs 1 (Insignificant), 2 (Minor), 3 (Moderate), 4 (Major), 5 (Catastrophic).

Risk Rating: Combined score of Likelihood and Impact, used to prioritize risks Low (1-4), Medium (5-10), High (11-15), Extreme (16-25).

7.18 ELECTRICAL PANEL ROOMS

Risk Category	Risk Description	Likelihood (1-5)	Impact (1-5)	Risk Rating (L x I)	Mitigation Measures
Electrical Fire	Potential fire due to electrical faults or overheating equipment	4	5	Extreme	Regular maintenance and inspections, install fire suppression systems, ensure proper cable management, use of fire-resistant materials
Short Circuit	Short circuit in wiring or equipment leading to damage or fire	3	5	High	Use circuit breakers and fuses, perform regular insulation resistance testing, immediate repair of faulty wiring
Equipment Failure	Failure of electrical panel components such as breakers, switches, or relays	2	4	Medium	Regular testing and calibration of components, keep spare parts available, implement a preventive maintenance program
Electrical Shock	Risk of electric shock to personnel due to exposed	3	5	High	Implement lockout/tagout procedures, ensure proper training of

	wires or improper handling				personnel, install grounding and bonding systems
Overload	Overloading of electrical circuits leading to potential failure or fire	3	5	High	Monitor load on electrical circuits, use overload protection devices, ensure proper sizing of circuits and breakers
Voltage Fluctuations	Fluctuations in voltage leading to equipment malfunction or damage	4	3	High	Use voltage stabilizers and surge protectors, monitor voltage levels regularly, ensure proper grounding
Unauthorized Access	Risk of unauthorized personnel accessing the electrical panel room	3	3	Medium	Implement access control systems, install security cameras, conduct regular security audits
Inadequate Ventilation	Insufficient ventilation leading to overheating of electrical equipment	2	4	Medium	Ensure proper ventilation and cooling systems, regularly check air flow and temperature
Natural Disasters	Risk of damage from events such as floods or earthquakes	2	5	Medium	Implement disaster preparedness plans, install protective barriers against environmental factors, regularly review and update disaster response plans

Definitions:

Likelihood: Probability of the risk occurring 1 (Rare), 2 (Unlikely), 3 (Possible), 4 (Likely), 5 (Almost Certain).

Impact: Severity of the risk if it occurs 1 (Insignificant), 2 (Minor), 3 (Moderate), 4 (Major), 5 (Catastrophic).

Risk Rating: Combined score of Likelihood and Impact, used to prioritize risks Low (1-4), Medium (5-10), High (11-15), Extreme (16-25).

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8. CONCLUSION

It has been a pleasure carrying out the study on Hazard Analysis and Risk Assessment **M/s. S.P.Y. Agro Industries Limited**, Udumalpuram (V), Nandyal District-518502, Andhra Pradesh, INDIA., with the enthusiasm along with maintained efforts and all staff carrying out their responsibilities it is inevitable that higher safety standards will be achieved.

The Quantitative risk assessment conducted for the **S.P.Y. Agro Industries Limited** have identified and evaluated the potential risks associated with the facility's operations. Through systematic analysis, key hazards, including fire and explosion risks, chemical exposure, mechanical failures, and environmental impacts, were identified. The implementation of recommended control measures, such as proper maintenance protocols, employee training, emergency response plans, and the use of personal protective equipment, is essential to mitigate these risks. By adhering to these safety practices and continuously monitoring the refinery's operations, the likelihood of incidents can be minimized, ensuring the safety of personnel, the surrounding community, and the environment. Regular reviews and updates of the risk assessment should be conducted to address any changes in processes, equipment, or regulations, thereby maintaining a safe and efficient operation at the ENA manufacturing and storage facility.

Once again our sincere thanks to the plant personals of **M/s. S.P.Y. Agro Industries Limited** for active support in completing this study.

9. DISCLAIMER

Nothing in this report shall be construed as taking the place of any Law, Rule or Regulation of the relevant Governmental Agencies.

Users of this report are informed that no publication of this type can be complete or any written document of this type can be a substitute for qualified engineering analysis. The experts and their professional experience only base the observations recommendations mentioned in this report on physical visits of the plant sections.

Lumen Engineering Associates does not hold any legal obligation in case of occurrence of any incident / accident / emergency in the plant while implementing the recommendations in this report all the views are based on technical expertise and past experience of the Auditors/Engineers.

26th August-2024,
Udumalpuram, Nandyal.

For Lumen Engineering Associates

D.A.Narasimha Raju
B.E,M.Tech.,MIE,FIV,MSPI
PGDBA,PGDEIM,Industrial Safety
Chartered Engineer, Approved Valuer
PG Diploma in Environmental Science
Certified Lead Auditor in ISO Systems
Competent Engineer under Factories Rules

10. ANNEXURES

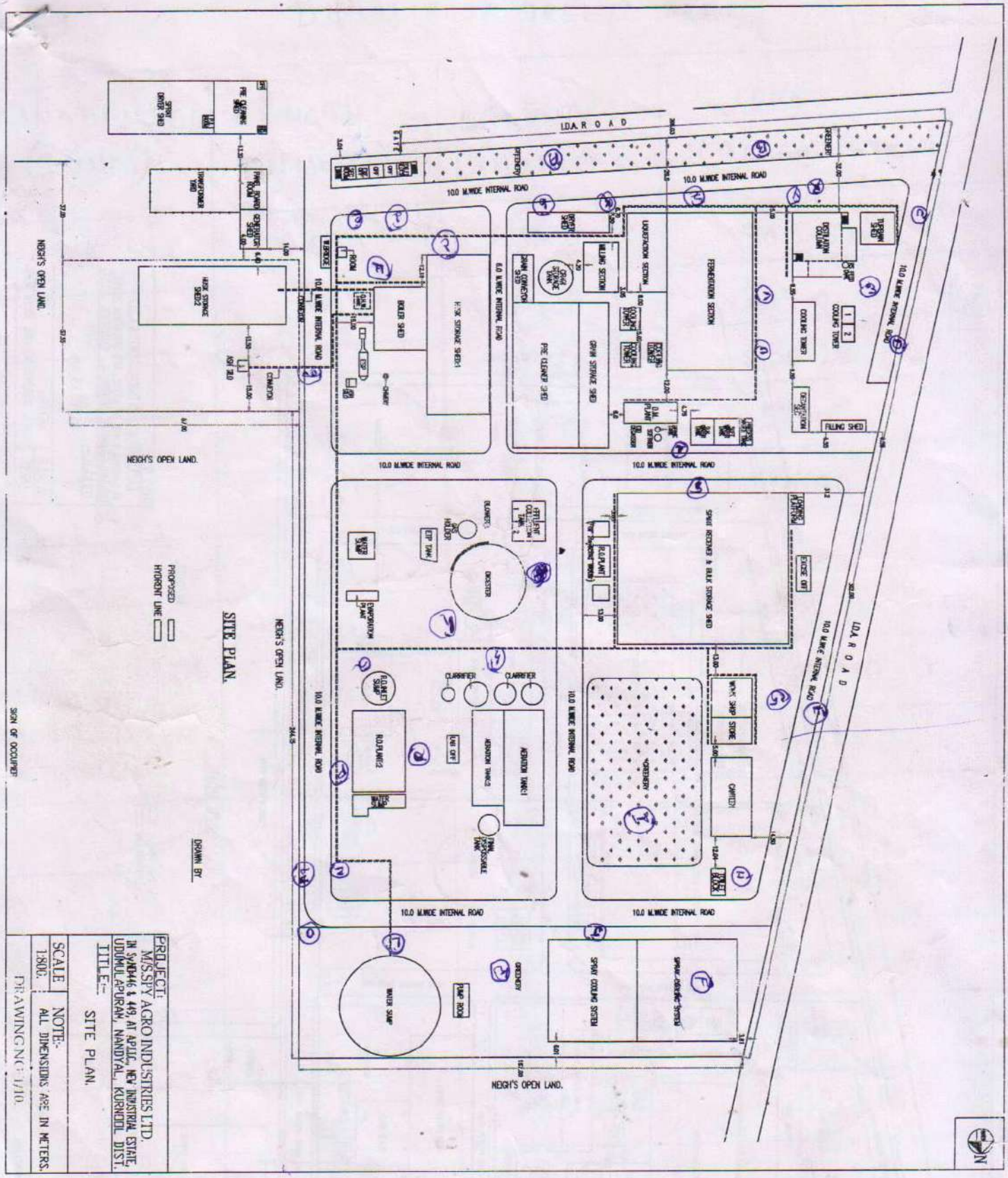
M/s S.P.Y AGRO INDUSTRIES LIMITED

GREEN BELT LAND DETAILS

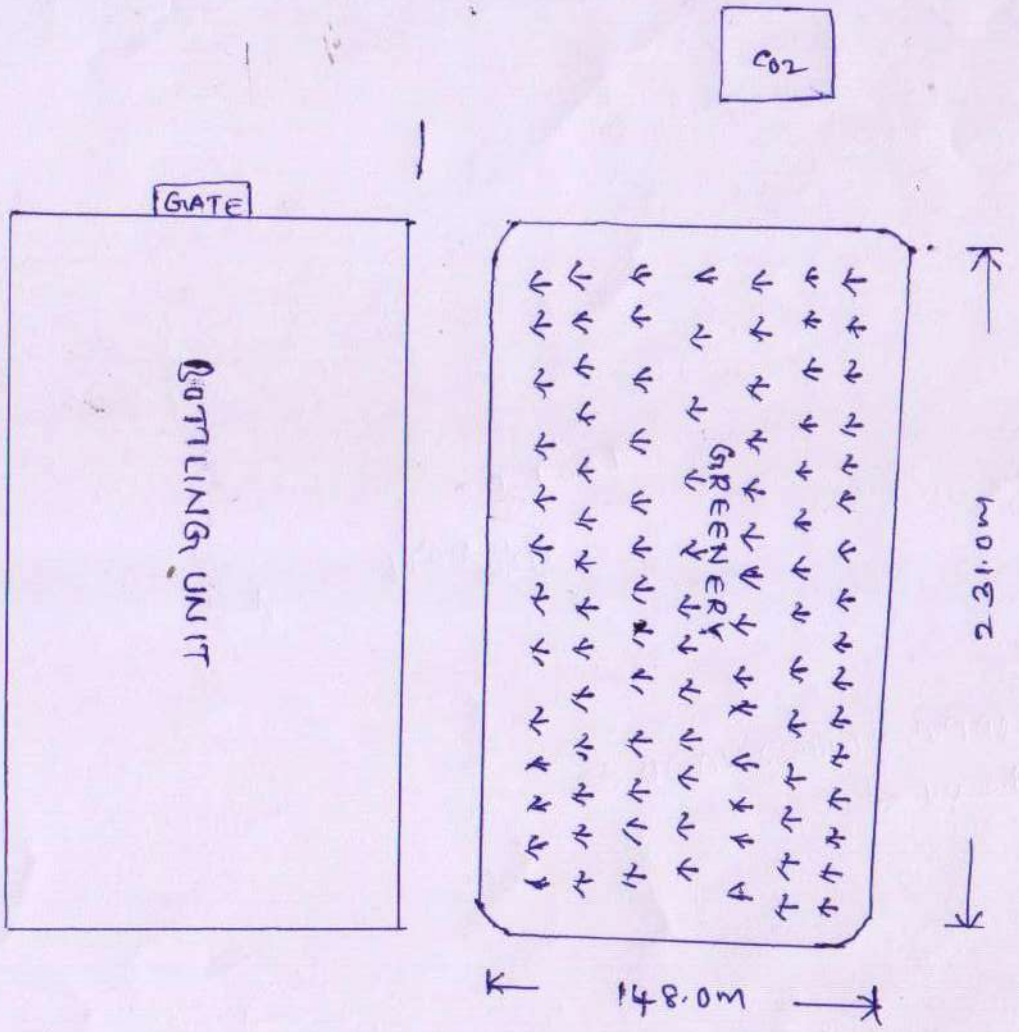
LAND DENOTED (IN NOS)	LENGTH (IN METERS)	BREADTH (IN METERS)	AREA (IN SQUARE METERS)
CO_2	148.00	231.00	34188.00
DRYERS	96.00	52.00	4992.00
A	6.50	47.00	305.50
B	3.50	114.00	399.00
C	3.60	22.30	80.28
D	3.50	154.00	539.00
E	3.10	39.00	120.90
F	51.00	42.00	214.20
G	30.00	29.50	885.00
H	30.00	28.00	840.00
I	39.00	89.00	3471.00
J	3.50	35.00	122.50
K	70.00	50.00	3500.00
L	43.00	31.00	1333.00
M	3.70	86.00	3182.00
N	2.50	36.00	90.00
O	26.00	3.70	96.20
P	40.00	6.00	240.00
Q	27.00	39.00	1053.00
R	42.00	10.00	420.00
S	60.00	4.60	276.00
T	51.00	2.00	102.00
U	8.50	1.00	8.50
V	43.50	1.00	43.50
W	10.00	3.00	30.00
X	8.00	3.50	28.50
Y	6.50	3.50	22.75
Z	27.00	3.00	81.00
a	12.00	11.50	138.00
b	18.00	1.80	32.40
c	17.00	23.40	397.80
d	16.00	3.50	56.00
e	10.50	0.70	7.350
f	8.00	10.50	84.00
g	4.40	55.00	242.00
h	17.50	37.00	647.50
		Total	**58268.88**

24/12/2019

S.P.Y. Agro Ind Ltd. NANDYAL-518 502


SITE PLAN.
PROPOSED HYDRONT LINE
DRAWN BY
SIGN OF OCCUPIER
PROJECT:
M/S.SFY AGRO INDUSTRIES LTD.
IN Sy.No.446 & 449, AT APIIC, NEW INDUSTRIAL ESTATE, UDUMULAPURAM, NANDYAL, KURNOOL DIST.
TITLE:-
SITE PLAN.
SCALE 1:800.
NOTE:- ALL DIMENSIONS ARE IN METERS.
DRAWING NO: 1/10.
L.D.A. R O A D
10.0 M.WIDE INTERNAL ROAD
NEIGH'S OPEN LAND.
GREENERY
FERMENTATION SECTION
DISTILLATION SECTION
COOLING TOWER
FILLING SHED
RICE STORAGE SHED-1
RICE STORAGE SHED-2
BOILER SHED
PRE CLEANER SHED
GRAIN STORAGE SHED
SPENT HOLDING & BULK STORAGE SHED
DIGESTER
CLARRIFIER
AERATION TANK-1
AERATION TANK-2
R.O.PLANT-1
R.O.PLANT-2
SPENT COOLING SYSTEM
WATER SUMP
PUMP ROOM
WORK SHOP STORE
CANTEEN
OFFICE
GATE
N

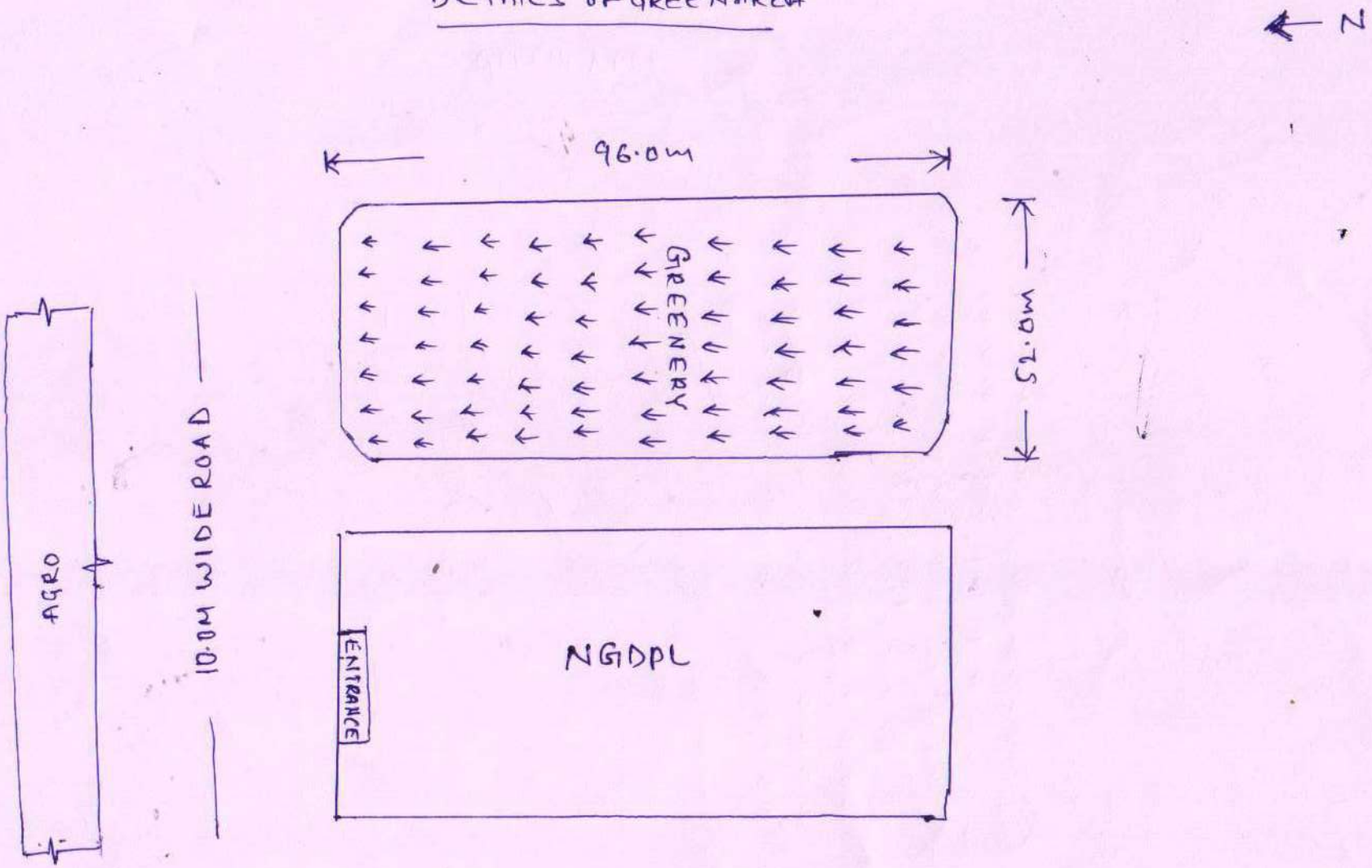
DETAILS OF GREEN AREA



$\Rightarrow 231.0 \times 148.0\,m = 34188\,m^2$

$= 8.44$ Acres.

DETAILS OF GREEN AREA



$\Rightarrow 96.0 \times 52.0\text{m} = 4992\ \text{m}^2$

$= 1.23$ Acres.

GREEN BELT DETAILS

Green belt developed near by Stores area 2.5 acres

Green belt developed near by Pump House area 2 acres

Green belt developed near by Electrical area 2 acres

Green belt developed near by Boiler area 3 acres

Green belt developed near by Admin block 0.42 acres

Green belt developed near by Distillation block 0.32 acres

Green belt developed near by Ware House area

SGP
COMPANY SECRETARIES

CERTIFICATE

We hereby certify that the list of directors as on 25.11.2024 of S.P.Y. AGRO INDUSTRIES LIMITED bearing CIN – U01100TG2005PLC045887 having registered office at D. No. 8-3-833/188, Plot No. 188, 1st Floor, Phase - II, Kamalapuri Colony, Hyderabad – 500 073, Telangana are as follows:

SL. No.	DIN	Name and address of the Director	Designation	Date of Appointment
1.	09189347	**SAJJALA SREEKANTH REDDY** H.No.30-726, Bommalasatram, Nandyal, Kurnool - 518 501, Andhra Pradesh.	Managing Director	21.08.2023 (Managing Director w.e.f. 22.11.2024)
2.	01796982	**SANNAPU REDDY SUJALA** H.No.30/726, Bommalasatram, Nandyal P.O., Kurnool–518501, Andhra Pradesh.	Director	17.07.2017
3.	01241976	**ARAVINDA RANI SANNAPUREDDY** H.No.31/726, Bommalasatram, Nandyal P.O., Kurnool–518501, Andhra Pradesh.	Director	13.06.2014
4.	02393630	**PARVATHI SANNAPUREDDY** H.No.30/726, Bommalasatram, Nandyal P.O., Kurnool–518501, Andhra Pradesh.	Director	13.06.2014
5.	02956004	**ANGITAPALLI SREENIVASULUREDDY** 30/726, Bommalasatram, Nandyal, Kurnool–518501, Andhra Pradesh.	Director	14.06.2010
6.	10692797	**ANNAPUREDDY VENKATARAMIREDDY** 28/768-22-A2, Lalitha Nagar, N.G.O. Colony, Nandyal, Kurnool-518501, Andhra Pradesh.	Director	03.07.2024

SGP & Associates Hyderabad Company Secretaries

For SGP & Associates
Company Secretaries

R. Sivaram Reddy
Partner
FCS-F5505
CP No.4685

Date: 25.11.2024
Place: Hyderabad

SGP & Associates
Plot No. 188, Road No.21-A, Prashasan Nagar,
Road No. 72, Jubilee Hills, Hyderabad-500096, Telangana. India.
T : +91 40 359 459 68, 9948155519
E : contact@sgpassociates.com
www.sgpassociates.com


OPPO F5 Youth
Andhra Pradesh
By NIHANTH REDDY

S.P.Y. Agro Industries Limited

CIN No.: U01100TG2005PLC045887

22.09.2022

To
The Environmental Engineer,
APPCB – Regional Office,
Kurnool.

Respected Sir,

Sub: Submission of Environmental Statement – Reg

Ref : Your Mail, Dt: 17.09.2022

With reference to the above cited subject, We would like to submit you that, The details are herein under:-

1) Form-V
2) CFE Compliance Report
3) CFO Compliance Report
4) Environmental Clearance Compliance Report

Kindly Acknowledge receipt.

Thanking you sir.
Yours faithfully,
For S.P.Y Agro Industries Limited.,

Authorized Signatory.

S.P.Y. Agro Ind Ltd NANDYAL-518 502

Pollution Control Board Regional Office A.P. KURNOOL Dt. 23/9/22

Regd.Office : D.No. 8-3-833, Plot No. 188, 1st Floor, Phase - II, Kamalapuri Colony, Hyderabad - 500 073. T.S. INDIA
E-mail: spyagroindustries@gmail.com
Works : New Industrial Estate, Sy. No. 446 to 449, APIIC, Udumalpur, Nandyal, Kurnool Dt. 518 502. A.P. INDIA
Phone: +91 8514 222084, Fax: 08514-222082, E-mail: spyagro_nandigroup@yahoo.com