

Fire & Explosion Index (cont.)

- Review the plant F&EI process units and classified hazard levels
- Review the evaluation of realistic F&E potential of the process unit and how this hazard is managed/minimized
- Review the Recommendations from the Consolidated Audit

Fire & Explosion Index

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- The F&EI Analysis System is a step-by-step objective evaluation of the realistic fire, explosion and reactivity potential of process equipment and its contents.
- The purpose of the F&EI System is to:
 - Quantify the expected damage of potential F&E incidents in realistic terms
 - Identify equipment that would be likely to contribute to the creation or escalation of an incident
 - Communicate the F&EI risk potential to management

LOSS PREVENTION/FIRE/BURNER MGMT/CEI REVIEW

(Date: Tuesday, December 3, 1996)

AUDIT TEAM: Buck Bailey, Bill Franklin, Leigh Hill, Steve Janda

PLANT TEAM: Leigh Hill

ATTENDING:

PLANT CONTACT: Leigh Hill

WRITER: Buck Bailey

INTRODUCTION:

Following is a list of recommendations from the recent Consolidated Audit at the Glycol 1 plant. These were developed from a standard Loss Prevention questionnaire, plant inspection, and discussion with the staff and the Technology Center.

OPERATING DISCIPLINE

Recommendations:

1. This topic was reviewed and there are no recommendations for further action.

Action Taken/To Be Taken:

<i>Responsibility</i>	<i>Expected Completion Date</i>	<i>Actual Completion Date</i>
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CHEMICAL EXPOSURE

Recommendations:

- M 1. Complete the CEI plot plan documentation to show the extent of the exposure area for the spill scenario. Set up a permanent PHA / CEI file to comply with the OSHA documentation practices.

Action Taken/To Be Taken:

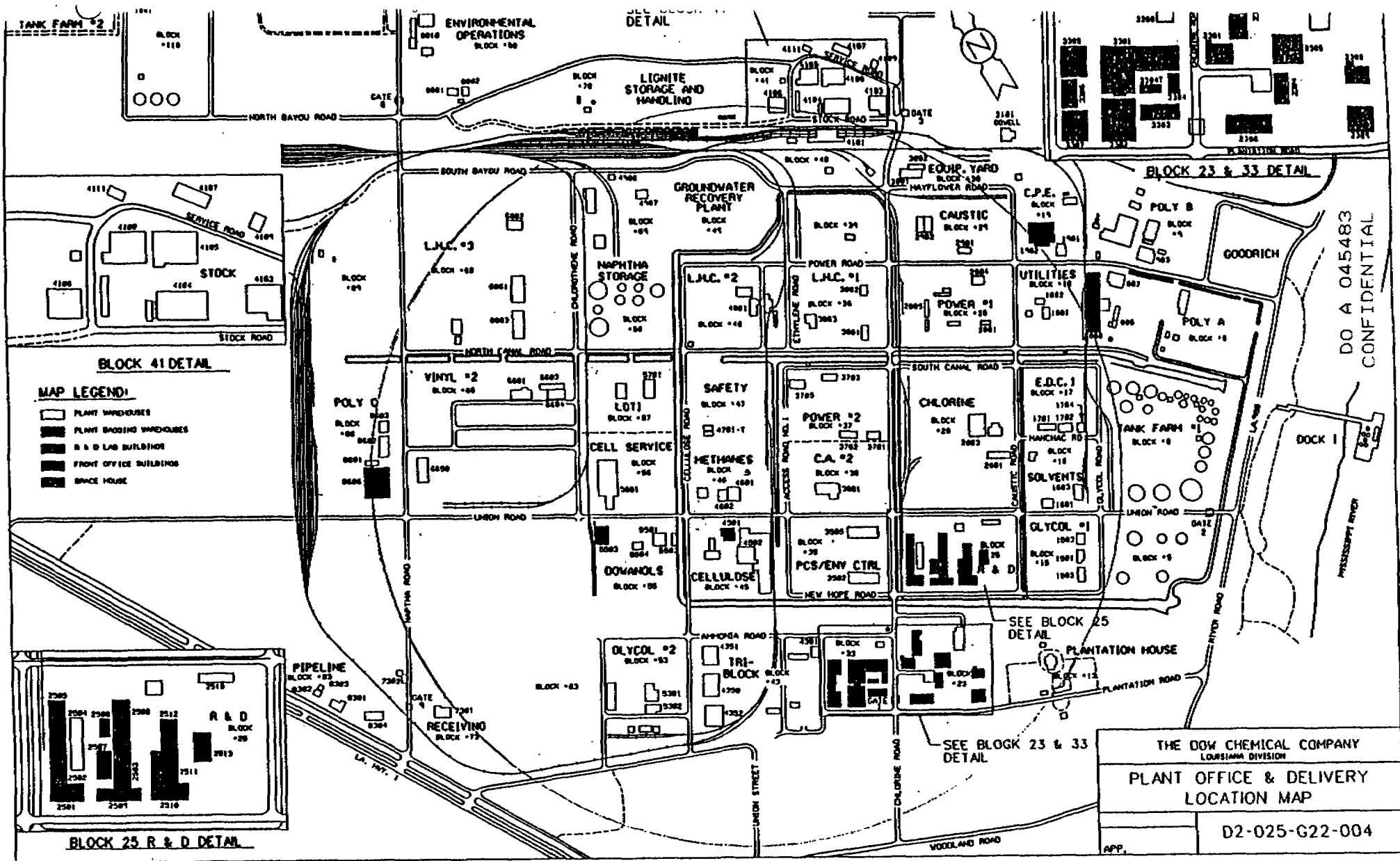
<i>Responsibility</i>	<i>Expected Completion Date</i>	<i>Actual Completion Date</i>
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M = Must-Do

HR = Highly Recommended



CEI2 - INTERMEDIATE SUPPORTING CALCULATIONS	
Plant or Project Name: ?	
Location: ?	
Prepared By: ?	
Date Prepared: ?	
Case Number	1
Release Scenario	Gas Release
1. RELIEF DEVICE or OTHER CALCS.	
Input Release Rate (lb/min)	-
Time to Deplete System Inventory, (min)	-
Airborne Quantity for CEI, AGr (lb/min)	-
2. GAS RELEASE CALCS.	
Calculated Release Rate, (lb/min)	2026.6
Time to Deplete System Inventory, (min)	11.1
Airborne Quantity for CEI, AGr (lb/min)	2026.6
3. LIQUID RELEASE CALCS. (PIPE/VESSEL, HOSE)	
Step 1: Liquid Flow Rate Released	
Calculated Diameter to Use, Dcalc (in)	-
Calculated Liquid Release Rate, Lcalc (lb/min)	-
Time to Deplete System Inventory, (min)	-
Liquid Release Rate to Use, L (lb/min)	-
Step 2: Total Liquid Released	
Calculated Total Liquid Release, WTcalc (lb)	-
System Inventory, Winv (lb)	-
Total Liquid Release, WT (lb)	-
Step 3: Fraction Flashed	
Fraction Flashed, Fv	-
Calculated Flash Rate, AGrcalc (lb/min)	-
Time to Deplete System Inventory, (min)	-
Airborne Quantity by Flash to Use, AGrf (lb/min)	-
Step 4: Liquid Pool Size	
Mass of Liquid Entering Pool, Wp (lb)	-
Calculated Liquid Pool Area, Ap calc (ft ²)	-
Liquid Pool Area, Ap (ft ²)	-
Step 5: Evaporation from Pool Surface	
Molecular Weight, MW	-
Characteristic Pool Temperature, T (°F)	-
Vapor Pressure at Ts, Pvp (psia)	-
Vapor Pressure at T, Pvp (psia)	-
Evaporation from Pool Surface, AGrp (lb/min)	-
Step 6: Total Airborne Quantity	
Calculated Airborne Rate, AGrcalc (lb/min)	-
Time to Deplete System Inventory, (min)	-
Airborne Quantity for CEI, AGr (lb/min)	-
4. OVERFLOW/SPILL CALCS.	
Step 1: Liquid Flow Rate Released	
Calculated Liquid Release Rate, Lcalc (lb/min)	-
Time to Deplete System Inventory, (min)	-
Liquid Release Rate to Use, L (lb/min)	-
Step 2: Total Liquid Released	
Calculated Total Liquid Release, WTcalc (lb)	-
System Inventory, Winv (lb)	-
Total Liquid Release, WT (lb)	-
Step 3: Fraction Flashed	
Fraction Flashed, Fv	-
Calculated Flash Rate, AGrcalc (lb/min)	-
Time to Deplete System Inventory, (min)	-
Airborne Quantity by Flash to Use, AGrf (lb/min)	-
Step 4: Liquid Pool Size	
Mass of Liquid Entering Pool, Wp (lb)	-
Calculated Liquid Pool Area, Ap calc (ft ²)	-
Liquid Pool Area, Ap (ft ²)	-
Step 5: Evaporation from Pool Surface	
Molecular Weight, MW	-
Characteristic Pool Temperature, T (°F)	-
Vapor Pressure at Ts, Pvp (psia)	-
Vapor Pressure at T, Pvp (psia)	-
Evaporation from Pool Surface, AGrp (lb/min)	-
Step 6: Total Airborne Quantity	
Calculated Airborne Rate, AGrscalc (lb/min)	-
Time to Deplete System Inventory, (min)	-
Airborne Quantity for CEI, AGr (lb/min)	-

(CB-2 System Ver-2.0 - 8/1/94)

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CEI2: THE CHEMICAL EXPOSURE INDEX CALCULATION SYSTEM

Reference: "Chemical Exposure Index Guide" - Second Edition, September-1993
Corporate Safety and Loss Prevention, The Dow Chemical CompanyWork File Name
"chlorine.xls/CEI2.thr

Plant or Project Name: GLYCOL-1 Prepared By: LEIGH HILL
 Location: LAD Date Prepared: 11/15/96
 Plant Superintendent or Manager: C. JACKSON Reviewed By: BUCK BAILEY
 Site Review Representative: BUCK BAILEY Date Reviewed: 11/21/96

I. CASE DATA	
Case Number	1
Release Scenario	Gas Release
Chemical Name	Chlorine
Release Scenario Description	RELEASE FROM HOLE IN 12" CHLORINE
EMERGENCY RESPONSE	
PLANNING	
Dow IHG (ppm)	-
ACGIH TLV-TWA (ppm)	-
STEL (ppm)	-
ERPG-1 (ppm)	1
ERPG-2 (ppm)	3
ERPG-3 (ppm)	20
PLANT DATA	
Total Quantity in Plant, (lb)	200
Largest Single Containment, (lb)	200
Pressure of Containment, (psig)	62
DISTANCES TO (feet):	
1. Public	1650
2. Other in-company facility	300
3. Non-company plant or business	2650
PHYSICAL PROPERTIES	
Operating Temperature of Liquid, Ts (°F)	127.0
Molecular Weight, MW	70.9
Normal Boiling Point of Liquid, Tb (°F)	-29.3
Vapor Pressure at Ts, Pvp (psia)	211.586
Liquid Density at Ts, rho (lb/ft³)	81.92
Heat Capacity, Cp (Btu/lb/°F)	0.246
Heat of Vaporization, Hv (Btu/lb)	96.01
II. AIRBORNE QUANTITY ESTIMATION	
SYSTEM INVENTORY, Unvt (gal)	2050
1. FROM A RELIEF DEVICE or OTHER	
Airborne Quantity, AGR (lb/min)	
2. FROM A GAS RELEASE	
Gauge Pressure, Pg (psig)	62.0
Diameter of Hole, D (in)	4.50
3. FROM A LIQUID RELEASE (PIPE/VESSEL, HOSE)	
Process Pipe/Vessel? or Hose?	
Diameter of Hole, D (in)	
Gauge Pressure, Pg (psig)	
Height of Liquid Above Release Point, h (ft)	
Diked area (ft²)	
4. FROM AN OVERFLOW/SPILL	
Filling or Unloading Rate (gpm)	
Diked area (ft²)	
CHEMICAL EXPOSURE INDEX	
Release Scenario	Gas Release
Airborne Quantity, AQ (lb/min)	2026.6
CEI	870
Hazard Distance, HD-1 (feet)	32800
Hazard Distance, HD-2 (feet)	28529
Hazard Distance, HD-3 (feet)	11049

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