

# **Plant Safety: Chemical Management**

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## Kami Blake – Discussion Host

- Assess regulatory requirements, information management technology and effectiveness of existing HazMat programs to develop and re-engineer compliance solutions
- Prior to joining 3E in 2002, served in Quality Assurance, Supply Chain Management and Process Engineering roles in the biotech and medical device manufacturing industries
- U.S. Marine
  - Computer Programmer / Systems Analyst
  - Two time Navy Achievement Medal recipient for small systems implementation and training

## Oscar Jimenez – Subject Matter Expert

- Leads the team responsible for delivering 3E's spill, release, emergency planning and response, and Hazmat transportation services
- 30 years of experience
  - Heavy equipment engineering
  - Construction safety
  - EH&S compliance management
  - Hazmat response and incident command
  - Municipal safety audits and inspections
- Retired U.S. Marine
  - 22 years of service
  - Awarded Navy Commendation and Achievement Medals

# Agenda

- Preparation and Planning
- Anatomy of a Release – After Action Analysis
- Emergency Response Plan Essentials
- External Resources
- OSHA Inspection Priorities
- Proactive Approaches

# Preparation and Planning

## Keys to Success

1. Roles and Responsibilities
2. Impact Research and Analysis
3. Resource Assessment
4. Management of Change

## Roles and Responsibilities

1. Define
  - a) Scope and capacity
  - b) Individual responsibilities
  - c) Team and command structures
  
2. Document
  - a) ERP
  - b) Job descriptions
  - c) Training plans & records
  
3. Assign

## Roles and Responsibilities

4. Train
5. Verify Response Capabilities
  - a) Capacity Planning
  - b) Resource Assessment
  - c) Effectiveness of Training
6. Review and Update

## Impact Research and Analysis

- Regulatory requirements research
- Applicability of Best Practices and Industry Standards
- Application of existing information
- Hazard analysis
  - Health and physical
  - Chemical risks
  - Worker, community and environment
- Mock Disaster Scenarios / EOC

## Resource Assessment

- Availability / Coverage
- Internal
- External
- Warning Systems
- Early Detection / Preventive Action

## Management of Change

Circumstances, conditions and knowledge of them rarely remain the same. Organizations must have effective methods of implementing, communicating and documenting change.

- New tasks and operational processes
- Upgraded equipment and systems
- Revised and expanded regulations
- Improved PPE
- New technology and automation
- New chemical substances, revised formulations
- Changes in known hazards

## Management of Change

Offers a collaborative workflow designed to systematically manage changes in Regulated Materials, Compliance Requirements, Technology, Equipment, Facilities, or Procedures.

Provides an accurate and comprehensive means to implement change organization-wide. Enterprise implementation reduces administrative overhead of assigning, tracking, reporting and soliciting and following-up on approvals, tasks, checklists, action items and training required to implement changes in regulated and non-regulated processes. Equally as important, it also provides a historical reference of all changes.

# Anatomy of a Release

## Incident Overview

- When: April 12, 2004, a chemical reactor overheated at the MFG Chemical manufacturing in Dalton, GA
- What: A highly toxic and flammable cloud of allyl alcohol and allyl chloride was released into the surrounding community
- Why: A self-accelerating (“runaway”) chemical reaction over pressurized a 4,000-gallon chemical reactor, activated an emergency vent and released a toxic vapor cloud directly into the atmosphere

## Incident Impact

- Residential evacuation (over 200 families)
- 154 people decontaminated and treated for chemical exposure at a local hospital
- 5 Residents hospitalized overnight
- 13 police officers and 2 ambulance personnel treated
- MFG worker suffered chemical burns

## Incident Cause

- Inadequate process evaluation
  - Underestimated the effects (reaction) of scaling up from the laboratory to full production volume
  - Failure to evaluate how much heat the reaction would produce
- Improper ER planning and preparation
  - Process controls
  - Instrumentation
  - Safety systems

**Not designed to prevent a runaway reaction and uncontrolled chemical release**

## Findings

- MFG failed to
  - Analyze existing information – This was the company's first attempt at a production-scale batch of triallyl cyanurate (TAC)
    - Investigators determined that MFG had not fully evaluated the hazards of the TAC-producing reaction
    - Published reports of two previous runaway reactions that occurred during attempts to produce TAC were ignored
  - Conduct thorough process hazard analyses
  - Examine possible accident scenarios
  - Implement appropriate safety controls
  - Follow good engineering and safety practices described in federal regulations

## Findings

- The City of Dalton and Whitfield County were cited as a contributing cause of the injuries and exposures
  - Responding officers had no proper training or protective equipment to safely enter the toxic vapor cloud
  - The city had no automated emergency notification system or evacuation plan
  - Officers, as instructed, drove into the vapor cloud to evacuate residents
  - Whitfield County had no established LEPC
- General: A 2002 CSB study estimates that over 90 % of significant reactive chemical incidents involve hazards that are **already** documented in publicly available literature.
- The CSB found that this incident was preventable and could've been mitigated by sufficient company and agency planning

# Emergency Response Plan Essentials

- Scope of Plan
  - Facility operations overview
  - Area map and description
  - Hazards covered in the plan
- Facility Identification
  - Address
  - Owner/Operator
  - Emergency and environmental contacts

- Hazard and Impact Analysis
  - Incidents that result in hazards to human health and the environment
  - Types and quantities of materials involved
  - Direct and indirect effects of a release, fire or explosion
  - Surrounding area evaluation
- EOC Structure
  - Ensure proper training has been administered
  - Traditional roles (command and control)
  - Additional roles (PR, agency liaisons, those who can mitigate corporate exposure)

- **Emergency Contacts**
  - Identify local emergency responders and the depth of their response capabilities
  - Specify designated ER contractors and the conditions under which they are to be contacted
- **Employee Response Capability**
  - Initial identification and assessment
  - Immediate action and protocols
  - Proactively follow HazCom fundamentals in non-emergency environments

- Emergency Procedures
  - Easily accessible, written instructions to be followed by facility personnel in case of emergencies and other adverse incidents
  - Account for multiple scenarios, as applicable (explosion, fire, release into the community, etc.)
  - Include procedures to be carried out by employees who remain to operate critical plants ops prior to evacuation
  - Deploy EOC
  - Document all communications and actions
  - Follow Business Continuity & Disaster Recovery Plan

- Notifications Procedures
  - Internal & External
  - Fulfill agency reporting requirements. Incident commanders and their support teams should be well versed in
    - ✓ When agencies must be notified
    - ✓ What agencies must be notified
    - ✓ What information must be reported
  - Engage LEPC, SERC, CAER groups or community advisory panels to ensure the public is up to speed on warning systems, evacuation and/or sheltering procedures in the event of a chemical release

- Sustained Actions and Termination Procedures
  - Deploy processes for managing the transition from the initial emergency to the sustained action
  - Continue to document all actions and communications related to the incident
  - Document discoveries and lessons learned
- Plan Review and Revision / MOC
  - Annually and after each adverse incident
  - When there are changes in facility logistics, business ops, regulations, chemicals, hazards, and employee capabilities

# External Resources

# External Resources

- Federal Agencies: OSHA, EPA, DHS, DOT, FEMA
  - Terminology amongst agencies is not standardized
  - However, many compliance tasks have application across multiple agency jurisdictions

<u>RMP</u>	<u>PSM</u>	<u>CFATS</u>	<u>EPCRA</u>
Regulated Substance	Highly Hazardous Substance	Chemical Substance	Extremely Hazardous Substance
Owner or Operator	Employer	Owner or Operator	Person
Stationary Source	Facility	Covered Facility or Covered Chemical Facility	Facility

- State and Local
  - LEPC / Emergency Management Depts.
  - SERC
  - Fire Departments
  - Citizen Corps
  - Community Awareness and Alert Programs (CAER, C.A.R.E)

- Third Party Sources
  - EH&S/ER Consulting
  - Automated EH&S Systems
    - Data & Document Management
    - Report Generation
  - Regulatory Reporting (permits, disclosures, HMBPs)
  - ER Services
    - Planning
    - Hotline Assistance
    - Dispatch

# OSHA Inspection Priorities



1. Imminent Danger Situations
2. Facilities and Catastrophes
3. Complaints
4. Referrals
5. Follow-ups
6. Planned / Programmed Investigations

# Proactive Approaches

1. Employee involvement
2. Quality process Approach
3. Develop Agency Relationships
4. Exceeding the Letter of the Law

## Employee involvement

1. The most effective safety programs and emergency response plans are significantly impacted by employee involvement and feedback
2. Employees that are involved in safety planning and decision making
  - ✓ Take ownership and demonstrate leadership when action is required
  - ✓ Network with co-workers to brain storm and implement improvements
  - ✓ Register less complaints

## Quality Process Approach

- ↓ **Scope Definitions** should drive  
(Plans, Projects, Scheduled Events, Standard Operations)
- **Standard Procedures** defined in detail by
  - **Written Instructions** supported by
    - **Accessible References  
& Records**

## Develop Agency Relationships

1. Solicit information
  - a) Contact information
  - b) Most common issues / violations
  - c) Training recommendations
  - d) Industry trends
  - e) Reporting and inspection schedules
2. Provide information
3. Request an inspection for educational purposes

## Exceeding the Letter of the Law

1. Stay Informed
  - Professional association involvement
  - Access to accurate and updated data
  - New methodologies and approaches
2. Recognized certifications
3. Superior training programs (on-going)
4. Rigorous, regularly scheduled internal audits
5. Voluntary programs
6. Community outreach / transparency