CalARP 101

Presented by

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22nd Annual California CUPA Training Conference
February 3 - 6, 2020
South San Francisco

Agenda

- General CalARP Overview
  - New regulated facilities
  - RMP requirements
- CalARP Inspection Examples
  - Plating Shop
  - Power Generation Plant
  - Cold Storage Facility
- Conclusion

Objectives

- Simplify the CalARP program via specific examples
- Understand the components of a RMP
- Recognize the value of a HR/PHA
- RAGAGEP into your inspection walk-through

Regulations - CCR

Title 19 Public Safety

Division 2 California Governor's Office of Emergency Services (CalOES)

Chapter 4.5 California Accidental Release Prevention (CalARP) Program Detailed Analysis

Sections 2735.1 – 2785.1

CalARP Definitions

"Regulated Substance (RS)" means **any substance**, unless otherwise indicated, **listed in Section 2770.5 of this chapter**

"Threshold Quantity (TQ)"means the **quantity specified for a regulated substance pursuant to Section 2770.5** and determined to be present at a Stationary Source as specified in Section 2770.2 of this chapter.

CalARP List of RS

CalARP Program Combined[1] List of Chemicals and Threshold Quantities (TQ)

Chemical Name	CAS Number	Table 1 TQs in (lbs)	Table 2[2] TQs in (lbs)	Table 3 TQs in (lbs)
Acetaldehyde	75-07-0		10,000	
Acetone cyanohydrin [3]	75-86-5			1,000
Acetone thiosemicarbazide	1752-30-3			1,000/10,000 [4]
Acetylene [Ethyne]	74-86-2		10,000	
Acrolein [2-Propenal]	107-02-8	5,000		500
Acrylamide	79-06-1			1,000/10,000 [4]
Allylamine [2-Propen-1-amine]	107-11-9	10,000		500
Aluminum phosphide [5]	20859-73-8			500
Aminopterin	54-62-6			500/10,000 [4]
Amiton oxalate	3734-97-2			100/10,000 [4]
Ammonia (conc 1% or greater) [6]	7664-41-7			500
Ammonia (anhydrous) [6]	7664-41-7	10,000		500
Ammonia (conc 20% or greater) [6]	7664-41-7	20,000		
Ammonium hydroxide (ammonia conc 1% or greater) [6]	1336-21-6			500
Ammonium hydroxide (ammonia conc 20% or greater) [6]	1336-21-6	20,000		

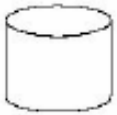
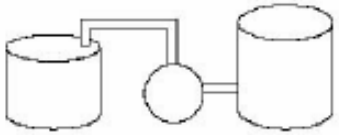
CalARP Definitions

"Process" means any activity involving a **REGULATED SUBSTANCE** including any use, storage, manufacturing, handling, or on-site movement of such substances, or combination of these activities. For the purpose of this definition, any group of vessels that are interconnected, or separate vessels that are located such that a regulated substance could be involved in a potential release, shall be considered a single process.

"Covered Process" means a **PROCESS** that has a **REGULATED SUBSTANCE** present in more than a **THRESHOLD QUANTITY**…

CalARP Processes

Process Representation

Schematic Representation	Description	Interpretation
	1 vessel 1 regulated substance above TQ	1 process
	2 or more connected vessels *different* regulated substances each above TQ	1 process
	2 or more vessels co-located *different* substances each above TQ	1 process
	2 vessels, located so they won't be involved in a single release *same* or *different* substances each above TQ	2 processes

CalARP Program Levels

Program levels 1 – 3

- Majority of CalARP facilities in California
- Offsite Consequence (Level 2 & 3)
- Similar General Requirements

Program Level 4

- Refinery facilities (specialized)
- 18 refineries in California

Risk Management Plan (RMP)

- 5-Year re-certification cycle

- RMP Updates
  - Within 6 months of MAJOR change
    - Revision of HR/PHA
    - Revision to Off-Site Consequence Analysis
    - Alters Program level

- Deregistration
  - Process no longer covered

Risk Management Plan (RMP)

- Registration Information

- Executive Summary
  - Release Prevention & ER Policies
  - Stationary Source & RS
  - Program & Prevention Steps
  - 5-year accident history
  - ER Program
  - Planned changes to improve safety

Risk Management Plan (RMP)

- Offsite Consequence Analysis
- Alternate Release Analysis (Level 2 & 3)
  - % weight, physical state, quantity released, etc
- CalARP Management System (Level 2 & 3)
- Prevention Program Information (Level 2 & 3)
- Emergency Response Program
  - Responders vs Non responder

CalARP Program Levels

Program 1	Program 2	Program 3	Program 4
Executive Summary 2745.3	Executive Summary 2745.3	Executive Summary 2745.3	Executive Summary 2745.3
Worst-case release analysis 2750.3	Worst-case release analysis 2750.3	Worst-case release analysis 2750.3	Worst-case release analysis 2750.3
N/A	Alternative release analysis 2750.4	Alternative release analysis 2750.4	Alternative release analysis 2750.4
5-year accident history 2750.9	5-year accident history 2750.9	5-year accident history 2750.9	5-year accident history 2750.9
N/A	Document management system 2735.6	Document management system 2735.6	Document management system 2735.6
Prevention Program			
N/A	Safety Information 2755.1	Process Safety Information 2760.1	*In addition to all Level 3 Prevention Elements, the following are required for Program Level 4* *2762.1 – 2762.10*
	Hazard Review 2755.2	Process Hazard Analysis 2760.2	
	Operating Procedures 2755.3	Operating Procedures 2760.3	
	Training 2755.4	Training 2760.4	**Safeguard Protection Analysis**
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		Contractors 2760.12	
		Employee Participation 2760.10	
		Hot Work Permits 2760.11	
Emergency Response Program			
Coordinate with local emergency responders 2765.1	Develop a plan and program (if applicable) and coordinate with local emergency responders 2765.1	Develop a plan and program (if applicable) and coordinate with local emergency responders 2765.1	**Must develop a plan and program consistent with 2765.2**

New CalARP Facility

- Coordination with the CUPA
  - Establish an approximate timeline of activities.
  - Properly implement the CalARP program

- Conduct initial Hazard Assessment
  - Off-site Consequence Analysis
    - Program level determination
    - RMP complexity

New CalARP Facility

- If Table 3 RS,
  - Registration & RMP submittal to CUPA
- If Table ½ and/or 3 RS,
  - Registration & RMP submittal to USEPA and CUPA
- Submittals are prior to RS being above TQ

RMP Review Process

- RMP Completeness review by UPA
  - Required elements in RMP

- If deficiencies are noted, facility has 60 days to correct and resubmit RMP

Public Review

- UPA submits RMP for formal public review
  - RMP made available to the public via website/local newspaper
- Public has 45 days to comment
- Technical Review/Evaluation Review
  - Up to 36 months to technically review RMP.

CalARP Inspection Example #2

Facility Name: Top Class Plating

Facility Process: Metal Finishing

- **RS**: Sodium & Potassium Cyanide
- **Quantity**: NACN – process tanks: 250 lbs/Storage: 300 lbs;
  KCN – Process Tanks: 150 lbs / Storage: 200 lbs

Facility Location: Commercial

CalARP Inspection Example #1

- Process tanks using RS

CalARP Inspection Example #1

- Storage of RS

CalARP Inspection Example #1

Chemical Name	CAS Number	Table 1 TQs in (lbs)	Table 2[2] TQs in (lbs)	Table 3 TQs in (lbs)
Picrotoxin	124-87-8			500/10,000 [4]
Piperidine	110-89-4	15,000		1,000
Potassium arsenite	10124-50-2			500/10,000 [4]
Potassium cyanide [5]	151-50-8			100
Potassium silver cyanide [5]	506-61-6			500
Propyleneimine [Aziridine, 2-methyl-]	75-55-8	10,000		10,000
Propyne [1-Propyne]	74-99-7		10,000	
Prothoate	2275-18-5			100/10,000 [4]
Sodium azide (Na (N3)) [5]	26628-22-8			500
Sodium cacodylate	124-65-2			100/10,000 [4]
Sodium cyanide (Na (CN)) [5]	143-33-9			100

CalARP Inspection Example #1

- Does this facility have a regulated substance?
- Does the facility have enough RS to exceed the Threshold Quantity for regulation?
- Can we make a Program Level determination?

CalARP Inspection Example #1

Program Level 1 Requirements

- The distance to a toxic or flammable endpoint for a worst-case release is less than the distance to any public receptor.
- No accidental releases of a RS where offsite exposure has led to death, injury, or a restoration of environmental receptors.
- Emergency response procedures have been **COORDINATED** between the stationary source and local emergency responders.

CalARP Inspection Example #2

Facility Name: Power Generation (PG)

Facility Process: Energy Generation

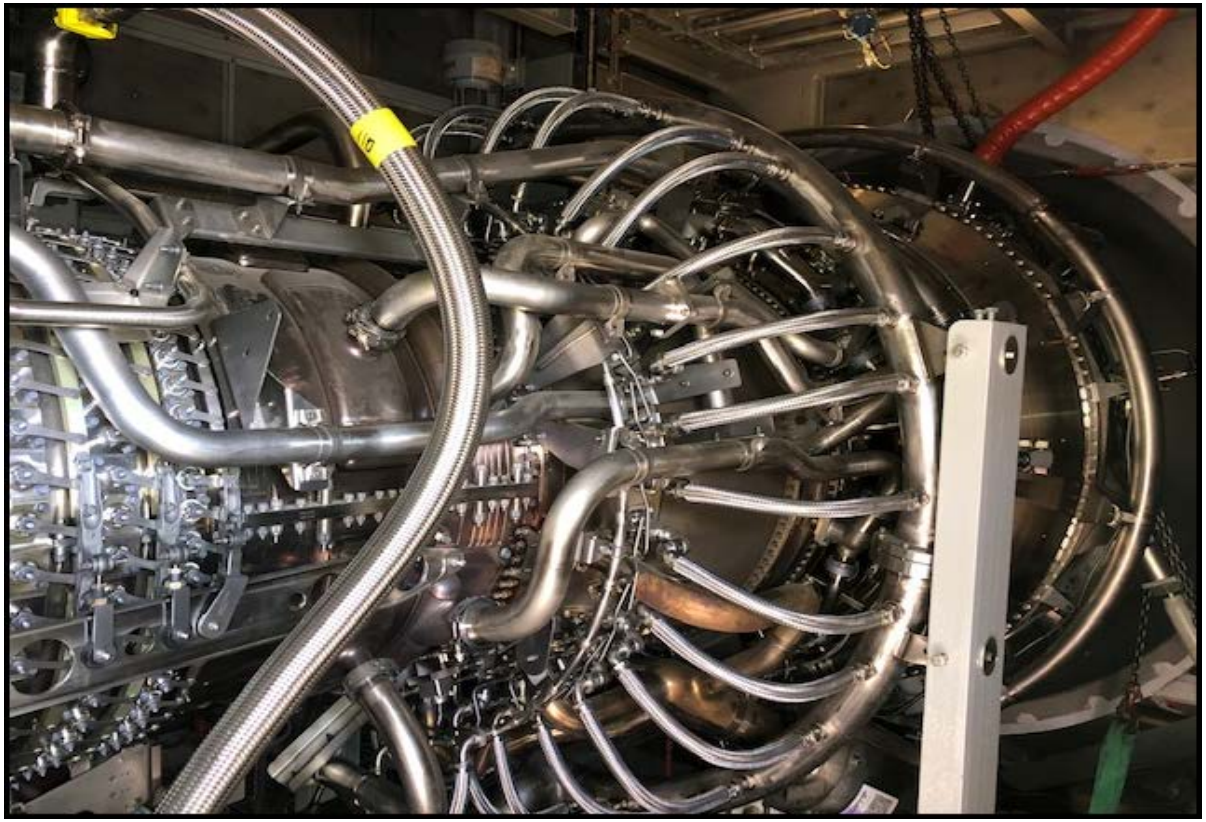
- **RS**: 29% Aqueous NH_3
- **Quantity**: 8,820 gallon tank = **19,700 lbs NH_3**

Facility Location: Commercial

Chemical of Concern: Ammonia (29%)

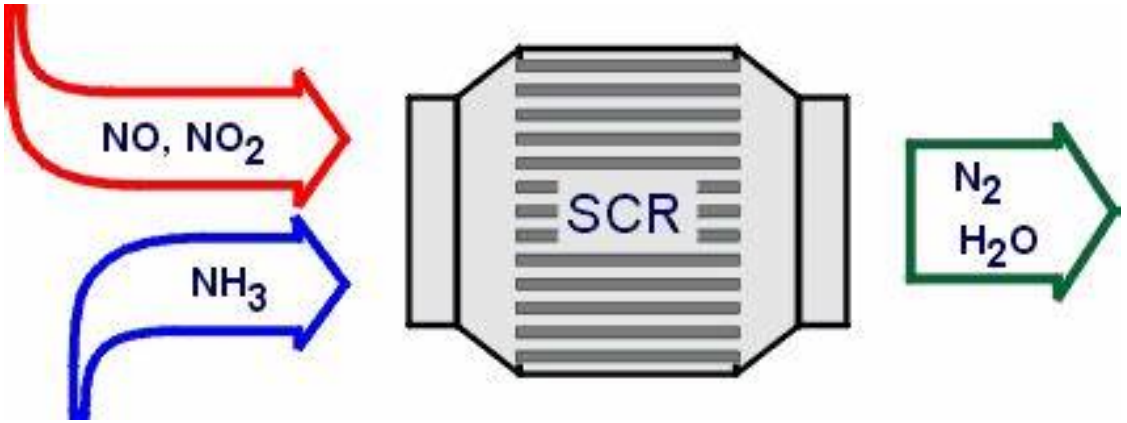
CalARP Inspection Example #2

- Natural Gas Turbine Engine - Generates NOx



CalARP Inspection Example #2

- Selective Catalytic Reduction using Aqua Ammonia



CalARP Inspection Example #2

Appendix A
CalARP Program Combined[1] List of Chemicals and Threshold Quantities (TQ)

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Acrylonitrile [2-Propenenitrile]	107-13-1	20,000		10,000
Ammonia (conc 1% or greater) [6]	7664-41-7			500
Ammonia (anhydrous) [6]	7664-41-7	10,000		500
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OSHA – Process Safety Management

This Appendix contains a listing of toxic and reactive highly hazardous chemicals which present a potential for a catastrophic event at or above the threshold quantity.

CHEMICAL NAME	CAS*	TQ**
Alkylaluminums	Varies	5000
Ammonia, Anhydrous	7664-41-7	10000
Ammonia solutions (greater than 44% ammonia by weight)	7664-41-7	15000
Ammonium Perchlorate	7790-98-9	7500

CalARP Inspection Example #2

CalARP Inspection Example #2

- What we know:
  - RS – 29% Ammonium Hydroxide
  - State TQ – 500 pounds
  - **Federal TQ – N/A**
  - **OSHA TQ – N/A**
  - Offsite Consequence:
    - **Yes**
  - **PROGRAM LEVEL 2**

CalARP Inspection Example #2

- Additional Required Elements:
  - Alternate Release Scenario
  - Prevention Program Elements

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Coordinate with local emergency responders 2765.1	Develop a plan and program (if applicable) and coordinate with local emergency responders 2765.1	Develop a plan and program (if applicable) and coordinate with local emergency responders 2765.1	**Must develop a plan and program consistent with 2765.2**

CalARP Inspection Example #2

- Safety Information

CalARP Inspection Example #2

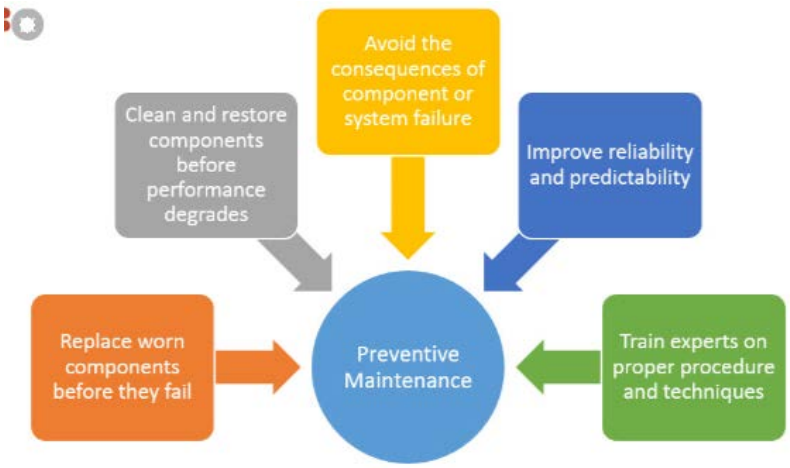
- Hazard Review
  - Identifying where systems can fail
  - Safeguards used or needed to control or prevent malfunction
  - Performed by a team knowledgeable of process.
  - Revalidation every 5 years

CalARP Inspection Example #2

- Operating Procedures
  - SOP's need to address:
    - Initial start-up
    - Normal ops
    - Normal shut down
    - E-Shutdown
    - Consequences of Deviation
    - Equipment Inspections
    - Temp Ops
    - Start-up after E-shutdown

CalARP Inspection Example #2

- Maintenance
  - Preventative Maintenance Inspections
  - Industry Accepted Standards
    - RAGAGEP
    - OEM Rec's



CalARP Inspection Example #2

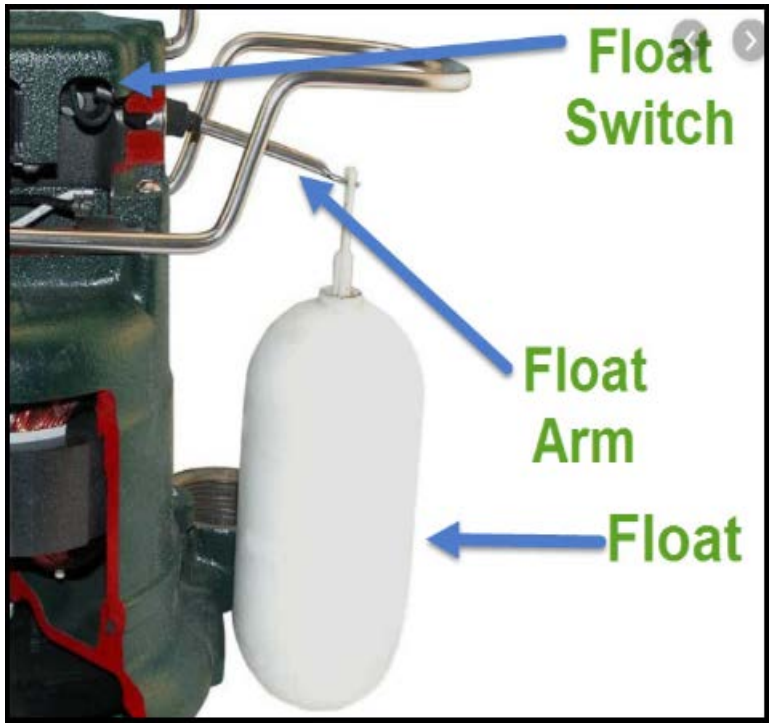
- Typical Aqueous ammonia set-ups

CalARP Inspection Example #2

Monitoring Equipment for RS

CalARP Inspection Example #2

Monitoring Equipment for RS

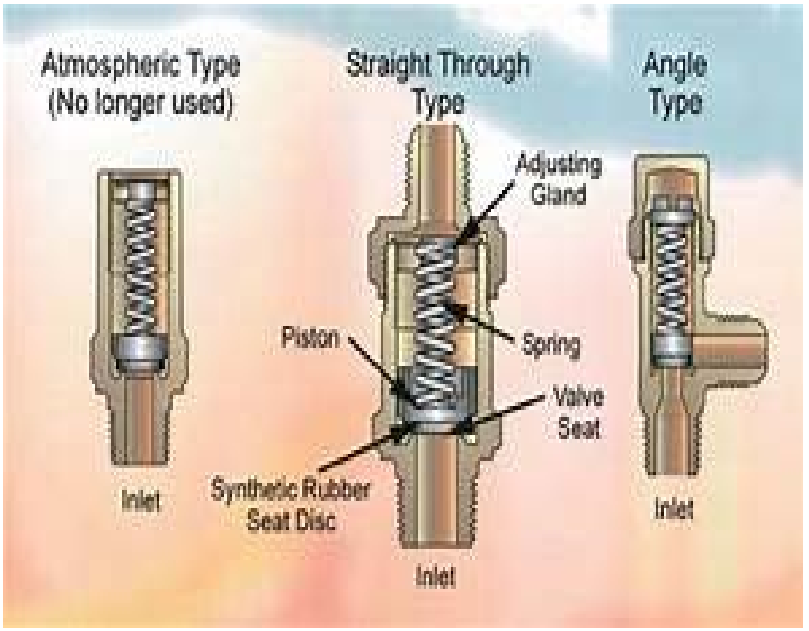


CalARP Inspection Example #2

Safety equipment

CalARP Inspection Example #2

Pressure Relief devices: 5-yr service period



CalARP Inspection Example #2

Additional Safety equipment

CalARP Inspection Example #2

- Program Level 2 Summary:
  - Program Level based on OCA
  - Prevention Program requirement
    - 7 prevention elements
    - Documentation!
  - Worst case release scenario & Alternate Release Scenario required for every covered process

CalARP Inspection Example #3

Facility Name: Colder Than Ice

Facility Process: Cold Storage

- RS- Anhydrous Ammonia
- Quantity – 12,000 pounds NH_3

Facility Location: Commercial and Residential

File Notes: Prior violations, but closed

CalARP Inspection Example # 3

Appendix A
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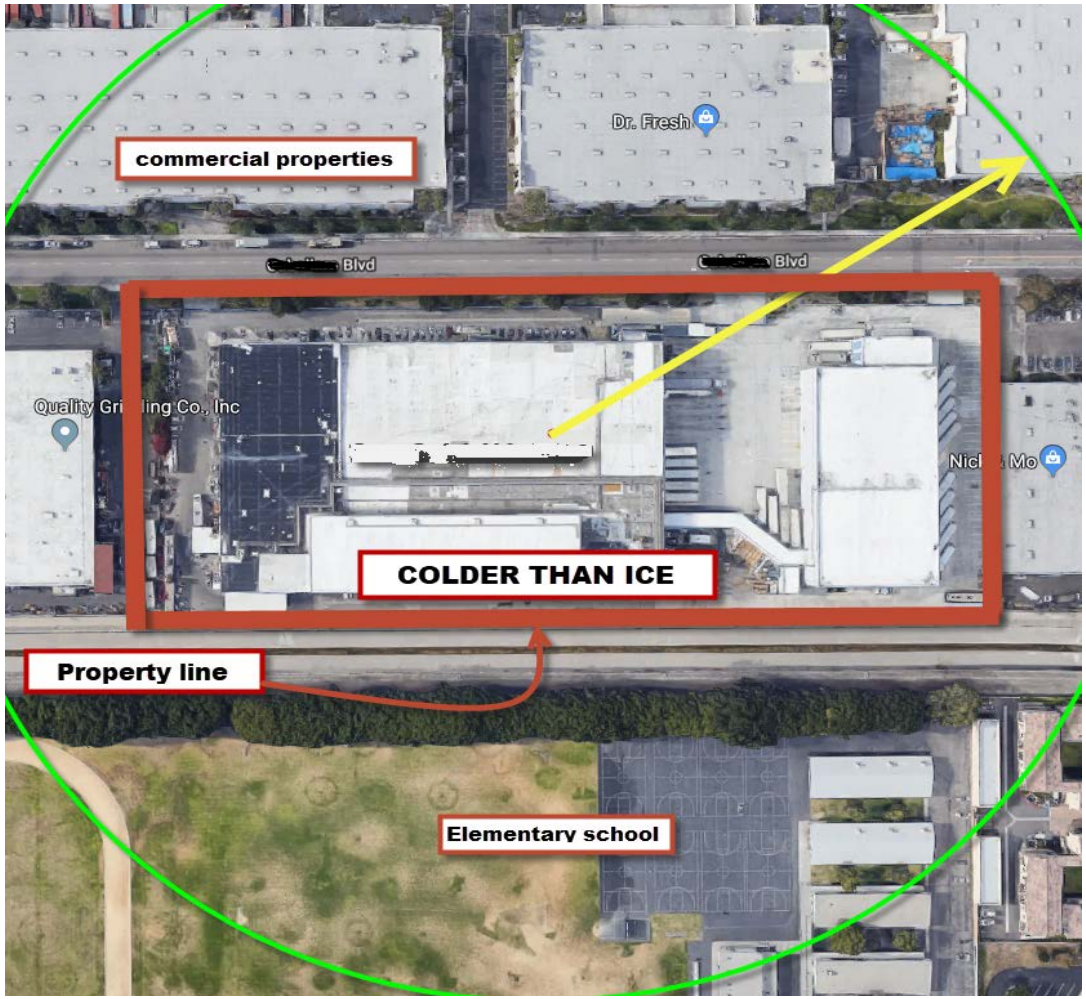
CalARP Inspection Example #3



CalARP Inspection Example #3

- What we know
  - RS – 12,000 pounds Anhydrous Ammonia
  - State TQ – 500 pounds (Table 3)
  - Federal TQ – 10,000 pounds (Table 1)
  - **OSHA TQ – 10,000 pounds (1910.119 App. A)**
  - Offsite Consequence – yes.
  - **Program Level 3!!!**

EPA United States Environmental Protection Agency

RMP*eSubmit

CalARP Inspection Example #3

- RMP Additions:
  - All Program level-2 requirements plus:
    - Additional Prevention Elements
      - ***Management of Change***
      - ***Process Safety Start-up Review***
      - ***Hot Work Permit***
      - ***Employee Participation***
      - ***Contractor requirement***

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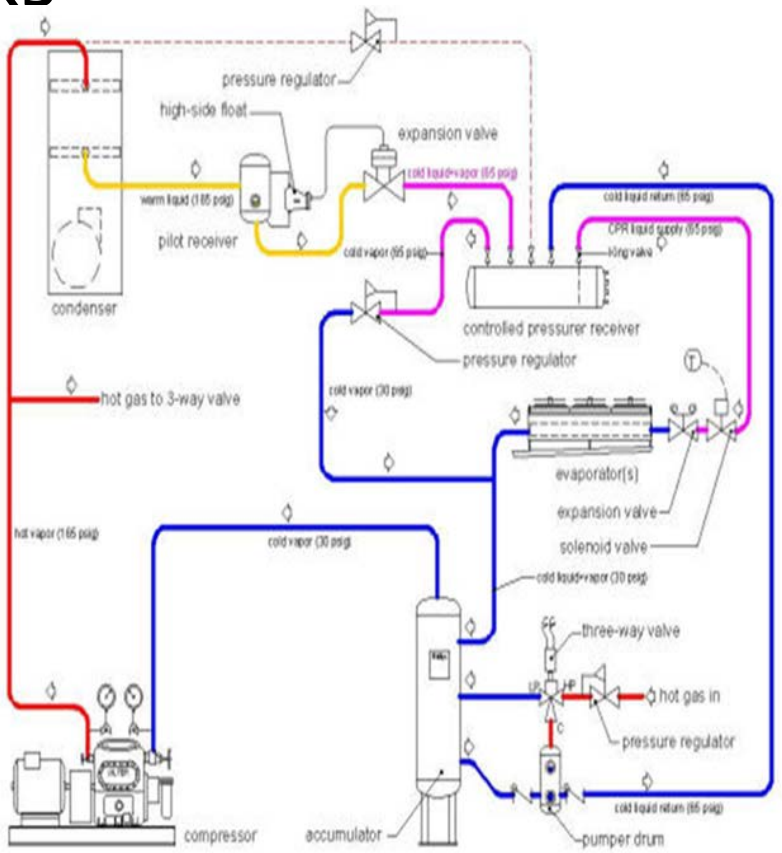
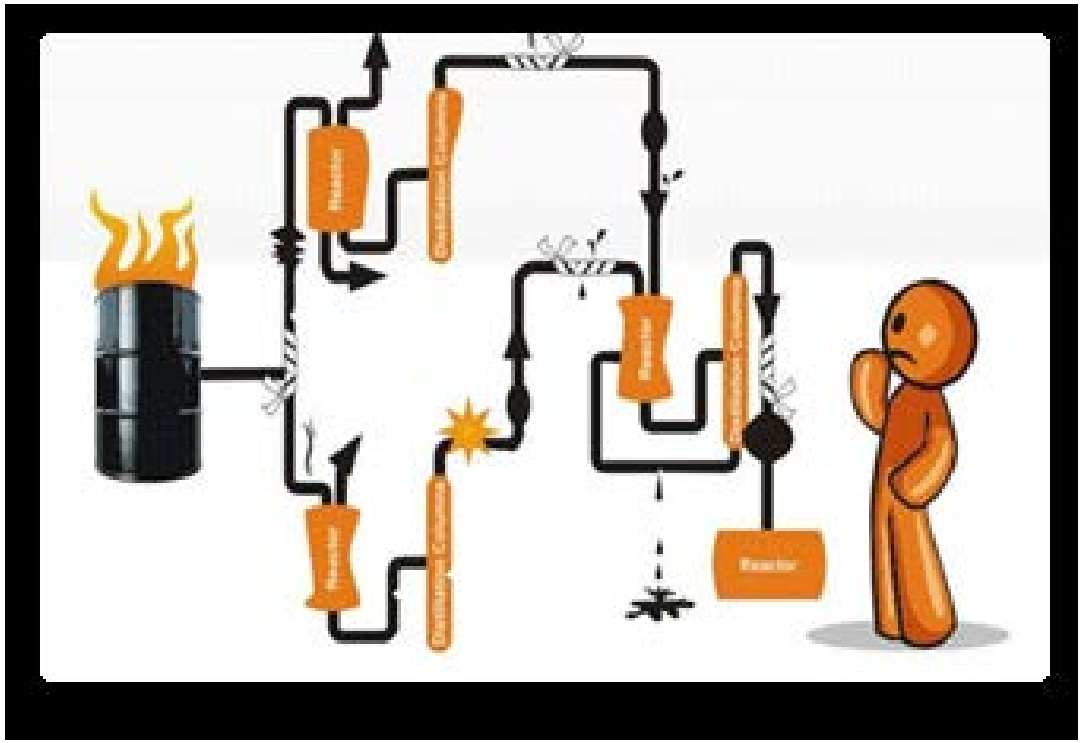
CalARP Inspection Example #3

- Process Safety Information (PSI)
  - **Information pertaining to the RS**
  - **Technology of process**
  - **Equipment of the process**
  - **RAGAGEP**



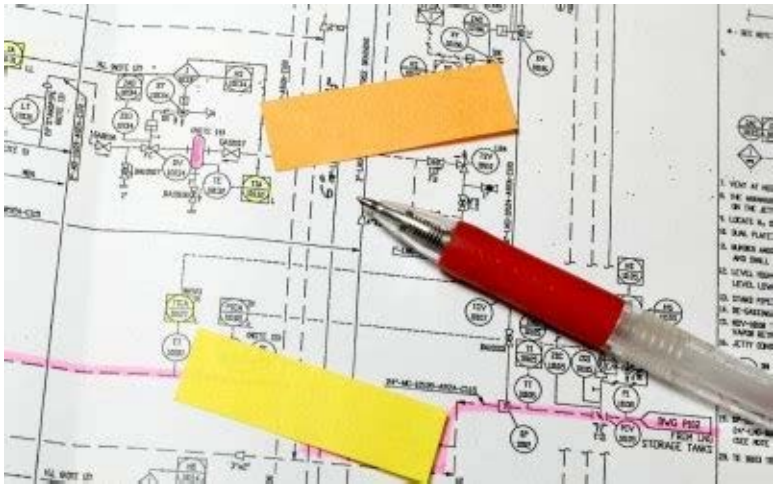
CalARP Inspection Example #3

- Process Hazard Analysis (PHA)
  - Identifying, evaluate, and control the hazards

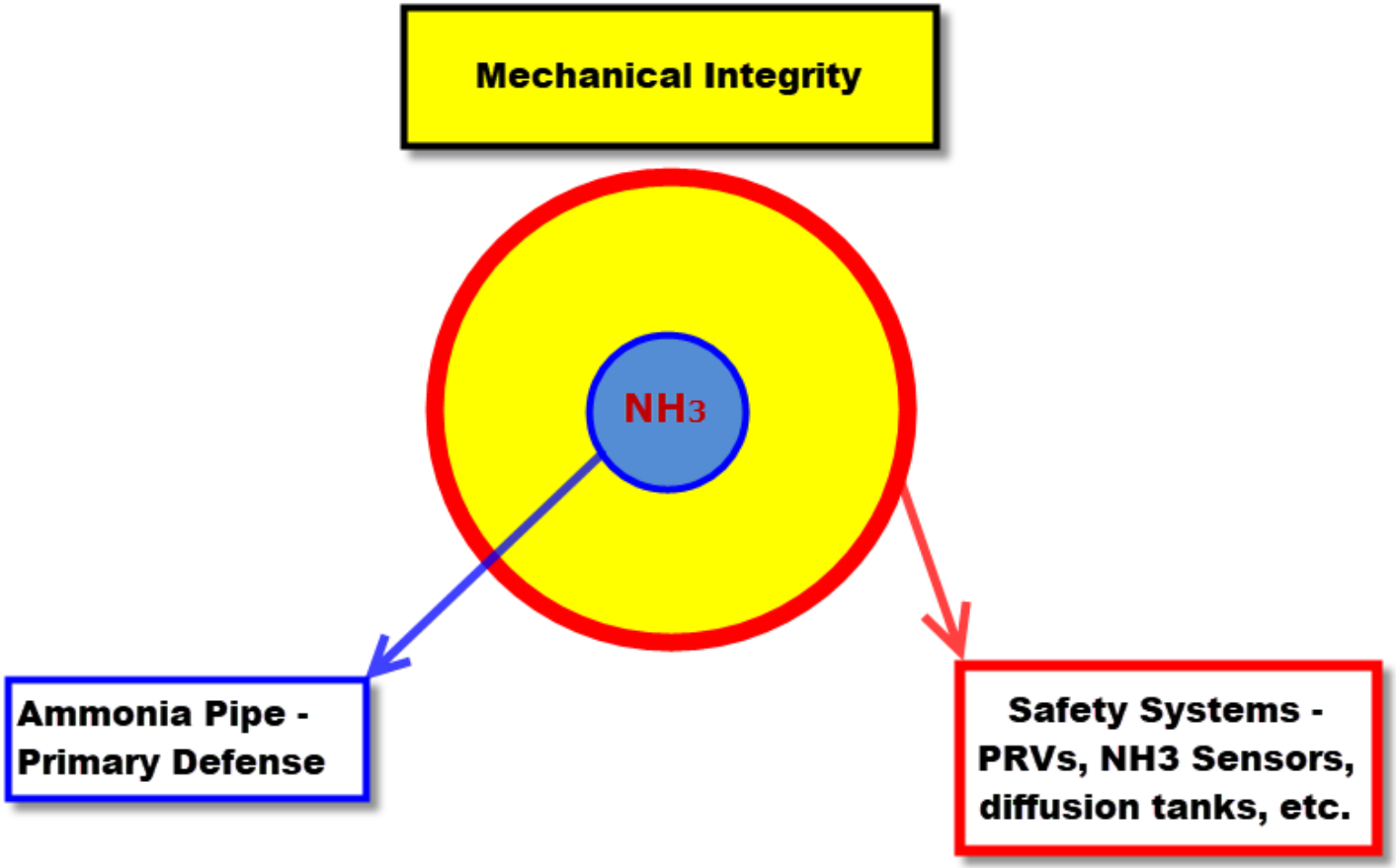


CalARP Inspection Example #3

- PHA
  - PHA conducted ASAP during development of CalARP program
    - Prior to RMP submittal
  - Team with expertise in engineering, operations, and PHA methodology being used.
  - Updated/revalidated every 5 years



CalARP Inspection Example #3



CalARP Inspection Example #3

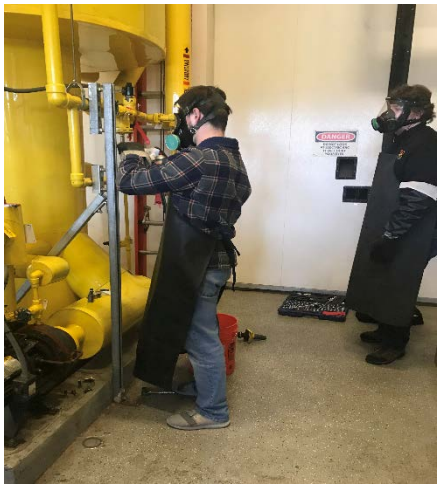
- Mechanical Integrity
  - Applies to:
    - Pressure vessels, piping, valves
    - Relief & venting systems
    - Emergency shutdown systems and controls
    - Ancillary equipment and controls
  - Establish written procedures to maintain integrity of system!
  - Inspection and testing*
    - Follow RAGAGEP and/or Equipment spec's

CalARP Inspection Example #3

- Management of Change
  - Procedures to manage major changes to process
  - Modifications to SOPs, duration of change, etc.
  - All applicable elements need to be updated accordingly
    - SOPs
    - PSI
    - Training
- Pre-Safety Start Up Review
  - Required when major change occurs – affects PSI
    - New RS or major increase of RS
  - Confirms:
    - Equipment and construction meet design specs
    - All safety, maintenance, operating, and emergency procedures in place
    - PHA completed for new stationary sources.

CalARP Inspection Example #3

- Contractor Information
  - Requires owner to ensure contractor has good safety standing
  - Owner must ensure contractor is trained in all aspects, hazards of process
  - Ensure contractor follows safety practices and procedures



CalARP Inspection Example #3

- System Walkdown
  - Checklist developed specifically for closed loop Ammonia systems!
  - A lot to look at. Lets take a closer look

CalARP Inspection Example #3

- Machinery Room (IIAR-2)

CalARP Inspection Example #3

- Machinery Room – IIAR-2 Ch. 6
  - Ammonia Detection & Alarm Systems
  - Ventilation Systems
  - Emergency/Electrical shutdown controls
  - Eyewash/shower systems
  - Tight sealing doors and openings
  - Well Placarded and labeled

** Older facilities can present issues (Grandfathering)

CalARP Inspection Example #3

- Machinery Room Doors

CalARP Inspection Example #3

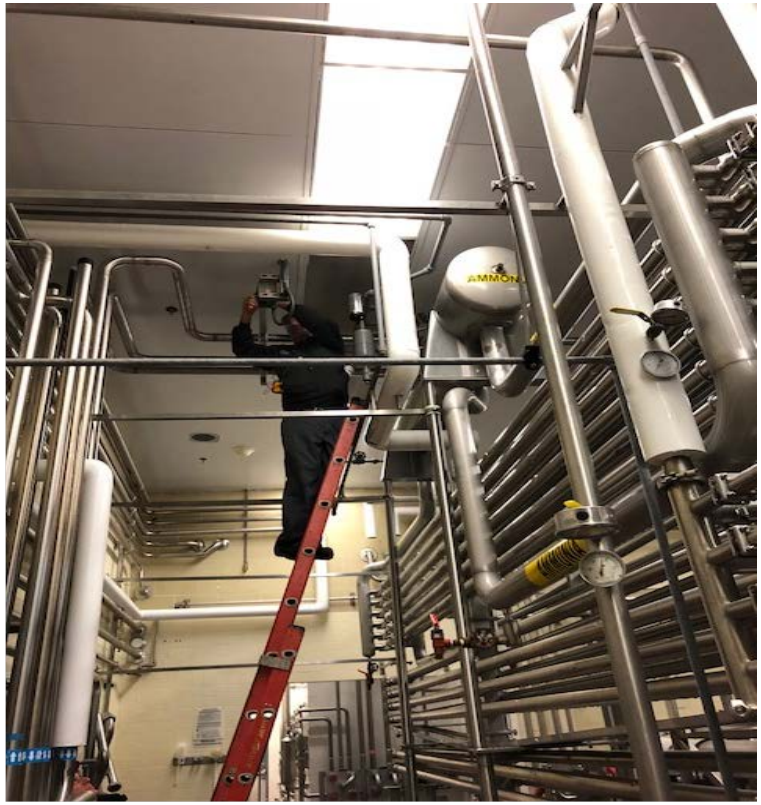
- Ammonia Sensors

Low level (25 ppm – 250 ppm)

High level (1 – 2%)

CalARP Inspection Example #3

- Ammonia Sensors – Calibration and Testing



CalARP Inspection Example #3

- General RAGAGEP
  - Main Shutoff Valves / King Valve

CalARP Inspection Example #3

- General RAGAGEP
  - Pressure Vessel Nameplate

CalARP Inspection Example #3

- General RAGAGEP
  - Oil Pot – Dead Man Valves

CalARP Inspection Example #3

- General RAGAGEP
  - Pressure Relief/Safety Valves (Bulletin 109)

CalARP Inspection Example #3

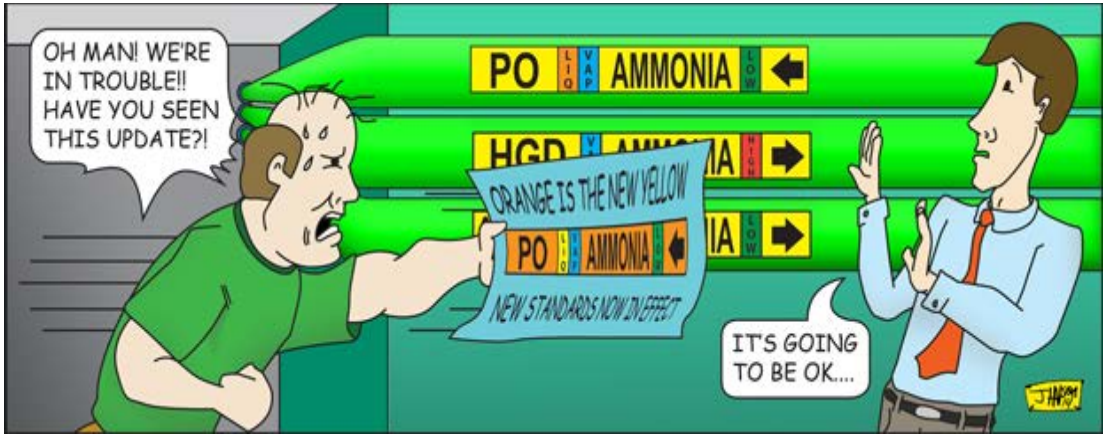
- General RAGAGEP
  - Pressure Relief/Safety Valves

CalARP Inspection Example #3

- General RAGAGEP
  - Diffusion/Deluge Tanks (IIAR-2 Ch.15)

CalARP Inspection Example #3

- General RAGAGEP
  - Ammonia Pipe Markings



CalARP Inspection Example #3

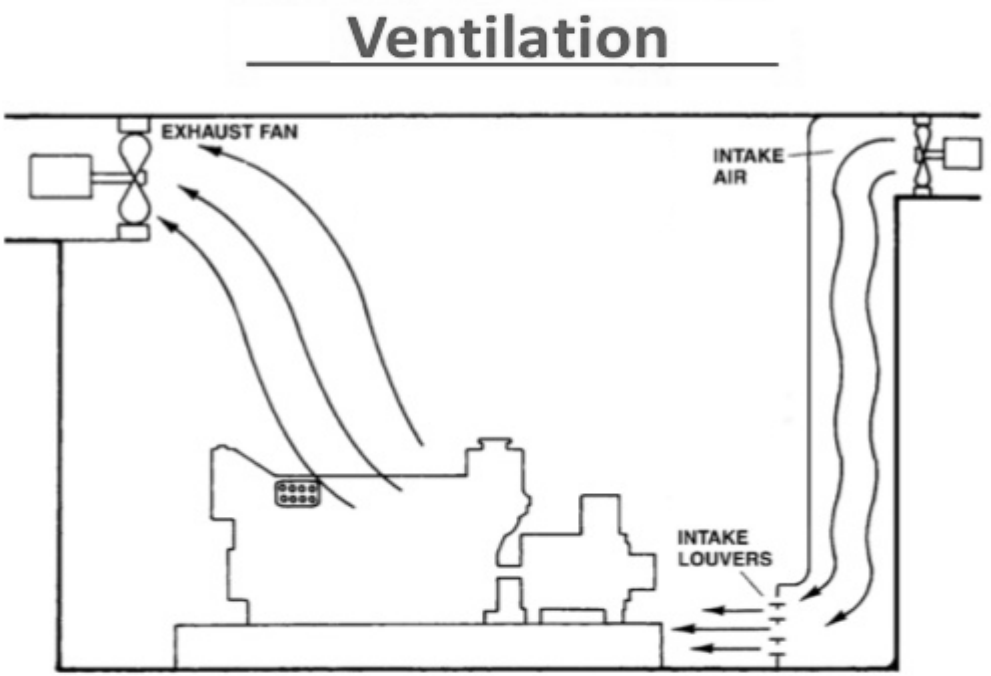
- General RAGAGEP
  - Pipe Markings/Insulation

CalARP Inspection Example #3

- General RAGAGEP
  - NFPA 704 Placards

CalARP Inspection Example #3

- Machinery Room Ventilation:
  - Purge NH_3 vapor from room
  - Prevents concentration from reaching LFL
  - Provides fresh air for personnel

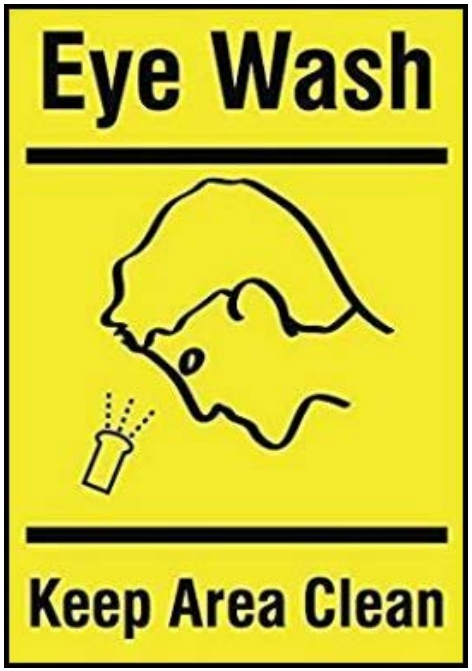


CalARP Inspection Example #3

- Machinery Room Ventilation:

CalARP Inspection Example #3

- Eye wash stations inside and outside room



CalARP Inspection Example #3

- General Safety
  - Wind Socks

CalARP Inspection Example #2

- Program Level 3 Summary:
  - Program Level 3 facilities determined by inclusion of OSHA PSM regulations.
  - Prevention Program requirement
    - 12 prevention elements tailored to more complex systems
  - Over-arching organizations (IIAR) that mandate specific standards for Closed-Loop Ammonia Systems.

Summary

- Understanding the component requirements of an RMP can simplify the documentation process during an inspection.
- The Prevention Program is the heart of the CalARP program
- Utilizing/Understanding RAGAGEP can help identify potential issues with system requirements.

CalARP 101

Thank You