Process Safety Management / Risk Management Program / EPCRA

- ***29 CFR 1910.119/1926.64***

Presented by: Education, Training and Technical Assistance, 919-807-2875

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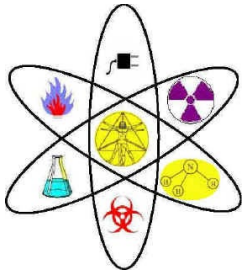
Objectives

- Attain an overall understanding of Process Safety Management and Risk Management Program
- Have an overall understanding of the Emergency Planning and Community Right-to-Know Act (EPCRA) of 1986
- Describe how to request and obtain Tier II reports
  - State Emergency Response Commission (SERC)
  - Local County Emergency Manager



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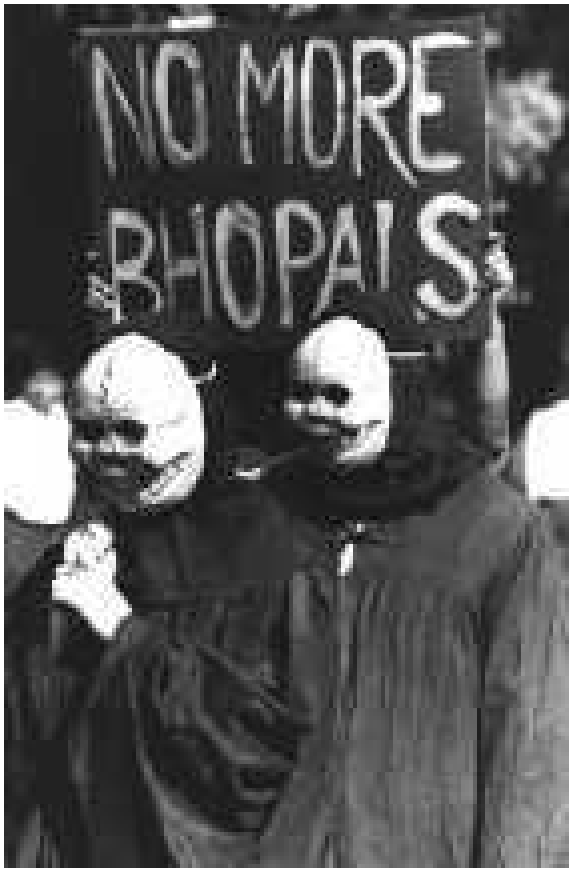
Catastrophic Events

- **Catastrophic Events in the United States which led to the development of the PSM standard**

- 1985 - Institute, WV; 135 injured.
- 1988 - Norco, LA; 7 dead/42 injured.
- 1988 - Henderson, NV; 2 dead/350 injured.
- 1989 – Richmond, CA; 9 injured.
- 1989 - Pasadena, TX; 23 dead/232 injured.
- 1990 - Channelview, TX; 17 dead.

Emergency Planning and Community Right-to-Know Act

- **October 17, 1986**
  - President signed Superfund Amendments and Reauthorization Act (SARA) into law
  - Emergency Planning and Community Right-to-Know Act (EPCRA) included under Title III of SARA



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Emergency Planning and Community Right-to-Know Act

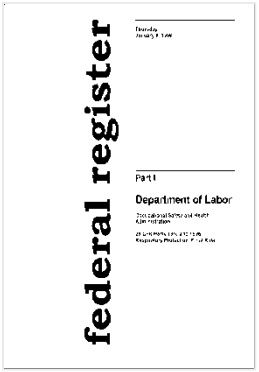
- **Subtitle A Emergency Planning and Notification**
  - Section 301: Establishes State Emergency Response Commission (SERC) and Local Emergency Planning Committee (LEPC)
  - LEPC: Fire, law enforcement, first aid, industry, hospital, elected officials, health, transportation, and emergency management

Emergency Planning and Community Right-to-Know Act

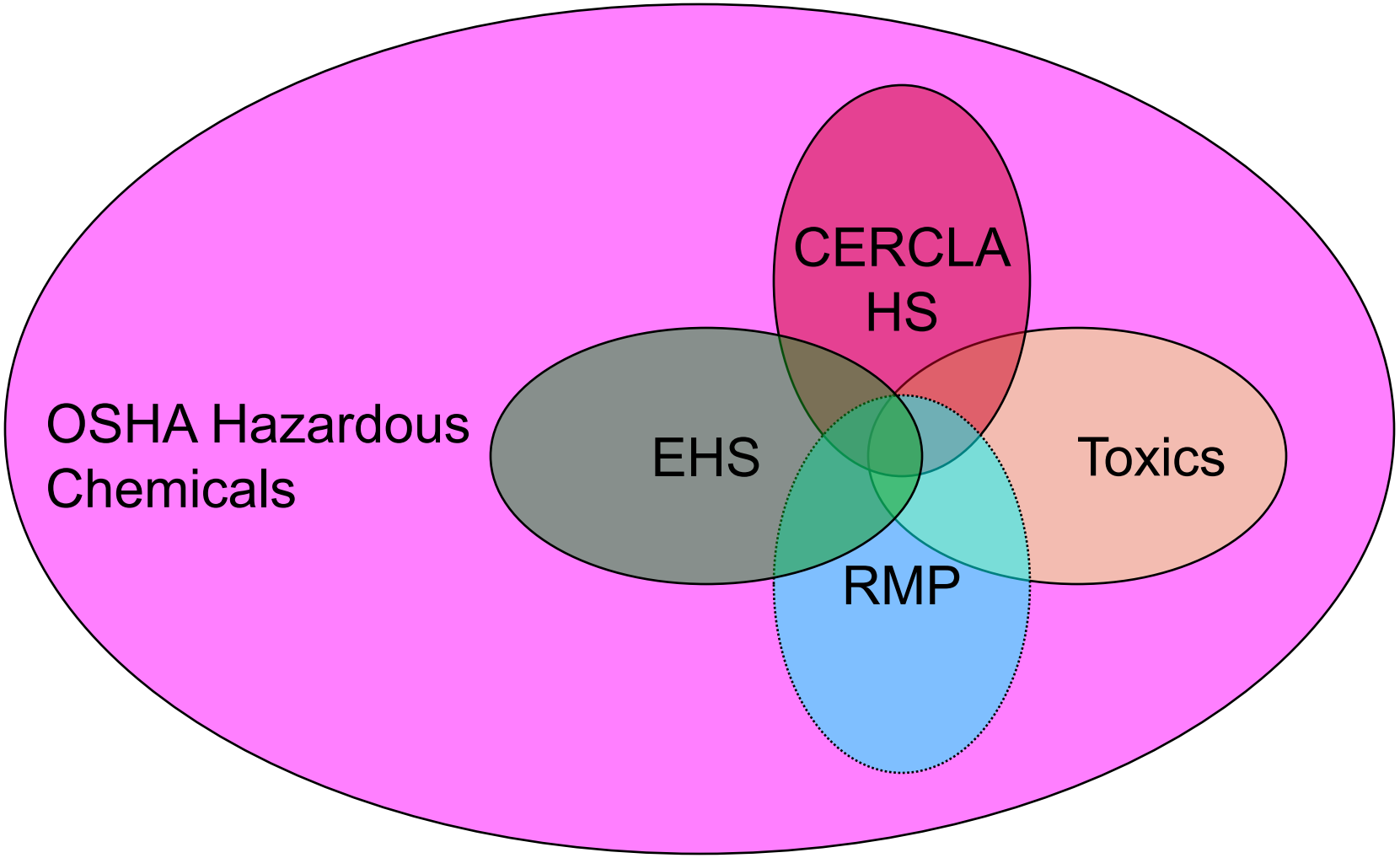
- **Subtitle B Reporting Requirements**
  - 312 Chemical Inventory Report (Tier II)
    - » *LEPC*
    - » *SERC*
    - » *Fire department with jurisdiction over the facility*

Clean Air Act

- Clean Air Act Amendments of November 1990 - Section 304
  - Required OSHA to develop chemical safety standard.
  - Required standard to contain a list of chemicals.
  - Required standard to contain certain elements.



PSM vs. 112r Applicability

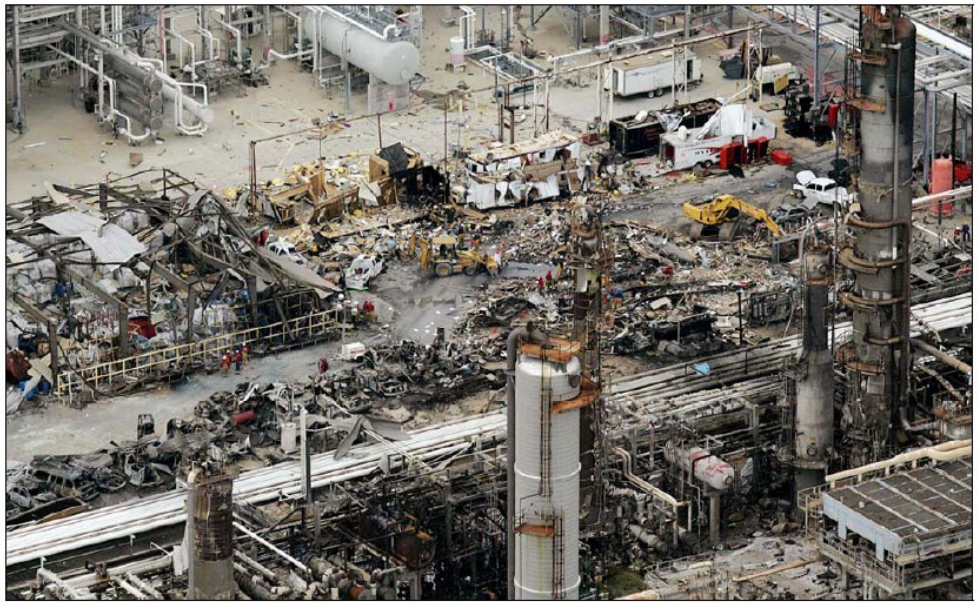


PSM/RMP Listed Chemical Differences

- RMP… 147 listed
  - ……77 Toxics/ 67 Flammables
- PSM…137 Chemicals + Flammables
- Inside fence vs. Outside fence

Purpose of Process Safety Management

- To Prevent Catastrophic Releases of Highly Hazardous Chemicals
  - (Containment)



Program Quality Verification

- PQV Team
  - Team inspection method used to evaluate an employer's PSM Program

Implementation of the PSM Standard

- Must have top management support to succeed
- May involve added personnel and capital investments
- "Giving another hat" to the plant engineer and/or safety manager generally does not work

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Implementation of the PSM Standard

- Company may need the help of outside consultants for parts of the program
- Company must be involved in the development and have ownership of the PSM program
- "Canned programs" generally do not meet the requirements of the standard

1910.119 - Process Safety of Highly Hazardous Chemicals

- Effective as of May 26, 1992
- Has 16 paragraphs (a-p)
- Time intensive program to implement and maintain
- Can also be time intensive to inspect
- Performance Based Standard

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Performance Based Standard

- Employer decides HOW to be safe based on GOOD ENGINEERING PRACTICES
  - (accepted practices)
- ANSI, ASME, NEC, NFPA, IIAR, Chlorine Institute, Owners Manual, etc., etc., etc.
- ANY documented procedures or instructions that MAKE SENSE to use.
- You decide what “makes sense”

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Process Safety Chemicals 1910.119 Appendix A

- **Appendix A**

Appendix A to §1910.119--List of Highly Hazardous Chemicals, Toxics and Reactives (Mandatory)

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

CHEMICAL NAME	CAS*	TQ**
Acetaldehyde	75-07-0	2500
Acrolein (2-Propenal)	107-02-8	150
Acrylyl Chloride	814-68-6	250
Allyl Chloride	107-05-1	1000
Allylamine	107-11-9	1000
Alkylaluminums	Varies	5000
Ammonia, Anhydrous	7664-41-7	10000
Ammonia solutions (> 44% ammonia by weight)	7664-41-7	15000
Ammonium Perchlorate	7790-98-9	7500
Ammonium Permanganate	7787-36-2	7500
Arsine (also called Arsenic Hydride)	7784-42-1	100
Bis(Chloromethyl) Ether	542-88-1	100
Boron Trichloride	10294-34-5	2500
Boron Trifluoride	7637-07-2	250
Bromine	7726-95-6	1500
Bromine Chloride	13863-41-7	1500
Bromine Pentafluoride	7789-30-2	2500
Bromine Trifluoride	7787-71-5	15000
3-Bromopropyne (also called Propargyl Bromide)	106-96-7	100
Butyl Hydroperoxide (Tertiary)	75-91-2	5000
Butyl Perbenzoate (Tertiary)	614-45-9	7500
Carbonyl Chloride (see Phosgene)	75-44-5	100
Carbonyl Fluoride	353-50-4	2500
Cellulose Nitrate (concentration > 12.6% nitrogen	9004-70-0	2500
Chlorine	7782-50-5	1500
Chlorine Dioxide	10049-04-4	1000
Chlorine Pentrafluoride	13637-63-3	1000
Chlorine Trifluoride	7790-91-2	1000
Chlorodiethylaluminum (also called Diethylaluminum Chloride)	96-10-6	5000
1-Chloro-2,4-Dinitrobenzene	97-00-7	5000
Chloromethyl Methyl Ether	107-30-2	500
Chloropicrin	76-06-2	500
Chloropicrin and Methyl Bromide mixture	None	1500
Chloropicrin and Methyl		

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Key P.O.C.s in Chemical Plant

- **Chemical Manufacturing**……PhD Chemistry
- **Engineering**……P.E.
- **Maintenance**……P.E.
- **SHE**……CSP/CIH

How People “Really” Speak

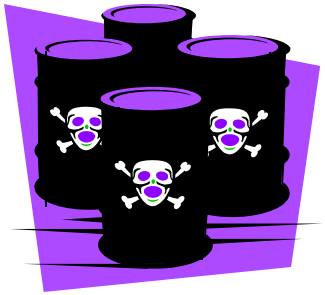
- PhD Chemistry…….**Proper Chemical name**
- Chemical Engineer……**MEBS**
- Mechanical Engineer…**Junk**
- Wrench Turners…….**Crap**

2 Things to Remember…

- Not all Chemists and Engineers finished in the top 10% of their class.
- A PSM site is just a regular manufacturer using the same chemicals, just larger amounts.

Useful Terminology

- PSM Covered Chemicals = **JUNK**
- All other chemicals = **STUFF**
- Proper name gets you the **MSDS**, other than that, you don't need or care what the name is.



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ONLY 2 Things to Care About

- **JUNK** stays inside the pipes = **GOOD**
- **JUNK** gets outside of pipes = **BAD**

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Junk

- ANY PSM covered chemical
- Think of it as a wild animal. It EATS PEOPLE. Who cares what the name of it is?

Remember

- They might be making rocket fuel.
- You are not.
- You are inspecting the cage to make sure the wild animal stays inside.

Definitions - Paragraph (b)

- Atmospheric tank
- Catastrophic release
- Facility
- Highly Hazardous Chemical (HHC)
- Hot work
- Normally unoccupied remote facility
- Process
- Replacement in kind
- Trade secret
- Covered process

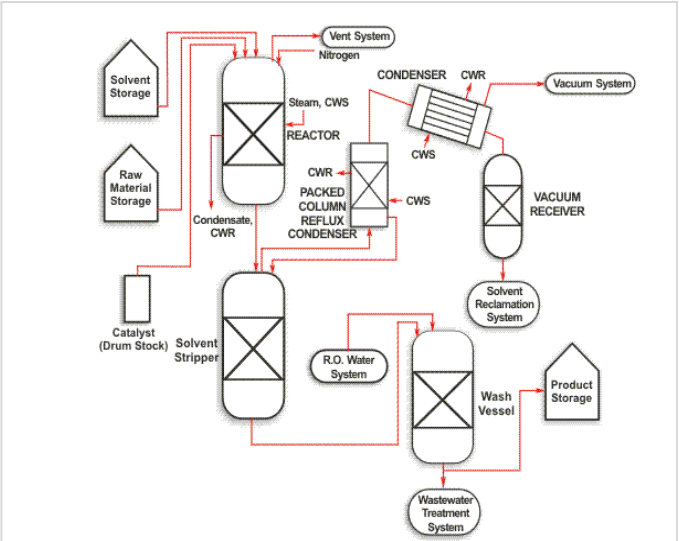
Important Terminology/Concepts

- Atmospheric tank
- Energy transfer system
- Venting
- Pressure relief system
- Alarm system

Example of each of these

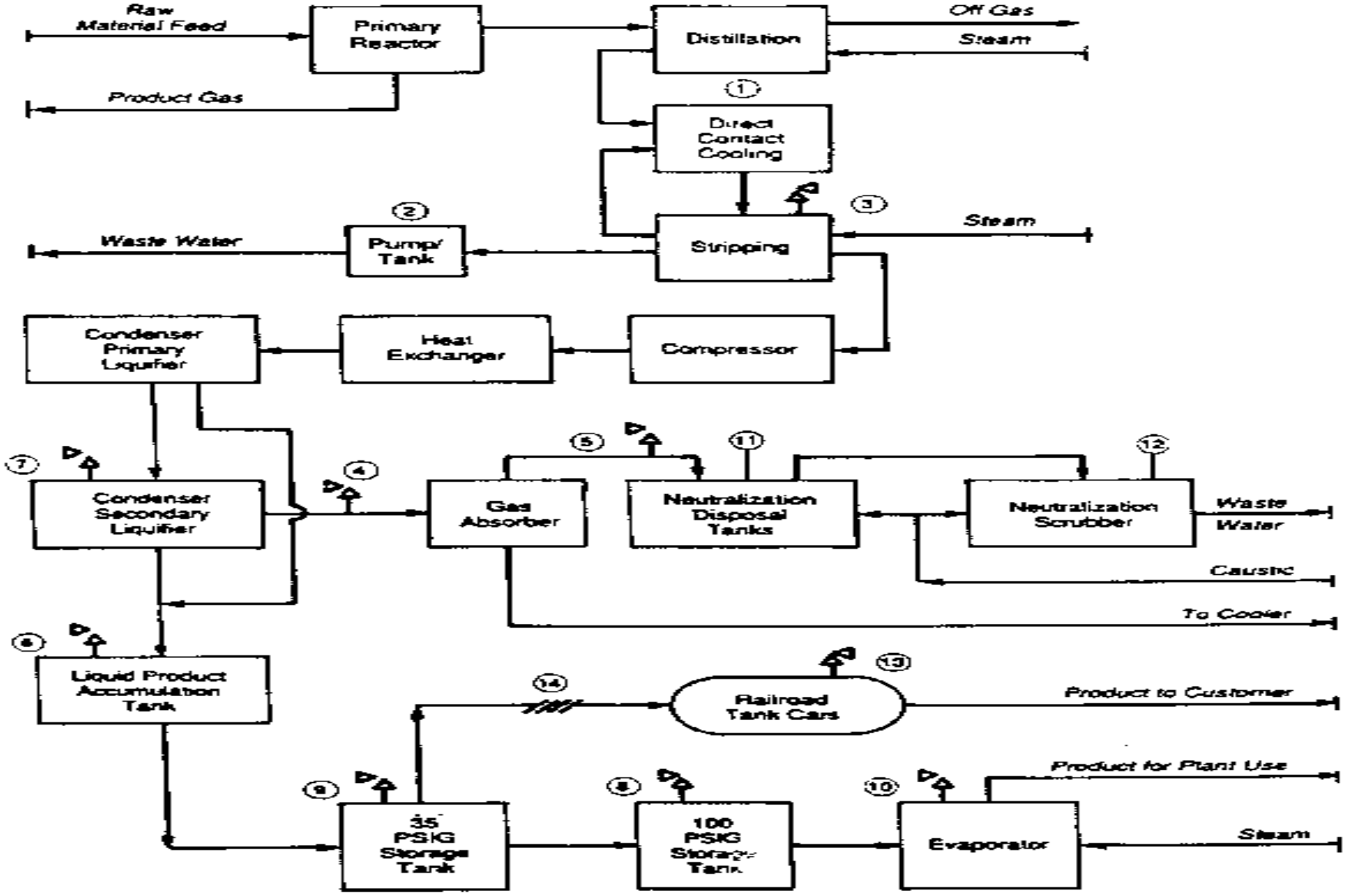
Important 119(d) PSI Documents

- P&IDs (roadmap of Equipment, not to scale)
- Block Diagrams / Process Flow Diagrams (roadmap of Operations performed)

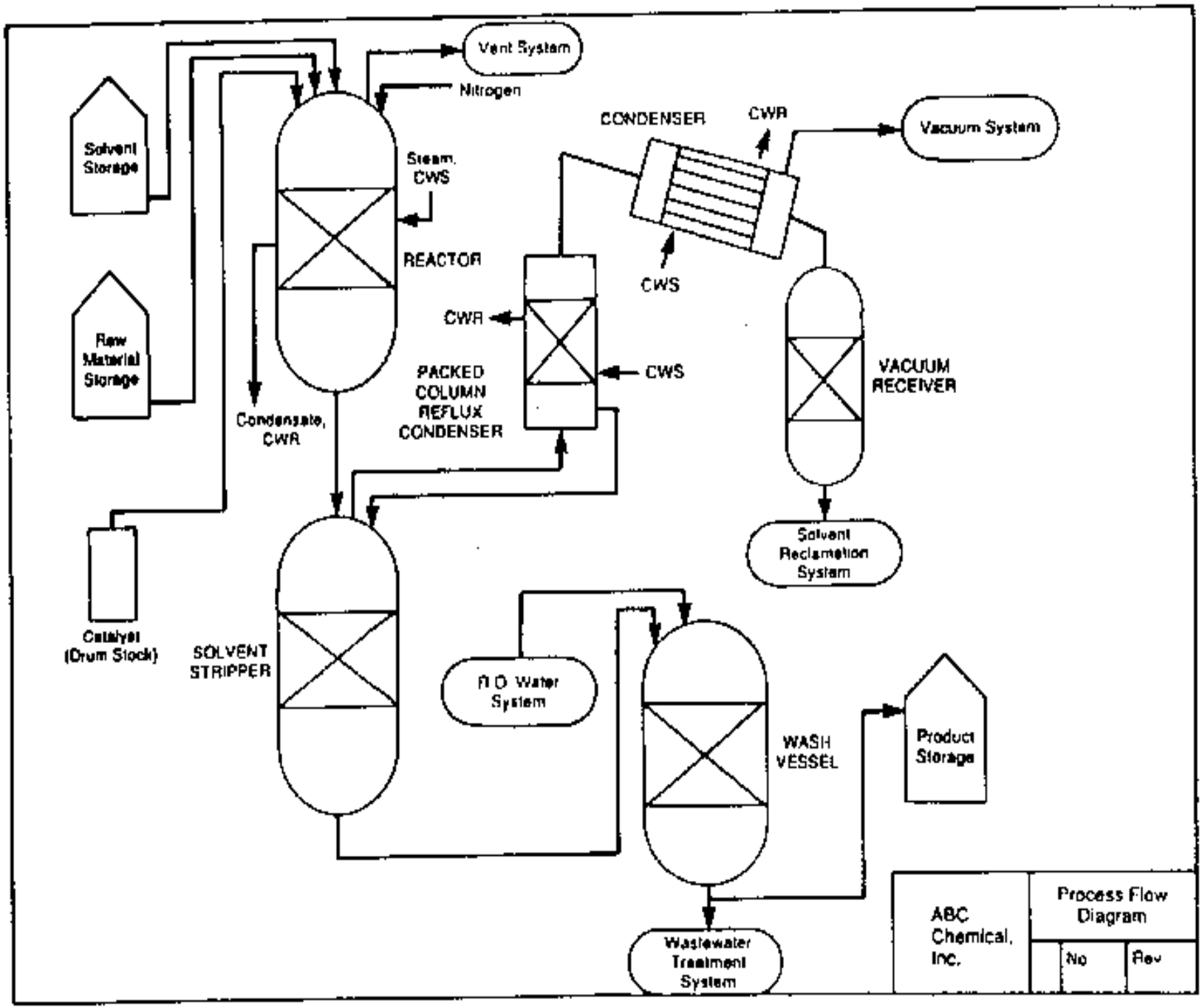


Example of a Process Flow Diagram

Example of a Block Flow Diagram



Example of a Simplified Process Flow Diagram



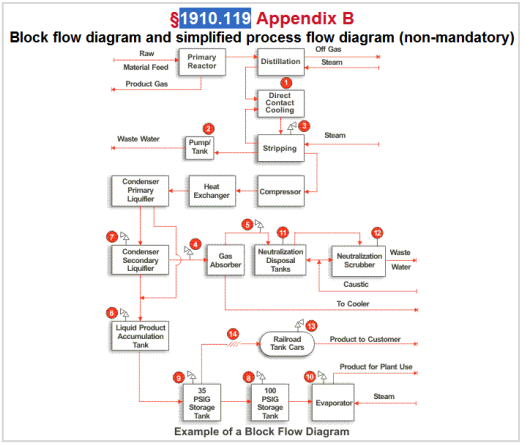
PSM Covered PROCESS

- HHC in use, storage, manufacturing, handling, or on-site movement

Process Boundary Lines

- Use Block or Process Flow Diagrams to show where HHC is in “use, storage, etc” to define the “initial” PSM Covered Process.

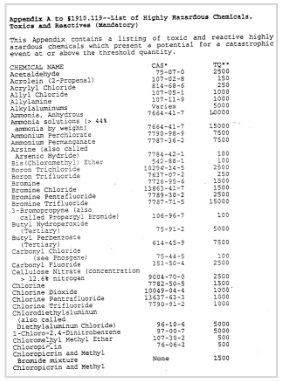
- Then evaluate “Adjacency Issues” to see if they need to be expanded.



Example of a Block Flow Diagram

Application - Paragraph (a)

- Covers plants which have toxic or reactive chemical(s) in processes at or above a listed Threshold Quantity (TQ):
  - Chemicals covered are listed in Appendix A.
    - » TQ for ammonia is 10,000 Lbs.
    - » TQ for chlorine is 1,500 Lbs.
    - » TQ for flammable liquids and gasses is 10,000 Lbs.



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Chloropicrin	76-06-2	500
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What's NOT Covered

- Retail facilities
- Oil or gas well drilling or servicing operations
- Normally unoccupied remote facilities
- Hydrocarbons USED AS FUEL
- Flammable liquids in atmospheric tanks

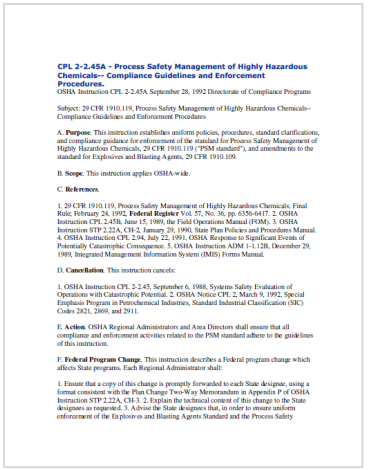
The Meer Decision

- Federal OSHA court decision from New Jersey (Meer Decision) states that language used in PSM standard for storage of flammable liquids in atmospheric tanks is “unconstitutionally vague”.

- **RESULT:** Flammable liquids stored in Atmospheric Tanks are not counted in the quantity used to determine the TQ (for right now)

CPL 2-2.45A - PSM of HHC

- PQV Team Leader
  - PSM330 & 340 or PSM 345
  - Chemical plant experience
  - Evals .119 D, E, F, I, J, L, O, P
    - » **1910.119 Paragraphs C, G, H, K, M, and N may be evaluated by ANY CSHO. ALL Other .119 MUST be evaluated by PQV Trained CSHO



CPL 2-2.45A - Process Safety Management of Highly Hazardous Chemicals-- Compliance Guidelines and Enforcement Procedures.
OSHA Instruction CPL 2-2.45A September 28, 1992 Directorate of Compliance Programs

Subject: 29 CFR 1910.119, Process Safety Management of Highly Hazardous Chemicals--Compliance Guidelines and Enforcement Procedures

A. **Purpose**. This instruction establishes uniform policies, procedures, standard clarifications, and compliance guidance for enforcement of the standard for Process Safety Management of Highly Hazardous Chemicals, 29 CFR 1910.119 ("PSM standard"), and amendments to the standard for Explosives and Blasting Agents, 29 CFR 1910.109.

B. **Scope**. This instruction applies OSHA-wide.

C. **References**.

1. 29 CFR 1910.119, Process Safety Management of Highly Hazardous Chemicals; Final Rule; February 24, 1992, **Federal Register** Vol. 57, No. 36, pp. 6356-6417. 2. OSHA Instruction CPL 2.45B, June 15, 1989, the Field Operations Manual (FOM). 3. OSHA Instruction STP 2.22A, CH-2, January 29, 1990, State Plan Policies and Procedures Manual. 4. OSHA Instruction CPL 2.94, July 22, 1991, OSHA Response to Significant Events of Potentially Catastrophic Consequence. 5. OSHA Instruction ADM 1-1.12B, December 29, 1989, Integrated Management Information System (IMIS) Forms Manual.

D. **Cancellation**. This instruction cancels:

1. OSHA Instruction CPL 2-2.45, September 6, 1988, Systems Safety Evaluation of Operations with Catastrophic Potential. 2. OSHA Notice CPL 2, March 9, 1992, Special Emphasis Program in Petrochemical Industries, Standard Industrial Classification (SIC) Codes 2821, 2869, and 2911.

E. **Action**. OSHA Regional Administrators and Area Directors shall ensure that all compliance and enforcement activities related to the PSM standard adhere to the guidelines of this instruction.

F. **Federal Program Change**. This instruction describes a Federal program change which affects State programs. Each Regional Administrator shall:

1. Ensure that a copy of this change is promptly forwarded to each State designee, using a format consistent with the Plan Change Two-Way Memorandum in Appendix P of OSHA Instruction STP 2.22A, CH-3. 2. Explain the technical content of this change to the State designees as requested. 3. Advise the State designees that, in order to ensure uniform enforcement of the Explosives and Blasting Agents Standard and the Process Safety

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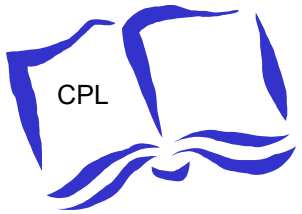
CPL 2-2.45A - Appendix A

- Questions arranged by .119 Paragraph (C-P)
- All set up for Yes or No answers.
- YES = Good
- NO = BAD = Citation
- USE THESE TO DOCUMENT EVERY PSM INSPECTION

Interrelationship of Paragraphs

- CPL 2-2.45A gives example of 1 valve impacting 11 paragraphs
- 1910.119 PSM Standard Paragraph arrangement is “clunky”
- HANDOUT ….“How to Conduct PQV”
- Wheel/Paragraph Arrangement
- USE this guidance for this class AND on every PQV Inspection



How to Conduct PQV Inspection

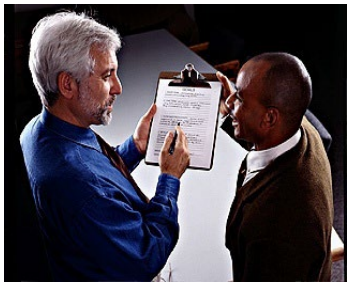
- Basic (non-PQV trained) CSHO
  - **Initiates ANY Inspection Activity through normal channels (FATCAT, Complaint, Referral, Follow-Up, General Schedule)
  - **Screens for possible PSM coverage (asks for types/amounts of chemicals)
  - **ANY possible PSM coverage, contacts Supervisor or any PQV Team member

Who are PQV Team Leaders/Members?

- See Hand Out

Key portions of the PSM Standard

- N Emergency Response (ANY CSHO)
- E PHA's (PQV Trained CSHO)
- J Mechanical Integrity (PQV Trained CSHO)
- F SOP's / Training (PQV Trained CSHO)
  - ***All other paragraphs can be evaluated in conjunction with these



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Employee Participation - Paragraph (c)

- Consult with employees on all stages of development of the process safety program
- Must develop a written employee participation plan
- Provide employees with access to all elements of the process safety program

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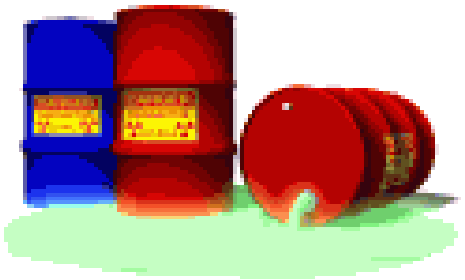
Process Safety Information - Paragraph (d) - Chemical Information

- Toxicity information
- Permissible exposure limits (PEL)
- Physical data
- Reactivity data
- Corrosively data
- Thermal and chemical stability data
- Hazardous effects of inadvertent mixing



Process Safety Information - Paragraph (d) - Technology Information

- Process chemistry
- Maximum inventory
- Safe upper and lower limits
- Consequences of deviation
- Block flow diagram

Process Safety Information – Paragraph (d) - Equipment Information

- Materials of construction
- Piping and instrument diagrams (P&ID's)
- Electrical classification
- Material and energy balances

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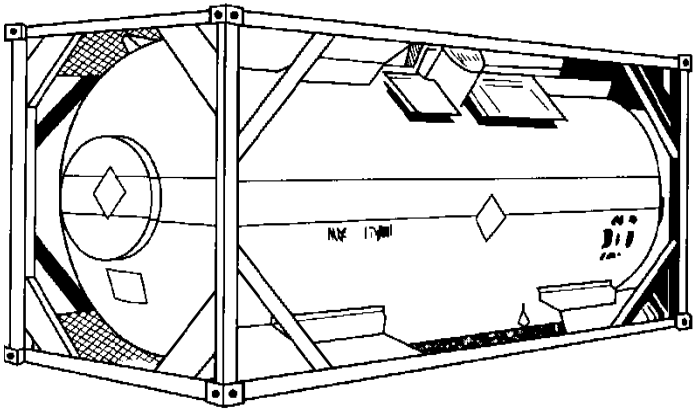
Process Safety Information - Paragraph (d) - Equipment Information

- Safety systems
- Relief systems design and design basis
- Ventilation systems design
- Design codes employed



Process Hazard Analysis Paragraph (e)

- The process hazard analysis is the cornerstone of the PSM regulation.
- It is a formal, systematic means of identifying, evaluating and controlling process hazards involving highly hazardous chemicals.

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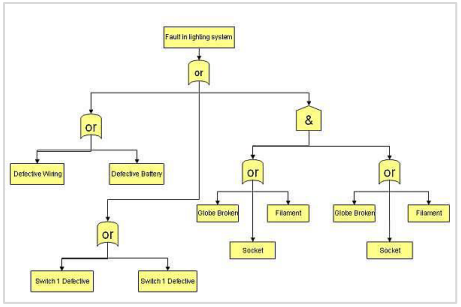
Process Hazard Analysis - Paragraph (e)

- Methodologies must be appropriate to complexity of process:
  - What-if Analysis
  - Checklist Analysis
  - What-if/Checklist
  - Hazard and Operability Study (HAZOP)
  - Failure Modes and Effects (FEMA)
  - Fault Trees



Process Hazard Analysis - Paragraph (e)

- Assemble team to conduct PHA:
  - Someone who is knowledgeable with the of PHA methodology to be used
  - Someone with engineering experience
  - Someone who is familiar with the specific system

Process Hazard Analysis - Paragraph (e)

- Hazards of the process
- Identification of previous incidents
- Engineering and administrative controls
- Consequences of failures of engineering and administrative controls
- Facility sitting
- Human factors
- Qualitative evaluation of failure of controls on employees

Operating Procedures - Paragraph (f)

- **Operating phases:** Initial startup, normal operations. temporary operations, emergency shutdown and operations, normal shutdowns, startup following shutdown.
- Operating limits
- Safety and health considerations
- Safety systems and their functions

Operating Procedures - Paragraph (f)

- **Safe work practices for:** Lockout/Tagout, confined space entry, operating process equipment, control over entrance into facility
- Quality control for raw materials
- Accessible to those who work on an/or maintain the process
- Reviewed on a regular basis to make sure that they consistent with the actual procedures

Training - Paragraph (g)

- Process overview
- Process hazards
- Operating procedures
- Emergency procedures
- Means used to verify/document training
- Refresher training

Contractors - Paragraph (h)

- Employer responsibilities:
  - Evaluate safety of contractor before hire
  - Inform of hazards of process
  - Explain emergency evacuation plan
  - Develop and implement safe work practices
  - Evaluate contractors are fulfilling obligations
  - Maintain a contract employee injury and illness log

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Contractors - Paragraph (h)

- Assure employees are trained in work practices
- Assure employees are instructed in emergency action plan
- Document employee receipt and understanding
- Assure employees follow safe work practices
- Advise facility employer or unique hazards presented or discovered

Pre-Startup Safety Review - Paragraph (i)

- Confirm that:
  - Construction and equipment meet design specifications
  - Operating procedures are in place before startup
  - New facilities: process hazard analysis
  - Modified facility: meets management of change
  - Training has occurred before startup

Mechanical Integrity - Paragraph (j)

- Employer must establish and implement written mechanical integrity program
- Employer must establish a list of all equipment to be covered by mechanical integrity program
- Training for maintenance activities including standard operating procedures

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Mechanical Integrity - Paragraph (j)

- Inspection and testing of equipment to determine if the equipment is designed and being used according to recognized good engineering practices
- Document inspection results
- Correct equipment deficiencies
- Establish quality assurance of equipment used in process (spare parts, equipment used according to manufacturers specifications….)

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Hot Work Permit - Paragraph (k)

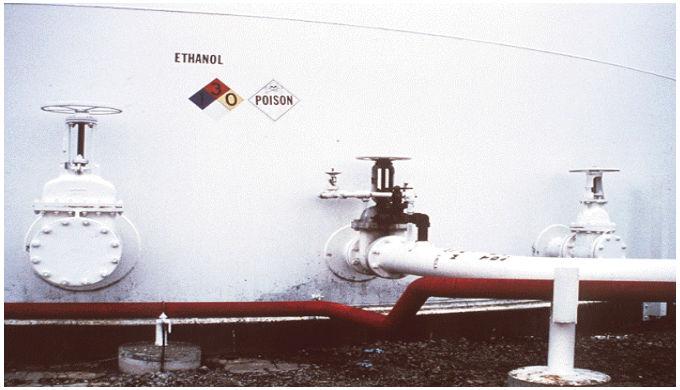
- Requires written permit
- Authorization of hot work: welding, cutting, brazing, flame or spark producing operations
- For work done on or near the covered process
- Fire prevention precautions.
- Refers to 29 CFR 1910.252(a) for safe requirement to be implemented prior to hot work operations

Management of Change Paragraph (l)

- Employer must establish written procedures to address the management of change.
- Replacement in kind
- Program must consider:
  - Technical basis
  - Impact of change on the process
  - Modification of operating procedures and,
  - Time period for the change

Management of Change - Paragraph (l)

- Who must authorize the change
- Training for employee operating or maintaining the process affected by the change prior to start up of the process
- Update process safety information



Incident Investigations - Paragraph (m)

- Incidents which did or could result in a catastrophic release of hazardous chemicals
- Near misses
- Investigation conducted within 48 hours
- Report and recommendations
- System to address recommendations
- Review with affected personnel

Emergency Planning & Response - Paragraph (n)

- Implement emergency action plan meeting (1910.38):
  - Preplanning
  - Escape procedures
  - Notification procedures
  - Alarm system
  - Training

- Handling of small releases:
  - May be subject to 1910.120, Hazardous Waste and Emergency Response

Compliance Audits - Paragraph (o)

- Certify that the program is in compliance with the paragraphs of 29 CFR 1910.119
- Verify that the program is effective
- Develop report and recommendations
- Conduct at least every three years

Trade Secrets - Paragraph (p)

- For the protection of process trade secrets involved with the highly hazardous chemical(s) involved in the process
- Enter in confidentiality agreements (if applicable)
- Make information available to affected employees

Thank You For Attending!

Final Questions?

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