Prevention Program:
Safety Information/Process Safety Information

Safety information is the foundation of a good prevention program

Prevention Program

Program 2

- **Safety information**
- Hazard review
- Operating procedures
- Training
- Maintenance
- Compliance audits
- Incident investigation

Program 3

- **Process safety information**
- Process hazard analysis
- Operating procedures
- Training
- Mechanical integrity
- Compliance audits
- Incident investigation
- Pre-startup review
- Management of change
- Employee participation
- Hot work permit
- Contractor accountability

Guidelines and Best Management Practices

- ***One of the most important parts of the regulation relates to "recognized and generally accepted good engineering practices"*** 40 CFR 68.48(b) & 68.65(c)(2)-(3)

- ***When it comes to the Risk Management Program and chemical safety in general (General Duty Clause), the "grandfather clauses" died June 21, 1999***

Safety Information/ Process Safety Information (PSI)

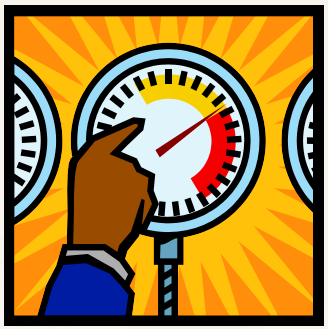
- Purpose of requirement
  - Ensure understanding of safety-related aspects of equipment, processes, and chemicals
  - Know limits those aspects place on operations
  - Adopt accepted standards and codes where applicable

Safety Information/PSI

- Purpose of requirement
  - Having updated safety information about the process is the foundation of an effective prevention program
  - Most elements, including hazard review/process hazard analysis (PHA,) depend on accuracy and thoroughness of information required by this element

Prevention Program Safety Requirements for Program Level 2 Processes

- Requirements
  - Up-to-date safety information
    - Hazardous/regulated substances
      - MSDS—current and from actual chemical supplier
    - Processes
      - Maximum intended inventories
      - Safe upper and lower limits for temperatures, pressures, flows, compositions
    - Equipment
      - Specifications
      - Codes/standards used to design, build, and operate
      - Compliance with good engineering practices
      - Update when major change makes information inaccurate



Prevention Program Safety Requirements for Program Level 3 Processes

- Written Process Safety Information
  - Hazards of the regulated substances
  - Technology of the process
  - Equipment in the process

Chemical Hazards	Process Technology	Process Equipment
✓ Toxicity	✓ Block flow diagram or simplified process flow diagram	✓ Materials of construction
✓ Permissible exposure limits (PEL)	✓ Process chemistry	✓ Piping and instrument diagrams (P&IDs)
✓ Physical data	✓ Maximum intended inventory	✓ Electrical classification
✓ Reactivity	✓ Safe upper and lower limits for such items as temperature, pressure, flows or composition	✓ Relief system design & design basis
✓ Corrosivity	✓ Evaluation of the consequences of deviation	✓ Ventilation system design
✓ Thermal & chemical stability		✓ Design codes & standards employed
✓ Hazardous effects of inadvertent mixing materials that could occur		✓ Safety systems
		✓ Material and energy balances for processes built after June 21, 1999

Prevention Program Safety Requirements for Program Level 2 and 3 Processes

Codes & Standards

Organization	Subject/Codes
ANSI American National Standards Institute	Piping, Electrical, Power wiring, Instrumentation, Lighting, Product storage and handling, Insulation and fireproofing, Painting and coating, Ventilation, Noise and Vibration, Fire protection equipment, Safety equipment, Pumps, Compressors, Motors, Refrigeration equipment, Pneumatic conveying
ASME	Power boilers, Pressure vessels, Piping, Compressors, Shell and tube heat exchangers, Vessel components, General design and fabrication codes
API	Welded tanks, Rotating equipment, Bulk liquid storage systems
NFPA National Fire Protection Association The authority on fire, electrical,	Fire pumps, Flammable liquid code, LNG storage and handling, Plant equipment and layout, Electrical system design, Shutdown systems, Pressure relief equipment, Venting requirements, Gas turbines and engines, Cooling towers, Storage tanks
ASTM INTERNATIONAL	Inspection and testing, Noise and vibration, Materials of construction, Piping materials and systems, Instrumentation
The Chlorine Institute, Inc.	Chlorine handling, inspections, testing, equipment integrity.

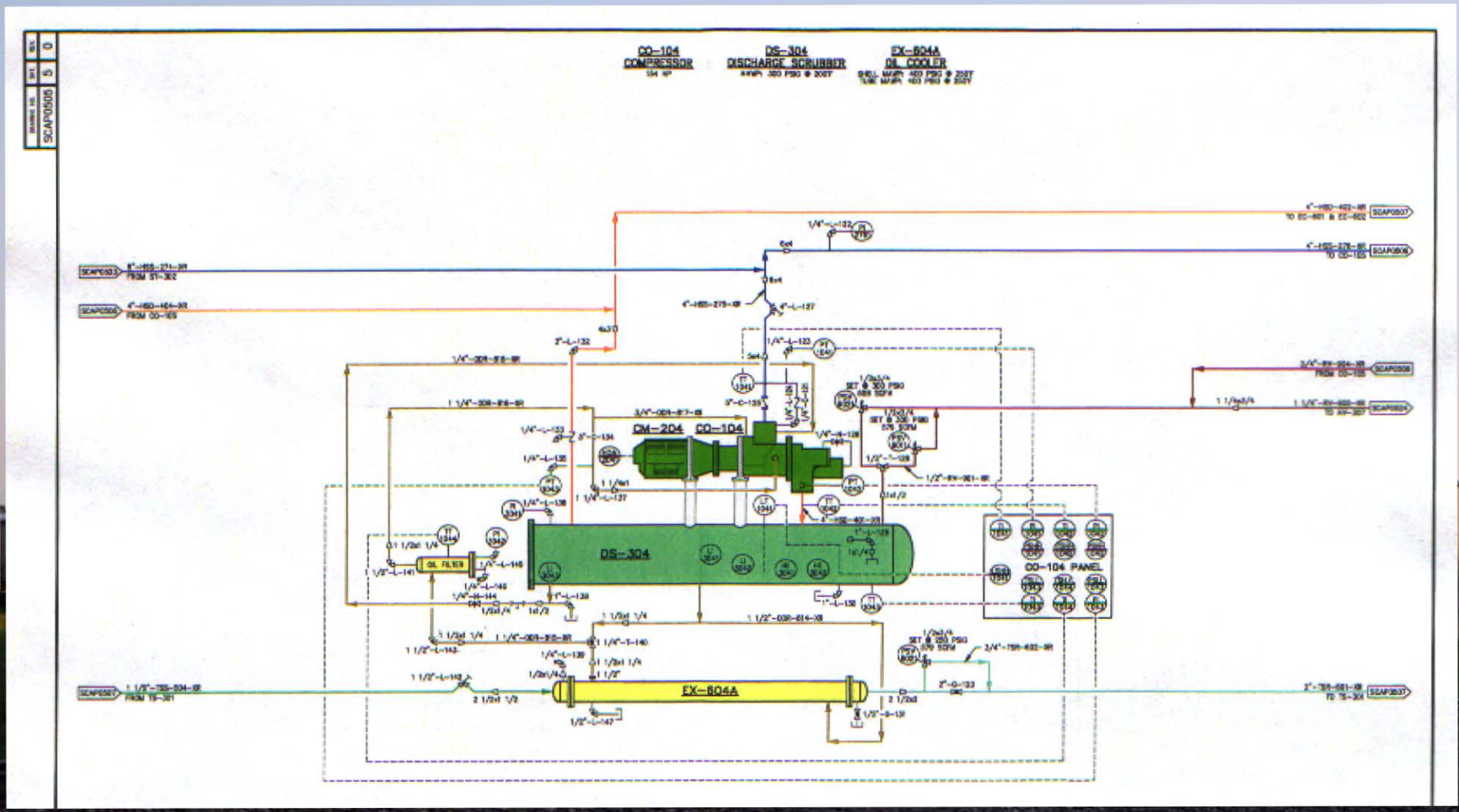
Common Deficiencies

- No or outdated MSDS (Program 2)
- Safety information/PSI incomplete, not current, or inaccurate
  - Maximum inventories
  - Safe operating control limits not specified
  - Piping and instrumentation diagrams (P&IDs)
    - Title block shows no date
    - No “checked” or “approved by” signature
    - Inaccuracies noted during walk-through

Common Deficiencies

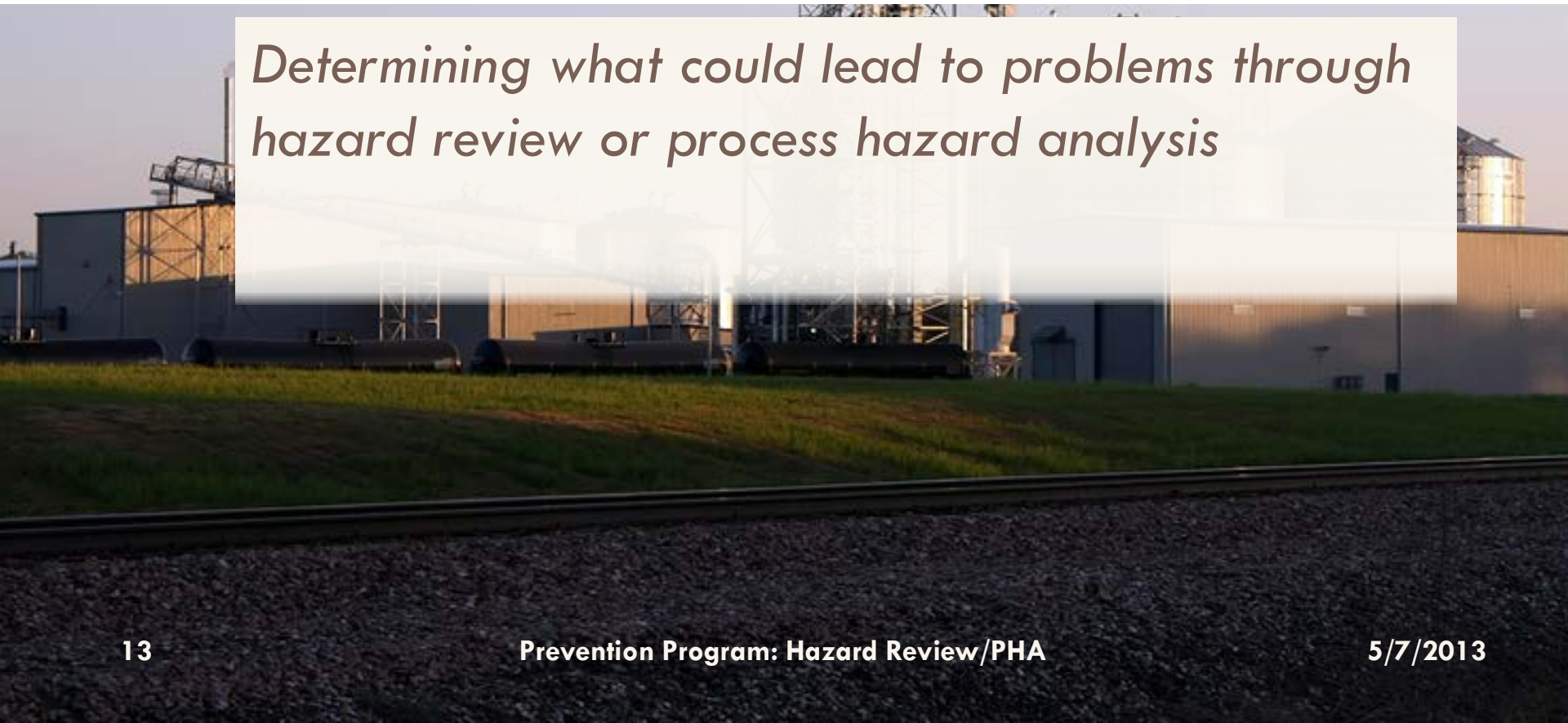
- Obsolete equipment or design with no plans to change and no documentation to show still safe
  - Example: emergency break-away in hose for nurse tank filling of anhydrous ammonia required in 1999
- Good engineering practices/industry standards not followed
  - Example: propane bullets with rust, no traffic barriers around piping

P&ID—Looks Great!



Until you try to walk through the process…

Prevention Program: Hazard Review/Process Hazard Analysis (PHA)



Determining what could lead to problems through hazard review or process hazard analysis

Prevention Program

Program 2

- Safety information
- **Hazard review**
- Operating procedures
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- Incident investigation

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Hazard Review/Analysis Concepts

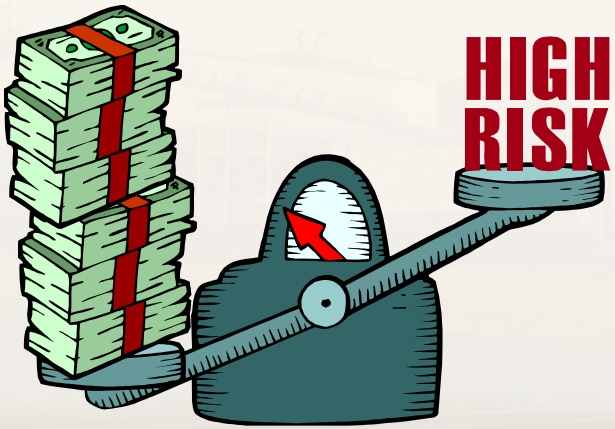
- Hazardous chemical systems
  - Processing operations
  - Pressurized systems
  - Runaway reactions
  - Contract labor
  - Complex systems
- Causes of accidents
  - Management system failure
  - Equipment failure
  - Human error

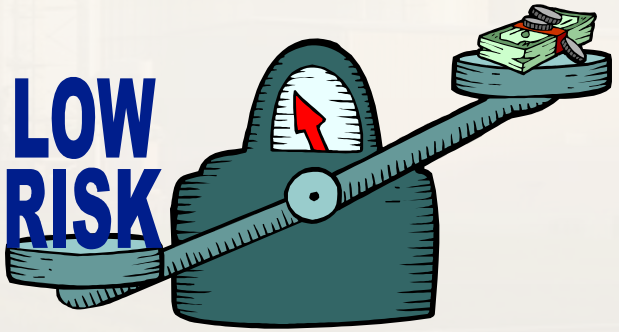
Hazard Review/Analysis Concepts

- Hazard evaluation terms
  - **Hazards:**
    - Unsafe acts or conditions that create potential for accident(s) with undesirable consequences
    - Loss of containment of flammable, combustible, highly reactive, or toxic materials
    - Uncontrolled electrical hazards or mechanical overpressure
  - **Accident:** unplanned sequence of events that has undesirable consequences
  - **Consequence:** impact of accident (i.e., effects on people, property, or environment)

Hazard Review/Analysis Concepts

- **Risk:** measure of potential human injury, economic loss, or environmental impact in terms of severity and likelihood





Risk Matrix Example

Probability

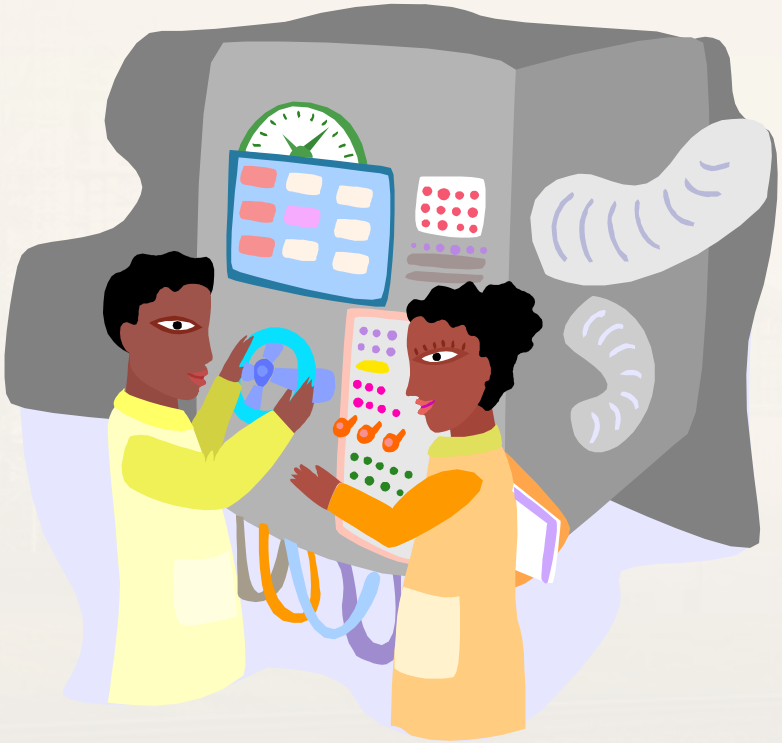
Severity

	1 Frequent (once per year or more)	2 Reasonably Probable (once per decade)	3 Occasional (sometime during facility lifetime)	4 Possible (unlikely but possible)	5 Improbable (unlikely to occur)
A Catastrophic (death or severe damage)	1A	2A	3A	4A	5A
B Severe (severe injury or major damage)	1B	2B	3B	4B	5B
C Marginal (lost time injury or moderate damage)	1C	2C	3C	4C	5C
D Negligible (first aid injury or minor damage)	1D	2D	3D	4D	5D
E Not a Hazard	1E	2E	3E	4E	5E

	Unacceptable
	Undesirable
	Acceptable with Controls
	Acceptable / Improbable

Hazard Review/Analysis Concepts

- Factors affecting risk
  - Process materials
  - Process conditions
  - Physical design
  - Equipment
  - Control system
  - Standard operating procedures
  - Operator training
  - Test, inspection, maintenance practices
  - Plant layout
  - Emergency plans
  - Protective measures
  - Staff attitudes
  - Management attention
  - Source siting



Hazard Review/PHAs

- Use to identify potential for chemical releases
- Incorporate the safety information gathered in the previous step
- Use to develop operating procedures, training programs, emergency response programs based on findings
- Many options available (checklists, HAZOP, fault-tree, etc.)
- If checklist used, should be made facility specific

Hazard Review (Program 2)

- Requirements
  - Conduct review of hazards to identify
    - Process and regulated substance hazards
    - Equipment malfunctions or human errors that could cause release
    - Safeguards used or needed
    - Release detection/monitoring used or needed
  - May use guides (e.g., checklists)
  - Must document results and resolve identified problems in timely manner
  - Update review
    - At least every 5 years
    - After major change in process (resolve problems identified before startup)

Process Hazard Analysis (Program 3)

- PHA must cover the following
  - Process hazards
  - Previous incidents with potential for catastrophic results (including near misses)
  - Engineering and administrative controls
  - Consequences of failure of controls
  - Stationary source siting
  - Human factors
  - Qualitative evaluation of health and safety impacts of control failure

Process Hazard Analysis (Program 3)

- Requirements
  - Performed by appropriate team
    - Experienced with process (not just contractors)
    - Knowledgeable about PHA technique
  - System must be developed to
    - Address recommendations
    - ***Document*** resolutions
    - Take corrective actions ***timely***
  - Updated and revalidated at least ***every five years***
  - PHAs and documentation of actions must be kept for life of process

Process Hazard Analysis (Program 3)

- Communicate actions resulting from resolution to all appropriate personnel

Common Deficiencies Both Program Levels

- Programs 2 and 3
  - Have not looked at industry standard(s) since the facility was designed/built (i.e., "grandfathered")
  - Not reviewing/updating at least every five years
    - Safety information not up to date, so hazard review/PHA not started on time
  - Hazard review/PHA findings
    - Not resolved
    - Not documented
    - Not tracked—will show up in next review/analysis

Common Deficiencies Program Level 2

- Program 2
  - Facilities do not look past industry checklist, resulting in overlooking obvious hazards
    - Flammable storage (propane/gasoline)
    - Underground piping
    - Floodplain/railroad/highway
    - Chlorine/anhydrous ammonia (water treatment, pH adjustment)

Common Deficiencies Program Level 3

- Program 3
  - Stationary source siting not addressed

Prevention Program: Operating Procedures

Not just another piece of paper.

Prevention Program

Program 2

- Safety information
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- **Operating procedures**
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- Process hazard analysis
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Operating Procedures

- Operating procedures must be
  - Appropriate for equipment and operations
  - Complete
  - Easily understood by facility's operators
  - Readily accessible to workers who operate or maintain process
- Review/modify as often as necessary to reflect current practices and process changes
- Annually document certification that procedures are current and accurate (program 3 only)

Requirements

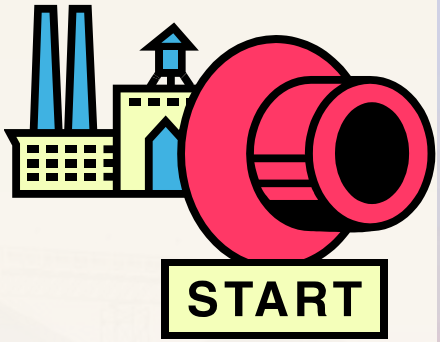
Steps for Each Phase	Program 2	Program 3
Initial startup	✓	✓
Normal operations	✓	✓
Temporary operations	✓	✓
Emergency shutdown	✓	✓
Emergency operations	✓	✓
Normal shutdown	✓	✓
Start-up following a normal or emergency shutdown or major change	✓	✓
Lockout/tagout		✓
Confined space entry		✓
Opening process equipment or piping		✓
Entrance into the facility		✓

Requirements (continued)

Operating Limits	Program 2	Program 3
Consequences of deviations	✓	✓
Steps to avoid, correct deviations	✓	✓
Safety & Health Considerations	**Program 2**	**Program 3**
Chemical properties & hazards		✓
Precautions for preventing chemical exposure		✓
Control measures for exposure		✓
QC for raw materials and chemical inventory		✓
Special or unique hazards		✓
Safety Systems & Their Functions	**Program 2**	**Program 3**
What systems are there and how do they work		✓
Annual Certification Requirement	**Program 2**	**Program 3**
Conduct annual certification		✓

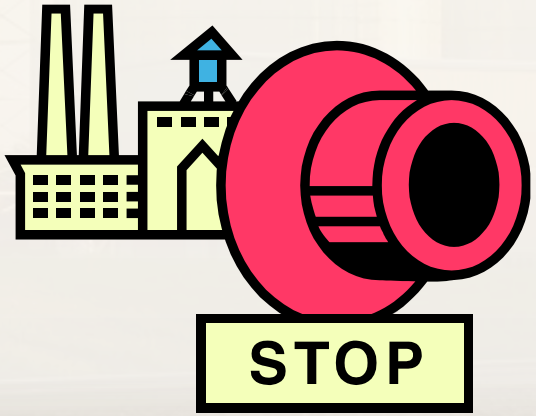
Startup Requirements

- Initial Startup
  - Steps taken before process starts for first time
- Normal Operations
  - Basic operations
  - Core procedures to run day-to-day processes safely
- Temporary Operations
  - Process shutdown
  - Extra capacity needed for limited time
  - Steps to ensure operations function safely
  - Documentation prepared and training conducted prior to starting temporary operations



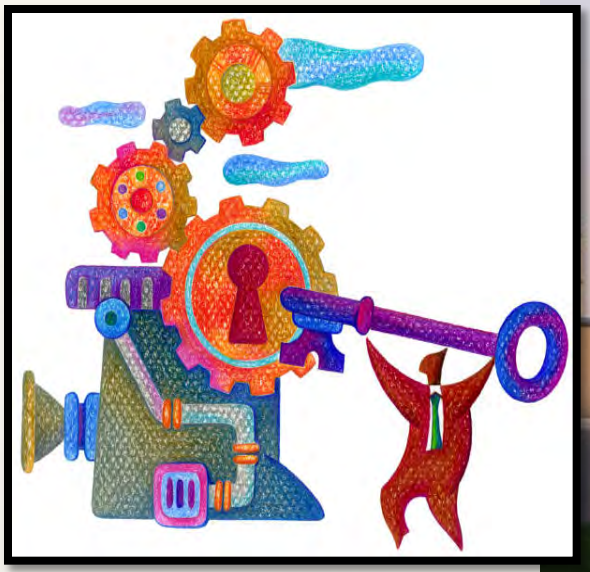
Shutdown Requirements

- Emergency shutdowns (ESD) and operations
  - Steps to shut down process quickly
  - Assignment of responsibility and instructions for activation of ESD system (if one exists)
  - More complex processes (under high pressure or temperature)
    - Recognize critical alarms
    - Reduce flow
    - Depressurize
    - Lower temperature
- Normal shutdown
  - All steps to stop process safely
  - Time necessary and checks needed



Requirements for Startup Following Shutdown or Major Change

- Following normal shutdown
  - May be same as or similar to initial startup procedures
- Following emergency shutdown
  - After emergency shutdown there may be additional steps (e.g., evaluating equipment status due to potential damage)



Operating Limits & Equipment Inspection Requirements

- Operating Limits
  - Consequences of deviation from procedures
    - What deviations need to be addressed (including items such as high pressure, high or low temperatures, exceeding capacities, operating without adequate level, feeding too fast)
    - Consequences could be leak, rupture, overflow, explosion, equipment damage, etc.
  - Steps to avoid or correct deviations
    - Operating instructions to maintain appropriate conditions
    - Specific steps to take to correct problems if they occur
- Equipment Inspection (program 2 only)
  - Periodic inspection and surveillance of equipment

Safety and Health Requirements

- Considerations (program 3 only)
  - Chemical properties and hazards
  - Precautions for preventing chemical exposure
  - Control measures for exposure
  - Quality control for raw materials and chemical inventory
  - Special or unique hazards

Safety and Health Requirements (continued)

- Safety systems and their functions (program 3 only)
  - Safety systems can provide warning of deviations to operators, take automatic corrective actions when deviations occur, and/or help mitigate consequences of deviation that occur

Lock Out/Tag Out and Confined Space Entry Requirements

- Only apply to program 3 processes
- Similar to OSHA's requirements

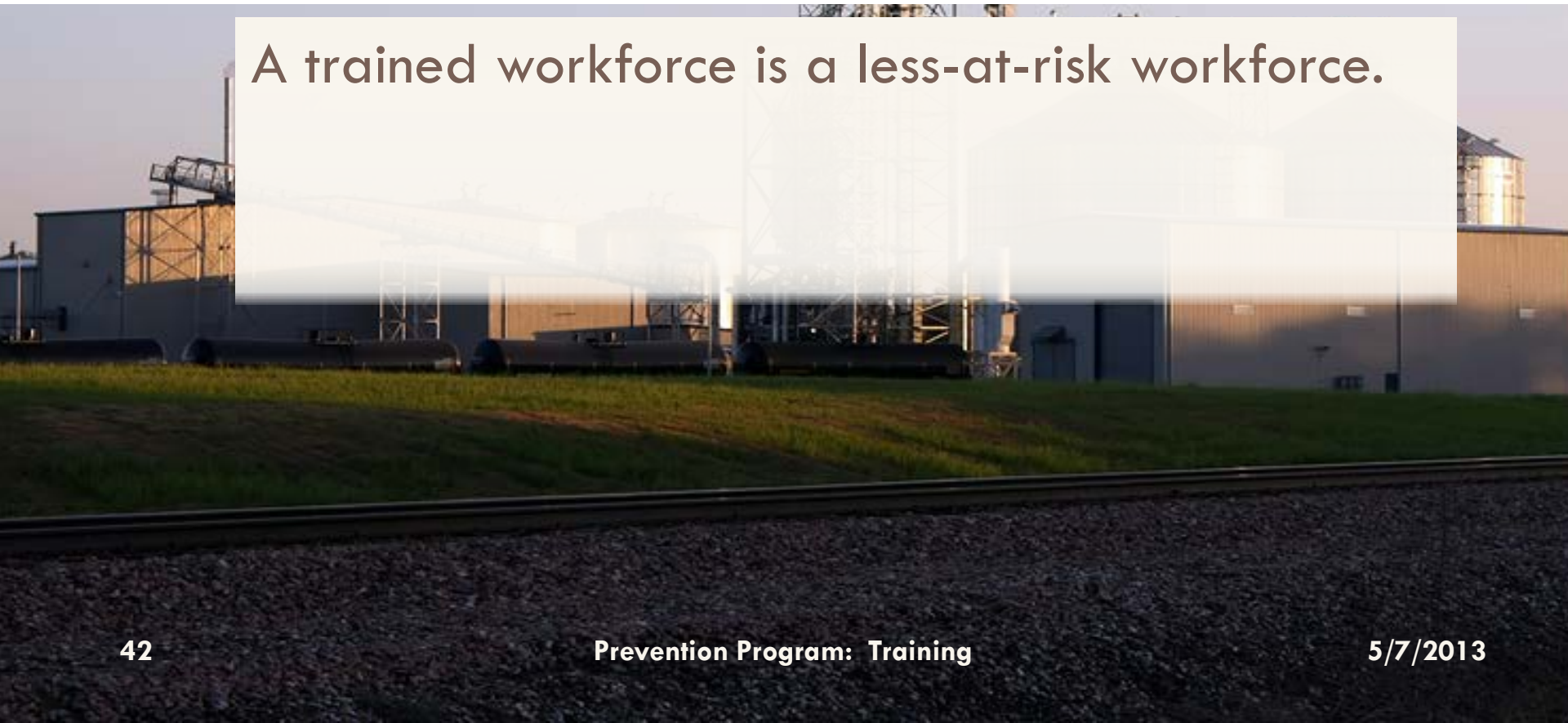
Other Safe Work Practice Requirements

- Entrance into facility by non-operations personnel (program 3 only)
  - Need to control "outsiders" in unit
    - Inform them of hazards they need to avoid (e.g., area unsafe due to minor leak)
    - Inform Operations of hazards they might introduce (e.g., work involving ignition sources)
  - Applies to maintenance, engineering, management, visitors (anyone not part of Operations)
  - Who needs to be evacuated if emergency occurs
  - OSHA standards require facilities to be able to perform evacuation head count (29 CFR 1910.38)

Common Deficiencies

- Failure to have all of the required procedures
- Failure to annually certify (program 3)
- Failure to include operating limits and consequences of deviation in operating procedures

Prevention Program: Training



A trained workforce is a less-at-risk workforce.

Prevention Program

Program 2

- Safety information
- Hazard review
- Operating procedures
- **Training**
- Maintenance
- Compliance audits
- Incident investigation

Program 3

- Process safety information
- Process hazard analysis
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- **Training**
- Mechanical integrity
- Compliance audits
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40 CFR Part 68 Training Requirements

Training Requirement	Section
Operating Procedures, Safe Work Practices & Refresher	68.54 (Program 2) 68.71 (Program 3)
Maintenance	68.56(b)
Mechanical Integrity	68.73(c)
Management of Change & Pre-Startup	68.54(d) (Program 2) 68.75(c) (Program 3) 68.77(b)(4) (Program 3)
Contractors	68.56(c) (Program 2) 68.75(c) (Program 3) 68.87(c) (Program 3)
Emergency Response	68.95(a)(3) 68.87(c) (Program 3)

Training (40 CFR 68.54(c))

- Owner or operator may use training conducted under federal or state regulations or under industry-specific standards or codes or training conducted by covered process equipment vendors. (***program 2 only)***

Operating Procedure, Safe Work Practices, and Refresher Training

- Employees must be trained in operating procedures pertinent to their duties *(68.54(a) & 68.71(a))*
- Training required for updated/new procedures prior to startup of process after major change *(68.54(d) & 68.77(b)(4))*
- On-site documentation required for program 3 processes *(68.71(c))*
  - Employee identity
  - Date of training
  - Means used to verify employee understood training
- Refresher training required at least every 3 years *(68.54(b) & 68.71(b))*

Maintenance/Mechanical Integrity Training

- Training required for employees responsible for process maintenance activities *(68.56(b) & 68.73(a))*
- Training must cover
  - Overview of process (program 3 only)
  - Hazards of process
  - How to avoid or correct unsafe conditions (program 2 only; good idea for program 3)
  - Procedures applicable to job tasks
- Maintenance contractor responsible for training employees in maintenance procedures *(68.56(c) & 68.87)*

Management of Change & Pre-Startup Review Training

- Operators, employees, and contractors shall be trained in updated procedures **before starting up** process after major change *(68.54(d), 68.75(c), & 68.77(b)(4))*
  - Can include new process equipment and introduction of regulated substance
  - Also includes those involved in maintaining process equipment

Contractor Training Requirements

- Contractor must ensure each contract employee and maintenance employee is trained in work practices needed to safely perform the job *(68.56(c) & 68.87(c))*
- Contract employees whose job tasks will be affected by change shall be informed of and trained in change prior to start-up *(68.75(c), program 3 only)*
- Contractor must ensure each contract employee is instructed in known potential fire, explosion, or toxic release hazards and process hazards related to his/her job, and applicable provisions of emergency action plan *(68.87(c), program 3 only)*
- Contractor training documentation requirements *(68.87(c), program 3 only)*
  - Employee identity
  - Date of training
  - Means used to verify employee understood training

Emergency Response Training

- For sources where employees will respond to releases, employees must be trained in relevant emergency response program procedures *(68.95(a)(3))*
- Contractor must ensure each contract employee is instructed in applicable provisions of emergency action plan *(68.87(c), program 3 only)*

RMP Documentation Requirements

- For all program 2 and program 3 processes
  - Date of most recent review or revision of training programs
  - Type of training provided (classroom, classroom + on the job, on the job)
  - Type of competency testing used
- For responding sources
  - Date of last emergency response training

Common Deficiencies

- Failure to
  - Ensure everyone gets refresher training
    - Process maintenance and contractor personnel
    - Multiple shifts
  - Have documentation of each individual's training
  - Address facility-specific operating procedures
  - Document how it was verified that employees understood training

Prevention Program: Maintenance/ Mechanical Integrity

Well-maintained equipment is less likely to fail.

Prevention Program

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- Safety information
- Hazard review
- Operating procedures
- Training
- **Maintenance**
- Compliance audits
- Incident investigation

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Maintenance/Mechanical Integrity Requirements

- Critical to safe operations
  - Preventive maintenance
  - Inspections and tests required
  - Identification of potential failures before failure occurs essential in prevention of releases
  - Running equipment to failure not acceptable
- Maintenance program
  - Prevent incidents/accidents/releases
  - Save facility money

Maintenance/Mechanical Integrity Program

- Includes
  - Written program
  - Criteria or rationale used to establish frequency of tests and inspections
  - Test and inspection schedule established for all equipment
  - Adherence to calibration testing and inspection schedules
  - Established process for use, removal, or replacement of equipment out of specifications
  - Written test procedures for all tests performed

Maintenance Requirements for Program 2 Processes

Maintenance Requirements Overview Program 2

- Prepare and implement maintenance procedures
- Train maintenance employees in process hazards, how to avoid or correct unsafe conditions, and maintenance procedures
- Inspect and test equipment

Written Maintenance Procedures

- Maintain ongoing integrity of process equipment
- Resources for written procedures
  - Vendors
  - Equipment manufacturers
  - Trade association/industry standards
  - Developed in-house
  - Maintenance history

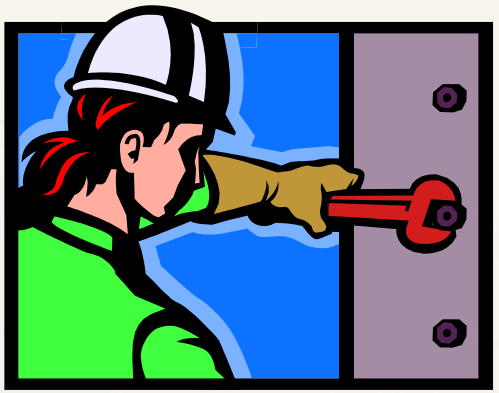
Inspection and Testing

- Use recognized and generally accepted good engineering practices
- Develop maintenance schedule
  - Manufacturer's recommendations (preventive maintenance)
  - Prior operating experience (predictive maintenance)
- Document maintenance activities
  - Written procedures
  - Reviews and revisions of procedures

Mechanical Integrity Requirements for Program 3 Processes

Mechanical Integrity Requirements Program 3

- Written procedures and inspection & testing requirements same as for program 2, plus
  - Each inspection and test ***must be documented***
    - Date
    - Inspector's name
    - Equipment identifier
    - Test or inspection performed
    - Results
  - Inspection results and corrective actions
    - Equipment deficiencies are results outside acceptable limits (as defined by PSI)
    - Correct equipment deficiencies
      - Prior to further use or
      - In safe and timely manner when necessary means are taken to assure safe operation



Mechanical Integrity Requirements for Program 3

- Quality Assurance
  - Assure that new equipment as installed or fabricated is suitable for process application
  - Perform appropriate checks and inspections to assure that equipment is installed properly and is consistent with design specifications and manufacturer's instructions
  - Assure that maintenance materials, spare parts, and equipment are suitable for process application

Maintenance Common Deficiencies

- No written maintenance procedures
- Equipment not inspected or tested
- Testing/inspection interval doesn't meet industry standards
- Failure to follow "good engineering practices"
  - Examples: proactive relief valve replacement, hose replacement, painting

Mechanical Integrity Common Deficiencies

- No plan for replacing equipment when it fails
- No program for monitoring integrity of tanks
  - Especially worst-case vessel

Don't Do This!

Prevention Program: Compliance Audits

Do your own CAA 112(r) inspection to check out your program and fix problems before dealing with EPA.

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- Safety information
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Requirements

- Conduct compliance audits every three years
- Self-audit compliance with **CAA 112(r) Prevention Program** requirements *(68.58 & 68.79)*
- Identify problem areas, recommend corrective actions, and follow through

Compliance Audits
40 CFR 68.58(a) & 68.79(a)

- Owner or operator assure compliance audit conducted and ***certify compliance*** at least every three years
- Evaluate compliance with the prevention program to verify that the procedures and practices developed under the rule are ***adequate*** and are ***being followed***

Compliance Audits
40 CFR 68.58(b) & 68.79(b)

- Must be performed by at least one person knowledgeable in the process
  - If performed by outside consultant, someone from facility must also participate
  - In documents, specify the name and title of person from the facility participating in the audit

Compliance Audits
40 CFR 68.58(c) & 68.79(c)

- Owner or operator shall develop a report of the audit findings

Compliance Audits
40 CFR 68.58(d) & 68.79(d)

- Document
  - Responses to each of the audit's findings
    - Should be developed promptly, any corrective actions should be explicitly listed
  - Deficiencies have been corrected
    - Corrective action should occur within a reasonable length of time
- All findings should be resolved and closed out.

Addressing deficiencies

- Assign responsibility for each recommendation to individual
- Assign start date and completion date
- ***Document*** action taken, label "closed" with date of completion
- ***If you don't document it, you can't prove it!***

Compliance Audits
40 CFR 68.58(e) & 68.79(e)

- Programs 2 & 3
  - Retain the two (2) most recent compliance audit reports
- Program 2 ONLY
  - Once a compliance audit report is more than 5 years old, it does not need to be retained

Common Deficiencies

- Failure to do compliance audit every three years
- No certification by company official
- Uses non-site-specific industry checklists
- Failure to detect major prevention program errors
- Issues found not addressed/documented

27% of ethanol facilities inspected in last 3 years failed to certify audit done every 3 years

Common Deficiencies

Risk Management Program audit includes the management system, all components of prevention program, the emergency response program, & implementation

NOT equipment audit!

Unit:	Make:	Model:	Serial #:

Item	Defects Found	Action Taken	Date
Safety Water			
Valves (Colored/Labeled)			
Relief Valve			
Relief/Tank Rain Caps			
Transfer Hose Condition			
Paint Condition			
PPE (Where Applicable)			
Acme Rubber Gaskets			
Tank Condition (Dents)			

CONDITION

- ☐ Satisfactory
- ☐ Unsatisfactory
- ☐ Defects corrected on _____ Date

(X) _____ Inspector's Signature

_____ Date

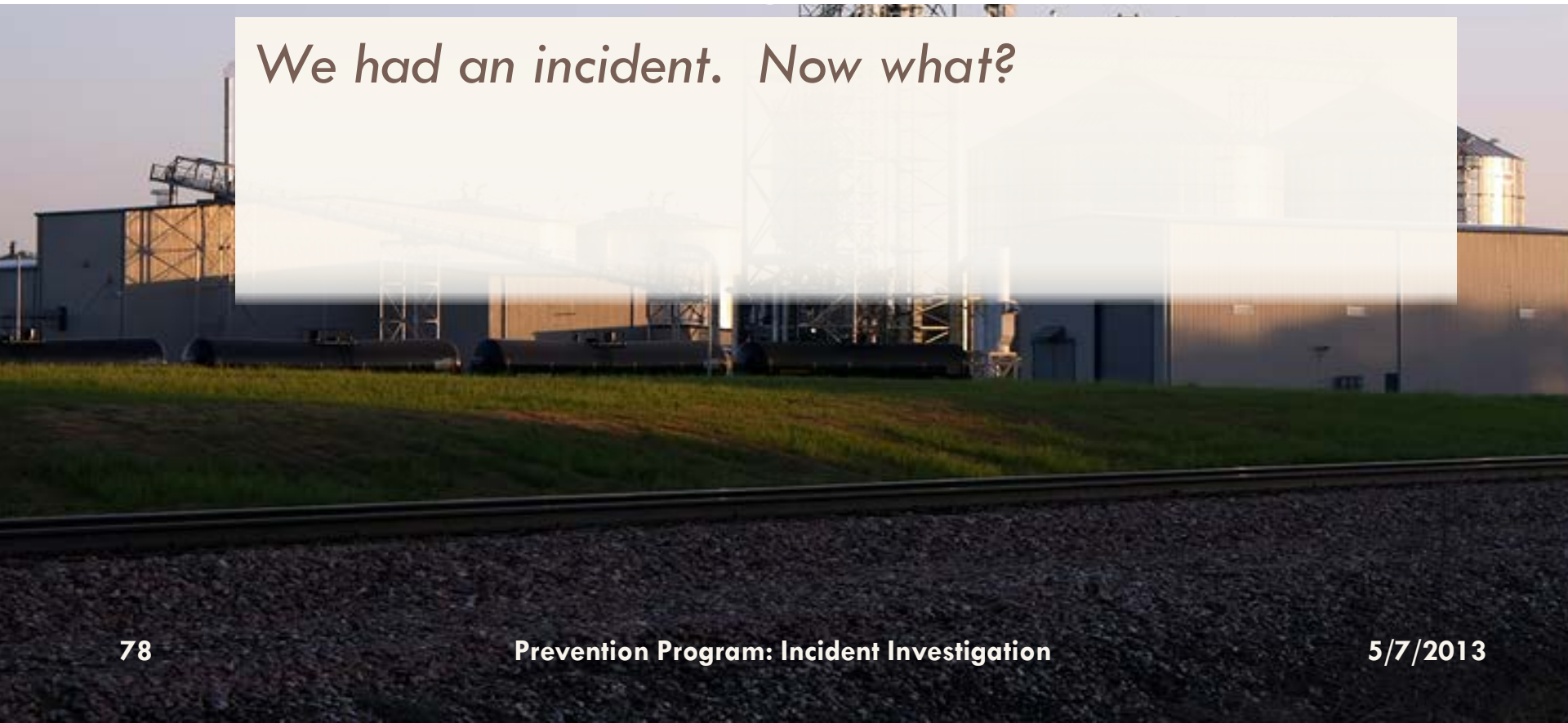
(X) _____ Mechanic's Signature

(X) _____ Responsible

_____ Date

Prevention Program: Incident Investigation

We had an incident. Now what?



Prevention Program

Program 2

- Safety information
- Hazard review
- Operating procedures
- Training
- Maintenance
- Compliance audits
- **Incident investigation**

Program 3

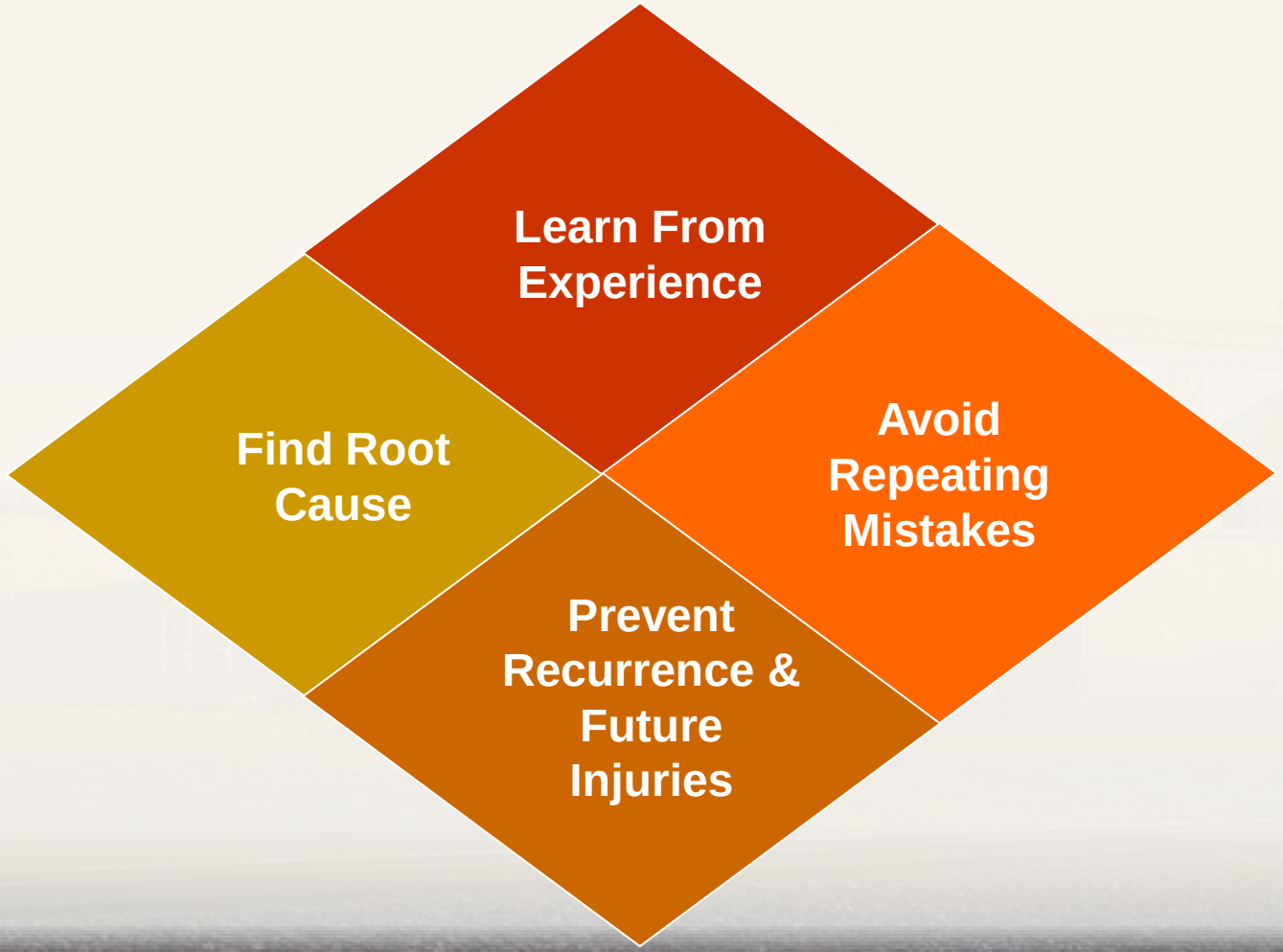
- Process safety information
- Process hazard analysis
- Operating procedures
- Training
- Mechanical integrity
- Compliance audits
- **Incident investigation**
- Pre-startup review
- Management of change
- Employee participation
- Hot work permit
- Contractor accountability

Definitions

- **Incident:** event that resulted in, ***or could reasonably have resulted in,*** catastrophic release
- **Incident investigation:** written analysis of accident/incident using various methods of causal determination
- **Catastrophic release:** one that presents imminent and substantial endangerment to public health and the environment

Formosa Plastics Plant Explosion, Illiopolis, Illinois, April 23, 2004 explosion. Photo: Kevin German/The State Journal-Register

Incident Investigation Purpose



Requirements

- Initiate investigation within 48 hours of incident
  - Includes weekends and holidays
  - Investigation for Friday incident must begin no later than Sunday
- Establish knowledgeable investigation team *(68.81(c), program 3 only)*

Requirements (continued)

- Summarize investigation in written report *(68.60(c) & 68.61(d); same for programs 2 & 3)*
  - Date of incident *(68.60(c)(1), 68.81(d)(1))*
  - Date investigation began *(68.60(c)(2), 68.81(d)(2))*
  - Description of incident *(68.60(c)(3), 68.81(d)(3))*
  - Factors that contributed to incident *(68.60(c)(4), 68.81(d)(4))*
  - Address investigation team's findings/recommendations *(68.60(c)(5), 68.81(d)(5))*

Requirements (continued)

- Owner/operator must *(68.60(d), 68.81(e))*
  - Address and resolve findings & recommendations
  - Document resolutions and corrective actions
- Findings must be reviewed with all affected personnel *(68.60(e), 68.81(e))*
- Investigation summaries must be retained for *5* years *(68.60(f), 68.81(g))*

Incident Investigation Resolution

- Owner/operator required to "promptly address and resolve" findings
- Regulation does NOT require adoption of all recommendations
- All resolutions and corrective actions must be documented

Real-World Examples

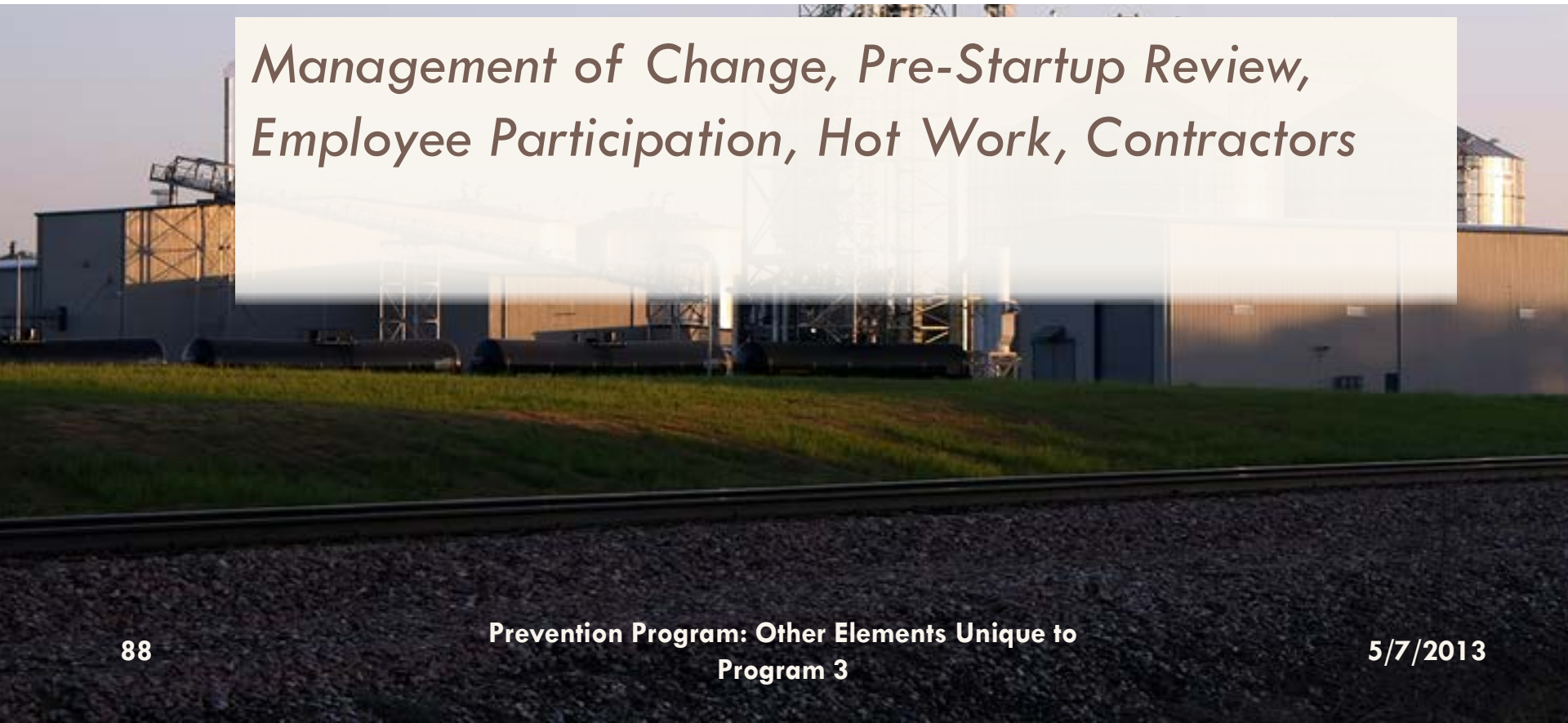
- Many program 3 facilities use specific analysis software
- Additionally, 5-year accident history, Emergency Response Notification System (ERNS), any Chemical Release Questionnaires (CRQs), OSHA 300 log, PHA incidents *(68.67(c)(2))*

Common Deficiencies

- "Near misses" not investigated
- Unresolved or undocumented findings/ recommendations
- Unreported incidents in 5-year accident history
- Reports never finished due to liability
- Overuse of equipment failure and/or human error—never really get to "root cause"

Other Elements Unique to Program 3

Management of Change, Pre-Startup Review, Employee Participation, Hot Work, Contractors



Prevention Program

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- **Pre-startup review**
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- **Employee participation**
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- **Contractor accountability**

Management of Change (MOC)

- 40 CFR 68.75 requires
  - Owner or operator establish and implement ***written*** procedures to manage changes to process chemicals, technology, equipment, and procedures that would affect CAA 112(r) covered process
  - Does not include replacements in kind

Management of Change (MOC)

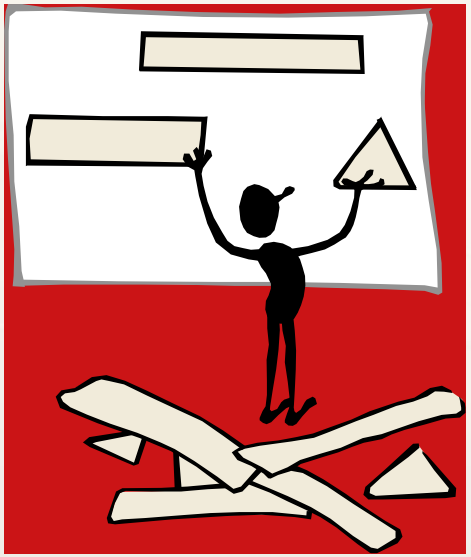
- MOC procedures must ensure the following considerations are addressed
  - Technical basis for change
    - Describe change
    - Provide drawings and specifications as necessary
  - Impact on safety and health
    - Evaluate potential change in hazards, consequences, and risk
  - Necessary time period for change
    - Permanent
    - Temporary with established end date

Management of Change (MOC)

- MOC procedures must ensure the following considerations are addressed
  - Modifications to operating procedures
  - Authorization requirements for proposed change
    - Appropriate authorization levels
    - Authorized before installation

Management of Change (MOC)

- Additional MOC Requirements
  - Employees affected by change must be informed of change and trained in change (as necessary) before startup
  - Process safety information must be updated, if necessary
  - PHA must be updated, if necessary
  - Operating procedures must be updated, if necessary



MOC Common Deficiencies

- Failure to follow "replacement in kind"
  - A change in the original equipment manufacturer (OEM) specs is a change
- MOC process not complete prior to change
  - **MOC should <u>not</u> be after-the-fact paperwork**
- PSI, SOPs, etc. not updated accordingly
  - If not done, delays PHA process

Pre-Startup Safety Review (PSSR)

- Pre-startup safety reviews necessary for
  - New stationary sources
  - Modified stationary sources whenever modifications require change in PSI

PSSR (continued)

- 40 CFR 68.77 requires that pre-startup safety review confirms
  - Construction and equipment in accordance with design specifications
  - Safety, operating, maintenance, and emergency procedures in place

PSSR (continued)

- Pre-startup safety reviews must confirm
  - PHA has been performed for new stationary sources and recommendations have been resolved
  - Changes to existing stationary source have been reviewed under MOC requirements
  - Employee training completed

PSSR (continued)

- Confirmations must occur **before** introducing a regulated substance to a new or modified process
  - Failure to do so can **AND DOES** cause accidents

PSSR Common Deficiencies

- Not conducted prior to startup of process
- Construction and equipment not per design
- PSI not updated

Employee Participation

- 40 CFR 68.83 requires owner or operator to
  - Develop **written** plan of action for employee participation
  - Consult with employees on development of PHA and other elements of process safety and accident prevention
  - Provide access to PHAs and any other process safety information

Employee Participation Common Deficiencies

- No written employee participation program
- Employees not involved in development of PHAs and other elements
- Written employee participation program not followed
- Employees do not know how to access documents

Hot Work

- **Hot work:** work involving electric or gas welding, cutting, brazing, or similar flame or spark-producing operations
- EPA's requirements *(68.85)* are similar to OSHA

Hot Work Common Deficiencies

- Permits not fully completed and maintained according to procedures
- Note: once hot work is completed, there is no requirement to maintain copy of permit

Contractors

- 40 CFR 68.86 requires owner or operator obtain and evaluate information regarding contract owner or operator's safety performance and programs ***before*** selecting contractor

Contractors—Facility Responsibilities

- Provide safety and hazard information to contractors
  - Potential fire, explosion, or toxic release hazards
  - Facility's emergency response activities as they relate to contractor's work and process
- Ensure safe work practices (e.g., hot work permits, lock out/tag out) to control activities of contractors in covered process areas
- Periodically evaluate contractor in meeting their responsibilities

Contractors Common Deficiencies

- Safety performance and programs not evaluated by facility

Questions?