

CE 400 / CE 500

Process Safety Management

Lecture 03

Elements of a PSM Program, continued

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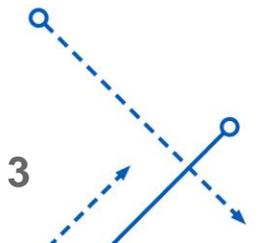
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Develop and implement written operating procedures for the chemical processes, including procedures for each operating phase, operating limitations, and safety and health considerations

- Need to document start up, shut down, transitions, etc
- Without detailed written operating procedures (OP) the way that the operators operate the process will evolve and no two operators will probably operate the process the same way
 - This can lead to dangerous deviations from the design of the process
 - It will certainly lead to variation that can affect product quality
- This is a good place to document various things that go wrong if the OP is not followed exactly

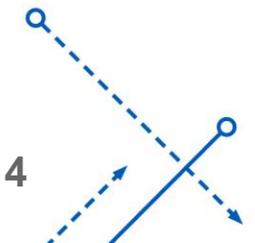
Provide written safety and operating information for employees and employee training in operating procedures, by emphasizing hazards and safe practices that must be developed and made available

- This states that the OPs must include and emphasize the hazards of the process so that operators understand WHY they are to follow these procedures



Ensure contractors and contract employees are provided with appropriate information and training

- Installation of new equipment and certain maintenance activities require specific equipment and/or expertise that your organization may not have
- Outside contractors often perform such work
- It is your company's responsibility to ensure that they are aware of plant work procedures and are informed of the hazards of your processes

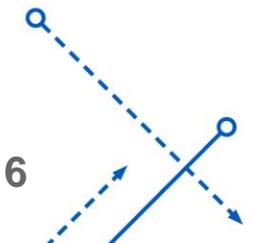


Train and educate employees and contractors in emergency response procedures in a manner as comprehensive and effective as that required by the regulation promulgated pursuant to section 126(d) of the Superfund Amendments and Reauthorization Act

- You need to have plans in place for how to respond to various scenarios
- If an emergency occurs you won't have time to develop a plan of action on the spot – you must anticipate scenarios and develop plans before anything happens
- Response plans really don't do much good if you don't have people trained on how to carry them out...

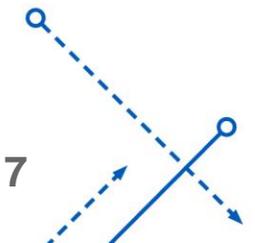
Establish a quality assurance program to ensure that initial process-related equipment, maintenance materials, and spare parts are fabricated and installed consistent with design specifications

- If the materials and fabrication of your equipment do not meet the specifications that were part of your design and part of your understanding when you did your Process Hazards Analysis then they could lead to failures which cause catastrophic events



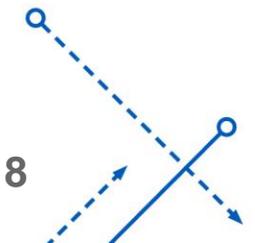
Establish maintenance systems for critical process-related equipment, including written procedures, employee training, appropriate inspections, and testing of such equipment to ensure ongoing mechanical integrity

- Over time things wear out, it's as simple as that
- You need systems to test equipment to make sure that it still meets the original design specifications
- Elements 10 and 11 are often referred to collectively as MIQA
 - **M**echanical **I**ntegrity and **Q**uality **A**ssurance



Conduct pre-startup safety reviews of all newly installed or modified equipment

- **Pre-Start Safety Review – PSSR**
- Usually done with a lengthy checklist which covers things such as:
 - Is installation per design?
 - Are all MIQA items done?
 - Are sharp edges removed? Hot Spots insulated?
 - Electrical wiring checked?
 - Does equipment meet required electrical classification
 - etc, etc



Establish and implement written procedures managing change to process chemicals, technology, equipment and facilities

- **Management of Change (MOC)**
- Many of the worst disasters in the chemical process industry have occurred during tests or with recently modified equipment
- MOC Procedures need to cover (a partial list):
 - Thorough Hazards Review
 - Update to Process Technology package
 - Update to relevant Operating and Maintenance procedures
 - Training updates for operators and mechanics
 - Updates to Preventative Maintenance procedures and MIQA

Investigate every incident that results in or could have resulted in a major accident in the workplace, with any findings to be reviewed by operating personnel and modifications made, if appropriate

- Much can be learned from “Near Misses”
- Really should not limit this to “major accidents” – any deviation from planned operation shows a weak link in your safety chain
 - By finding the root cause of minor incidents (where “nothing really happened”) can reveal the potential for very serious consequences
- Recommendations from these investigations must be tracked to completion, as well!

- DuPont's corporate PSM Standard breaks the OSHA standard up into different groupings - number in red indicates which OSHA element is addressed

