A Best Practice for Managing Process Safety During Turnarounds & Routine Business Cycles

An Online Continuing Education Course for Engineers

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OSHA Process Safety Regulation Reference

In the succeeding paragraphs, you will find the OSHA defined PSM program elements. As with any regulation from OSHA, interpretation and precedents set by OSHA and court rulings provide additional clarity for each rule. The most important thing to remember with any OSHA rule is that they set minimum standards. Whatever your company states in its own policies that they will conform to is what you are bound to. It does not matter if you are going above and beyond and just fall short. If you write it down in your company policies and say that you will comply with some OSHA standard, that is now your company or site standard, even if the company next door is much less stringent.

Each company that is in the OSHA compliance program is bound by these standards of process safety. An exempt facility, as defined by OSHA, must be granted by a formal review. Certain smaller facilities are not bound by OSHA PSM and RMP (Risk Management Plan) regulations. This training will not be applicable if you work at an exempted OSHA facility. An exempted facility does not mean there are no applicable OSHA regulations for PSM; OSHA applies to all work sites. However, the larger the facility, the more rules apply.

A starting point to improve turnaround compliance with the OSHA PSM standards below is to read and understand the fourteen elements of PSM as they are applied at your facility. Here are a few things to consider and understand in reviewing your facility against the best practices in this training course:

1. Do I work at an exempt facility?
2. What are my companies interpretation and standards application for PSM?
3. Is PSM managed by a single department, or is it distributed between multiple departments?

Number three above is very important to understand. For example, Mechanical Integrity can be administered at your site through Maintenance Department or Process Safety. The Hot Work can, and most normally is, administered by the personal safety department. Each one of the elements in a smaller facility sometimes falls under one department to manage and another department to implement. This can make compliance more difficult as those applying the standards are not reporting to those that own it. The point here is to understand the chain of custody and, more importantly, the chain of influence or management. The structure PSM management at your site will affect how you apply this course to improve your facility.

Employee Participation (c)[68.83]

(1)[a] Employers [the owner or operator] shall develop a written plan of action regarding the implementation of employee participation in process safety management as required by this paragraph [this section].

(2)[b] Employers [the owner or operator] shall consult with employees and their representatives on the conduct and development of process hazards analyses and on the development of the other elements of process safety management in this standard [rule].

(3)[c] Employers [the owner or operator] shall provide to employees and their representatives access to process hazard analyses and to all other information required to be developed under this standard [rule].

Process Safety Information (d)[68.65]

[a]In accordance with the schedule set forth in paragraph (e)(1) [PHA] [68.67] of this section [of Subpart D - Program 3 Prevention Program], the employer [owner or operator] shall complete a compilation of written process safety information before conducting any process hazard analysis required by the standard [rule]. The compilation of written process safety information is to enable the employer [owner or operator] and the employees involved in operating the process to identify and understand the hazards posed by those processes involving highly hazardous chemicals [regulated substances]. This process safety information shall include information pertaining to the hazards of the highly hazardous chemicals [regulated substances] used or produced by the process, information pertaining to the technology of the process, and information pertaining to the equipment in the process.

(d)(1)[b] Information pertaining to the hazards of the highly hazardous chemicals [regulated substances] in the process. This information shall consist of at least the following:

> ***(i)[1] Toxicity information;***
> ***(ii)[2] Permissible exposure limits;***
> ***(iii)[3] Physical data;***
> ***(iv)[4] Reactivity data ;***
> ***(v)[5] Corrosivity data ;***
> ***(vi)[6] Thermal and chemical stability data;***
> ***(vii)[7] Hazardous effects of inadvertent mixing of different materials that could foreseeably occur.***

Process Hazard Analysis 1910.119(e)[RMP 68.67]

(1)[a] The employer [owner or operator] shall perform an initial process hazard analysis (hazard evaluation) on processes covered by this standard [part]. The process hazard analysis shall be appropriate to the complexity of the process and shall identify, evaluate, and control the hazards involved in the process. Employers [The owner or operator] shall determine and document the priority order for conducting process hazard analyses based on a rationale which includes such considerations as extent of the process hazards, number of potentially affected employees, age of the process, and operating history of the process. The process hazard analysis shall be conducted as soon as possible, but not later than:

i. *No less than 25 percent of the initial process hazards analysis shall be completed by May 26, 1994;*
ii. *No less than 50 percent of the initial process hazards analysis shall be completed by May 26, 1995;*
iii. *No less than 75 percent of the initial process hazards analysis shall be completed by May 26, 1996;*

All initial process hazards analysis shall be completed by May 26, 1997.

(2)[b] The employer [owner or operator] shall use one or more of the following methodologies that are appropriate to determine and evaluate the hazards of the process being analyzed

(i)[1] What-If;
(ii)[2] Checklist;
(iii)[3] What-If/Checklist;
(iv)[4] Hazard and Operability Study (HAZOP)
(v)[5] Failure Mode and Effects Analysis (FMEA);
(vi)[6] Fault Tree Analysis; or
(vii)[7] An appropriate equivalent methodology.

(3)[c] The process hazard analysis shall address:

(i)[1] The hazards of the process;

(ii)[2] The identification of any previous incident which had a likely potential for catastrophic consequences in the workplace ["in the workplace" is omitted in RMP rule language];

(iii)[3] Engineering and administrative controls applicable to the hazards and their interrelationships such as appropriate application of detection methodologies to provide early warning of releases. (Acceptable detection methods might include process monitoring and control instrumentation with alarms, and detection hardware such as hydrocarbon sensors.);

(iv)[4] Consequences of failure of engineering and administrative controls;

(v)[5] Facility [stationary source] siting;

(vi)[6] Human factors; and

(vii)[7] A qualitative evaluation of a range of the possible safety and health effects of failure of controls on employees in the workplace ["on employees in the workplace" is omitted in RMP rule language].

(4)[d] The process hazard analysis shall be performed by a team with expertise in engineering and process operations, and the team shall include at least one employee who has experience and knowledge specific to the process being evaluated. Also, one member of the team must be knowledgeable in the specific process hazard analysis methodology being used.

(5)[e] The employer [owner or operator] shall establish a system to promptly address the team's findings and recommendations; assure that the recommendations are resolved in a timely manner and that the resolution is documented; document what actions are to be taken; complete actions as soon as possible; develop a written schedule of when these actions are to be completed; communicate

the actions to operating, maintenance and other employees whose work assignments are in the process and who may be affected by the recommendations or actions.

(6)[f] At least every five (5) years after the completion of the initial process hazard analysis, the process hazard analysis shall be updated and revalidated by a team meeting the requirements in paragraph (e)(4)[d] of this section, to assure that the process hazard analysis is consistent with the current process. [Updated and revalidated process hazard analyses completed to comply with 29 CFR 1910.119(e) are acceptable to meet the requirements of this paragraph.]

(7)[g] Employers [The owner or operator] shall retain process hazards analyses and updates or revalidations for each process covered by this section, as well as the documented resolution of recommendations described in paragraph (e)(5) [e] of this section for the life of the process.

Operating Procedures (f)[68.69]

(1)[(a)] The employer [owner or operator] shall develop and implement written operating procedures that provide clear instructions for safely conducting activities involved in each covered process consistent with the process safety information and shall address at least the following elements.

(i) [(1)] Steps for each operating phase,
(ii) [(2)] Operating limits,
(iii) [(3)] Safety and health considerations and
(iv) [(4)] Safety systems and their functions.

Operating Phases (1)(i)[1]

(1)(i) [1] Steps for each operating phase:

(A) [i] Initial startup;
(B) [ii] Normal operations;
(C) [iii] Temporary operations;
(D) [iv] Emergency shutdown including the conditions under which emergency shutdown is required, and the assignment of shutdown responsibility to qualified operators to ensure that emergency shutdown is executed in a safe and timely manner.
(E) [v] Emergency Operations;
(F) [vi] Normal shutdown; and
(G) [vii] Startup following a turnaround, or after an emergency shutdown.

Operating Limits (1)(ii)[2]

(1)(ii) [2] Operating limits:

(A) [i] Consequences of deviation; and
(B) [ii] Steps required to correct or avoid deviation.

Safety and Health Consideration (1)(iii)[3]

(1)(iii)[3] Safety and health considerations:

(A)[i] Properties of, and hazards presented by, the chemicals used in the process;
(B)[ii] Precautions necessary to prevent exposure, including engineering controls, administrative controls, and personal protective equipment.

(C)[iii] Control measures to be taken if physical contact or airborne exposure occurs;
(D)[iv] Quality control for raw materials and control of hazardous chemical inventory levels; and,
(E)[v] Any special or unique hazards.

Safety Systems and Their Function (1)(iv)[4]

(1)(iv)[4] Safety systems and their functions.

Access to Procedures (2)[4b]

(2) [4b] Operating procedures shall be readily accessible to employees who work in or maintain a process.

Procedure Review and Certification (3)[4c]

(3) [4c] The operating procedures shall be reviewed as often as necessary to assure that they reflect current operating practice, including changes in process chemicals, technology, and equipment, and changes to facilities[stationary sources]. The employer shall certify annually that these operating procedures are current and accurate.

Safe Work Practices (4) [4d]

(4)[4d] The employer[owner or operator] shall develop and implement safe work practices to provide for the control of hazards during operations such as lockout/tagout; confined space entry; opening process equipment or piping; and control over entrance into a facility[stationary source] by maintenance, contractor, laboratory, or other support personnel. These safe work practices shall apply to employees and contractor employees.

Training (g)[68.71]

Initial Training (1)[a]

> ***(i)[1] Each employee presently involved in operating a process, and each employee before being involved in operating a newly assigned process, shall be trained in an overview of the process and in the operating procedures as specified in paragraph (f) of this section [§68.69 of this part]. The training shall include emphasis on the specific safety and health hazards, emergency operations including shutdown, and safe work practices applicable to the employee's job tasks.***
>
> ***(ii)[2] In lieu of initial training for those employees already involved in operating a process on May 26, 1992 [June 21, 1999], an employer [owner or operator] may certify in writing that the employee has the required knowledge, skills, and abilities to safely carry out the duties and responsibilities as specified in the operating procedures.***

Refresher Training (g)(2)[b]
Refresher training shall be provided at least every three years, and more often if necessary, to each employee involved in operating a process to assure that the employee understands and adheres to the current operating procedures of the process. The employer [owner or operator], in consultation with the employees involved in operating the process, shall determine the appropriate frequency of refresher training.

Training Documentation (g) (3) [c]
The employer [owner or operator] shall ascertain that each employee involved in operating a process has received and understood the training required by this paragraph. The employer [owner or operator] shall prepare a record which contains the identity of the employee, the date of training, and the means used to verify that the employee understood the training.

Contractors (h)[68.87]

(1)[a] Application. This paragraph [section] applies to contractors performing maintenance or repair, turnaround, major renovation, or specialty work on or adjacent to a covered process. It does not apply to contractors providing incidental services which do not influence process safety, such as janitorial work, food and drink services, laundry, delivery or other supply services.

Employer [Owner or Operator] Responsibilities (2)[b]

> ***(i)[1] The employer [owner or operator], when selecting a contractor, shall obtain and evaluate information regarding the contract employer's [contract owner or operator] safety performance and programs.***
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> ***(ii)[2] The employer [owner or operator] shall inform contract employers [contract owner or operator] of the known potential fire, explosion, or toxic release hazards related to the contractor's work and the process.***
>
> ***(iii)[3] The employer [owner or operator] shall explain to contract employers [the contract owner or operator] the applicable provisions of the emergency action plan required by paragraph (n) of this section [subpart E of this part].***
>
> ***(iv)[4] The emplo… safe work practices consistent with p… control the entrance, presence, and exi… and [contractor] employees in cove…***
>
> ***(v)[5] The emplo… te the performance of contractor employe… obligations as specified in paragraph (h)(3)…***
>
> ***(vi) The employer si… g related to the contractor's work in… .87(b)]***

Contract Employer [Contrac…

> ***(i)[1] The contract er… each contract employee is trained in… job.***
>
> ***(ii)[2] The contract er… tract employee is instructed in the know… hazards related to his/her job and the process, and t… the emergency action plan.***