The Use Of a Ranking System and Protocol For Process Safety Management Audits

By

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Abstract

OSHA's Process Safety Management (PSM) standard requires companies to periodically audit their facilities to meet performance goals for process safety. In addition, companies may also seek process safety improvements beyond minimum compliance levels. This paper suggests that a consistent audit protocol and ranking system can improve a company's PSM performance. These tools help to create a more objective auditing system, encourage company improvement, and facilitate a common measure of PSM effectiveness.

The continuous safety improvement (CSI) ranking system AcuTech has developed accomplishes these goals. The CSI ranking system employs a five point ranking system to evaluate management system design and effectiveness and the technical approaches used. The rating generated from this evaluation better measures a company's PSM performance against compliance requirements and adherence to industry practices.

I. Introduction

The OSHA PSM Standard (29 CFR 1910.119) includes the requirement that employers must conduct an audit of their process safety management system and certify that they have evaluated compliance with the provisions of the standard at least once every three years. The audit verifies that the procedures and practices developed under the standard are adequate and are being followed.

Several problems commonly occur with companies attempting to meet the audit requirements of the standard:

- auditing the PSM system is often a new experience for managers
- little guidance is available on specifically how to evaluate compliance

- even less guidance is available on how to evaluate effectiveness
- no commonly accepted ranking system is available to rate performance
- since the standard is performance-based, it is difficult to conduct an audit unless specific goals have been set to measure performance against

The two most common questions which managers want answered are "Is the facility in compliance with the standard?" and "How does the facility compare to similar facilities in the same industry?" Currently, neither question is easily answered, except for some information possible from trade associations, from individual cases of sharing information, or from consultants with experience auditing a representative sample of safety management systems.

As a result, three components to a PSM management and auditing system are recommended:

- PSM performance goals and criteria to evaluate progress
- an audit protocol
- a ranking system

The benefits of these systems include:

- a clear set of goals and assessment criteria
- a more objective auditing system
- a means of encouraging improvement, particularly beyond minimum compliance levels
- a common measure of PSM system effectiveness between facilities.

An effective PSM management and auditing system will improve a company's compliance with the OSHA PSM standard and create a mechanism for continuing improvement. This paper will present how an audit protocol and a ranking system can assist in defining levels of compliance, setting goals for improvement, comparing safety improvement status among companies, and create more uniform assessments.

II. Audit Methodology

According to OSHA, an audit is a technique used to gather sufficient facts and information, including statistical information, to verify compliance with standards. Auditors should select as part of their preplanning a sample size sufficient to give a degree of confidence that the audit reflects the level of compliance with the standard. The audit team, through this systematic analysis, should document areas which require corrective action as well as those areas where the process safety management system is effective and working in an effective manner. This provides a record of the audit procedures and findings, and serves as a baseline of operation data for future audits. It will assist future auditors in determining changes or trends from previous audits. . . .An effective audit includes a review of the relevant documentation and process safety information, inspection of the physical facilities, and interviews with all levels of plant personnel. Utilizing the audit procedure and checklist developed in the preplanning stage,

the audit team can systematically analyze compliance with the provisions of the standard and any other corporate policies that are relevant. (29 CFR 1910.119, Appendix C).

The audit can be conducted using the OSHA Program Quality Verification (PQV) approach:

1. Program - Understand the PSM program (interview persons responsible for each of the elements),
2. Quality - Assess its quality (compare the program design and progress to industry standards, good engineering practices, and others), and
3. Verification - Verify that the program was designed and managed as reported (by reviewing records, conducting a facility inspection, and conducting interviews of employees and contractors.

For each of the requirements of the regulation, a sufficient sample size of documentation should be reviewed to provide physical evidence of the form and quality of the information. If the facility has more than one process, for example, the information associated with a single unit can be reviewed. The overall management system should be reviewed for all PQV elements.

OSHA requires that a report of the findings of the audit be developed. The employer shall then promptly determine and document an appropriate response to each of the compliance audit findings and document that deficiencies have been corrected.

III. Audit Protocol

The standard offers very little guidance on how to accomplish the audit. The appendix to the standard does give some insight to OSHA's expectations for an audit. No specific mention is made to a ranking system, but it is implied that some means of ensuring completeness while determining compliance and effectiveness is needed. The appendix states:

The audit is to include an evaluation of the design and effectiveness of the process safety management system and a field inspection of the safety and health conditions and practices to verify that the employer's systems are effectively implemented. The format should be designed to provide the lead auditor with a procedure or checklist which details the requirements of each section of the standard. The checklist, if properly designed, could serve as the verification sheet which provides the auditor with the necessary information to expedite the review and assure that no requirements of the standard are omitted. This verification sheet format could also identify those elements that will require evaluation or a response to correct deficiencies. This sheet could also be used for developing the follow-up and documentation requirements.

From a regulatory compliance perspective, employers must interpret the standard as it applies to their covered processes, and develop a defensible position of adequate information and systems for properly managing process hazards. An audit protocol is recommended to accomplish this.

The audit protocol can be based on several reference sources including:

- an interpretation of the preamble of the standard
- the exact language of the standard
- the Federal OSHA Training Reference Manual
- the Federal OSHA Compliance Directive CPL 2-2.45a
- referenced interpretations and citations from Federal OSHA
- and experiences of other companies

Two categories of recommendations often are derived from a PSM audit: compliance recommendations and suggestions for improvement to the safety management systems which may not be prescribed by the standard. Compliance recommendations are given where it is concluded that the minimum program level required by the standard is not currently met. Each of the compliance recommendations addresses deficiencies in the companies' PSM system that must be addressed to improve the effectiveness of the PSM effort and to achieve compliance.

Unless a protocol is defined which is based on a predefined interpretation of the standard's requirements, a problem may develop for management. They will need to determine which recommendations are mandatory, because it is commonly interpreted that they are required to be implemented to be in compliance, and those that could be considered optional. Implementation of these suggestions is not mandated by the regulation, but may be useful for developing a more effective and efficient program.

IV. Continuous Safety Improvement Ranking System

AcuTech has developed a ranking system for PSM. During the audit, in addition to the recommendations, an overall rating of each PSM element is given by using the AcuTech Continuous Safety Improvement (CSI) ranking system. CSI is founded on the basis that goal setting and measurement of progress towards goals for process safety will result in the most effective implementation and management of a process risk management program. Use of the CSI ranking system will allow for more objective measurement of status and progress. While the assessment of CSI level is somewhat subjective, it is at least a measure of the auditor's opinion on the relative level of completeness and effectiveness of the element.

CSI uses a five point ranking system to provide management with a measure of completeness and effectiveness of the program as compared with the PSM systems of other companies. On this scale, 1.0 represents the least developed program, 3.0 indicates acceptability per the PSM standard, and 5.0 represents a very progressive, highly

effective program element. This rating is intended as a measure of compliance and as a relative benchmark to industry practices.

Those elements rated 3.0 or higher indicate that they completely met all the PSM requirements. Elements that are rated less than 3.0 indicates that some noncompliance issues exist.

The CSI model evaluates the PSM program from two perspectives:

1. The management system design and effectiveness, including:
    - Commitment and diligence
    - Comprehensiveness
    - Appropriateness to the level of hazards of the process
    - Employee involvement and knowledge
    - Methods employed compared to state of the practice in similar industries
    - The completeness and quality of documentation

2. The technical approaches employed including:
    - Methods employed compared to state of the practice in similar industries
    - Physical systems in place, such as alarms, safety systems, etc.
    - Appropriateness to the level of hazards of the process
    - The completeness and quality of documentation

The definitions of each level are listed in Table 1. For each element of the PSM system, criteria (performance indicators) have been developed. These criteria are those which the references mentioned in the previous section concluded were important to or indicative of a complete and effective program.

Table 1: Continuous Safety Improvement Levels

CSI Level	Definition
1.0 - Inadequate	No program exists, or one or more element requirements are very incomplete or ineffective
2.0 - Incomplete	A program exists, but the element is lacking completeness or effectiveness in one or more areas
3.0 - Compliant	Meets the intention of the OSHA requirement in all element requirements
4.0 - Advanced	Program exceeds the minimum level of compliance of all requirements in the element
5.0 - Superior	Highest level of effectiveness and completeness; state of the art

An employer can use the CSI levels for two purposes: to measure against compliance or "typical" industry practices, or to set goals to implement and measure processes against those goals. A typical audit result is illustrated in Table 2, which lists the number of Safety Improvement suggestions pertaining to each element of the PSM standard. Conclusions include compliance recommendations, system improvement suggestions, and a CSI Ranking.

Table 2: AcuTech Continuous Safety Improvement Ranking

Element	CSI Ranking	Compliance Recommendations	System Improvement Recommendations
Employee Participation	2.8	2	3
Process Safety Information	2.4	4	4
Process Hazard Analysis	2.8	3	3
Operating Procedures	2.4	4	1
Training	2.7	2	2
Contractors	2.3	5	2
Pre-Startup Safety Review	2.0	2	1
Mechanical Integrity	2.0	7	3
Hot Work Permit	2.9	3	2
Management of Change	2.5	5	2
Incident Investigation	2.7	2	3
Emergency Planning & Response	2.6	3	6
Trade Secrets	3.0	0	0
Compliance Audits	3.0	0	1
Total Recommendations		40	33

For each recommendation, an assessment is given as to why the CSI ranking level was less than goal and how to best reach that goal. Using this process, the required recommendations are more clearly developed.

V. Conclusion

In conclusion, by using the audit protocol, the company benefits by having a more defined set of PSM goals and criteria for judging compliance to those goals. By using a ranking system, the numeric scale can assist in defining the level of compliance, for

setting of goals for improvement, and for comparison to other companies. Use of the ranking system also assists in more uniform assessments of different employer's PSM programs.