1
PROCESS SAFETY MANAGEMENT: AUDIT PROGRAMS

1.1 PROCESS SAFETY MANAGEMENT (PSM) AUDITS AND PROGRAMS

Auditing is an element of a PSM program. It is a critical element in that it provides information about the effectiveness of the program and contributes to management control of other programs, systems, facilities, and safety and health programs. A sound PSM audit program will help improve the effectiveness of a PSM program.

In discussion, PSM auditings, some conclusions about terminology may arise. “Auditing” is used in various contexts to describe many different types of reviews or assessment activities. In this book, an “audit” is a systematic, independent review to verify conformance with established guidelines or standards. It employs a well-defined review process approach consistency and to allow the auditor to reach defensible conclusions. Other related activities sometimes referred to as audits include the following:

- Inspections: The process of physically examining a facility.
- Assessments, evaluations, and reviews: Less formal reviews, which may combine aspects of inspections and audits, are guided by the judgment, experience, and intuition of the reviewer, often without a well-defined review procedure or process. Such a review allows a broader scope than an inspection, but it does not leave the consistency and rigor of an audit. At times, companies or facilities will use these types and other less formal terms in lieu of “audit,” but the activity does the same rigor as an audit, often the same protocol, the same way of using the protocol (i.e., interviews, record review, etc.), and the same reporting requirements. The reasons for using these terms interchangeably vary widely. Some companies have very strict rules governing any activity called “audit,” including legal permanence. Some companies reserve the word “audit” to only those activities that are regulatory or compliance related.
In its early publications (CCPS, 1989a and 1997a), the American Institute of Chemical Engineers' Center for Chemical Process Safety (CCPS) defined 12 elements of a process safety management program. Subsequently, OSHA adopted the Process Safety Management Standard (OSHA, 1992), which contains 14 elements, and the applicability section of the standard. In 2007 CCPS revised the definition of a process safety management program in the publication of the Guidelines for Risk Based Process Safety (CCPS, 2007c) to include 20 elements. In addition, several states adopted process safety regulations before and after CCPS and OSHA established their programs; for example, New Jersey (H.4, 1987), California (CAL.1988, Delware (DE, 1992), Washington (WA, 1992), Louisiana (LA, 1993), and Nevada (NV, 1994). Some states have simply adopted the OSHA PSMS standard variation, as nearly all, while others states have added state-specific requirements. Several states have modified their state PSMS programs to include the federal RMP Rule and obtain implementing agency status from the EPA to enforce the RMP Rule within their jurisdictions (e.g., Delaware, Maryland, Georgia, Kentucky, Mississippi, New Jersey, North Carolina, Ohio, and South Carolina). California has its own state RMP regulation (the CalABR program), but it is not an implementing agency for the federal RMP Rule. Also, since the publication of the first edition of this book, a number of domestic and international governmental and nongovernmental organizations have developed and published PSMS program requirements. Some of these have been mandatory requirements enshrined in various regulations, and some have been voluntary standards representing the consensus of the publishing organization. Table 2.1 summarizes several of these various mandatory and voluntary process safety requirements. The table has been arranged so that comparable program elements are in the same row, representing that the detailed requirement between comparable elements may not be the same. Some of these programs have elements that have no corresponding element in another program and these have been placed at the bottom of the table.

For the purposes of the book, the elements published by CCPS in Guidelines for Risk Based Process Safety (CCPS, 2007c) have been used as a guide to describing a PSMS program and the elements. Management systems that address each of these 20 elements should be established to form a comprehensive PSMS program.

The ISD 14001 Standard defines a management system as "that part of an overall management system that includes organizational structure, planning activities, responsibilities, procedures, processes, and resources for developing, implementing, maintaining, reviewing, and maintaining the environmental policy." Process safety management systems are comprehensive sets of policies, procedures, and practices designed to ensure that hazards or accidents and potential process safety incidents are in place, in use, and effective. OSHA management systems, including those designed for PSMS programs, typically follow closely the Plan-Do-Check-Act (PDCA) model used in many total quality management systems. A PDCA management system is founded upon the notion that continuous improvement is a cardinal principle. The "plan" portion of this model is essentially the development of written policies and procedures to define a desired program (in
this case a PSM program). The “do” portion is where these policies and procedures are implemented (usually the most difficult step). The “check” portion is the evaluation or auditing of what occurs during the “do” step, while the “act” step involves taking what is learned and feeding the lessons learned back to revise the policies and procedures if necessary. This circular design with appropriate feedback is the key aspect of a PDCA management system and provides the continuous improvement. Figure 1.1 depicts a PDCA management system.

Figure 1.1 Plan-Do-Check-Act Management System

Process safety management auditing is the systematic review of these management systems to verify the suitability of these systems and their effective, consistent implementation. PSM audits are intended to determine whether management systems are in place and functioning properly to ensure operating facilities and process units have been designed, constructed, operated, and maintained to ensure that the safety and health of employees, communities, customers (to the extent that portions of the PSM program extend beyond the facility boundary, such as emergency response planning), and the environment are being properly protected. These audits are an important control mechanism within the overall management of process safety. In addition, these audits can provide other benefits such as improved operability and increased safety awareness. There are several items that are not included in the purpose or methods of a typical PSM audit:

- Focus on the programmatic aspects of PSM programs, not on identifying the equipment/process hazards. Process hazard analyses, hazard identification, risk assessments, and other similar activities are intended to determine the possible hazards and risk associated with the processes/equipment under consideration.
Verify or replicate the engineering activities that took place to design the equipment and processes. For example, a PSM audit should not include within its scope work or activities that replicate the calculations performed to establish the set point and capacity of the relief devices in the processes. Engineering, design reviews, design approvals, or the technical reviews associated with a MOC procedure are the appropriate places to perform this basic engineering work. A PSM audit would verify that the calculations have been performed and are in the facility’s files; the current recognized and generally accepted good engineering practices (KAAAGIP) were used in design, install, and periodically test the relief devices; and the engineering design reviews or project approval specified in the project manual/procedures were carried out and documented. This thin, but distinct line between modeling and engineering should be carefully observed. Audit issues have neither the time nor the expertise to perform basic engineering work, and it is always outside the purpose and scope of a PSM audit.

The criteria used during PSM audits, which will be used to evaluate PSM programs, may be limited to the requirements of specific laws and regulations, or they may be broadened to include company policies and standards, or the guidelines of organizations described in Table 1.1. Each company should decide on appropriate audit criteria during the design of the audit program. The audit criteria are the reference points against which the PSM program will be examined to determine whether any deficiencies exist.

A PSM audit involves examination of management system design, followed by evaluation of management system implementation. The design of the management system must be understood and then evaluated to determine if the system, when functioning as intended, will meet the applicable criteria. Then the auditor must evaluate the quality and degree of implementation since a well-designed system must be backed up by examination through implementation.
### Table 1.1  Elements of Chemical/Processing Process Safety Programs

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**Note 1:** CCPS, Guidelines for Risk Based Process Safety, 2007.

**Note 2:** CCPS, Guidelines for Technical Management of Chemical Process Safety, 1989. This original concept of the process safety program was used in Canada by the Major Industrial Accident Council of Canada (MIACC) before its dissolution. MIACC was a voluntary PSM initiative.

The Process Safety Management committee, a joint committee with the Canadian Chemical Producers Association (CCPA), remains active, despite the dissolution of CCPA. This committee was responsible for developing tools to assist companies in assessing their own level of accomplishment toward good PSM practices.


**Note 6:** Synthetic Organic Chemical Manufacturers Association, ChemStewardsSM Program.


**Note 8:** EU Council Directive 96/82/EC—9 December 1996 (Seveso II). The Seveso II citation (i.e., Annex number) is shown.

**Note 9:** International Labor Organization, Convention concerning the Prevention of Major Industrial Accidents, March 1, 1997, Convention C174.
The remainder of this chapter discusses the issues associated with the design and management of a PSM auditing program. Specifically, the issues of audit scope, frequency, staffing, reporting, follow-up, and quality assurance are discussed. Although the concepts and guidance presented in this chapter are applicable in a general sense to all domestic and international facilities with PSM programs, there are some special issues that should be considered when U.S.-based auditors perform PSM audits in international locations. Appendix D provides additional guidance for international PSM audits.

4.1.1 Management Responsibilities and Accountability

Senior management at either the company or facility level is responsible for establishing the PSM audit program. Using offshore management has been financially assigned the accountability for the design and implementation of PSM programs, the auditing of the program is often considered a governance activity, and company-level policies and procedures are generally used to perform PSM audits. If the company has not established the necessary management systems to plan, execute, and document PSM audits, then the site management should assume these responsibilities. Management is responsible for the following aspects of the PSM audit program:

Policy. Management should establish the overall policy that will control the audit activity. Responsibilities for overall planning, executing, documenting, reporting, and following up on the audit can and should be delegated to appropriate personnel. Senior management, while retaining overall responsibility for the PSM audit program, should appoint a PSM audit “champion” with the appropriate background, experience, interest, and enthusiasm who will be responsible for planning and executing the details of the program.

Commitment. Management should establish the proper philosophical tone for the audit program. This tone should emphasize the importance of the activity, what management hopes to learn from the audit about the PSM program in question, and the opportunity to look beyond regulatory compliance, if possible. The underlying tone should allow everyone that all involved knows that no personal blame will be attached to the results, but that the responsible parties will be accountable for the findings, particularly their execution (except for situations where individuals in performing the audit are involved). Management should participate in the audit by attending debriefs and the opening and closing meetings, if time and schedules allow. This will allow the audit team and facility personnel to observe and understand management’s commitment to as well as their interest in the activity. PSM audits are intended to improve the program and reduce the likelihood of a process safety incident, and only senior management can convincingly convey this commitment message.
Preparation: Management should establish and implement the appropriate management system procedures for the PSM audit program. A typical PSM audit procedure should address the following topics:
- Selecting facilities for PSM audits
- Establishing frequency of PSM audits
- Planning and conducting audit, including scheduling
- Determining training and qualifications of auditors, including lead auditors
- Selecting and determining audit team and assignment of the lead auditor
- Developing and maintaining the audit protocol
- Selecting focus units/processes and sampling guidance
- Documenting audits
- Following up on audit findings
- Determining format and content of audit reports
- Distributing and retaining audit reports
- Communicating audit results to employees
- Providing access to employees of audit results
- Correcting audits (rectification requested by some process safety regulations)

This procedure, as with other PSM-related management procedures covering other PSM program elements, should be documented, formally issued, and approved for use.

Attention: Management should commit the proper resources to execute the audit program. These resources should be formally documented, annual monitored on other budget cycle basis. The resources need to include the following:
- Staffing and expenses associated with keeping the audit program up-to-date. Unlike any management system, it should be documented a Plan-Do-Check-Act procedure, in which the “Act” portion of the model requires that the management system be continually improved. Reference actual audits (the use of the management system procedure), over lead auditors and audit team members will require training and the protocol will require updating.
- Staffing and expenses associated with actual audits if these are scheduled during the budgetary cycle under consideration. If second- or third-party auditors will be involved, the necessary arrangements will be required in advance. Different groups and disciplines may be involved in executing PSM audits, and the individual analyses of these different groups should be coordinated.
- Staffing and expenses associated with the follow-up of audit recommendations. The amount of needed resources for follow-
up activities will be difficult to project until audits have been completed, but some allowances should be made for this in planning and budgeting. These items should be realized, requiring time and effort beyond the audit team. Engineering, operations, maintenance, and other groups and disciplines will all likely have work to do to address audit results in a timely manner. If subject matter experts from inside or outside the company are required, arrangements should be made for their services. Finally, the resolution may dictate that hardware, processes, software, training, or other aspects of the process safety policies, practices, or procedures be modified in some manner. These may involve engineering, projects, procedure revisions, or other technical work that should be planned and budgeted. Some of this work will be long term and will extend over several budget cycles, whereas some of this work will be completed relatively quickly. PSM audit programs are not one-time expenses and should be budgeted and planned as ongoing activities. Although hardware-related changes may be necessary as a result of a PSM audit, most recommendations from these audits will be programmatically in nature and will be related to changes in PSM program policies, procedures, training programs, and other management system documents and practices.

Management is responsible for providing the right people with the proper expertise to perform PSM audits. For example, process safety experts for each element should be present for the audits if they are available.

Continuous Improvement: Management's role in continuous improvement is to first provide a management system for the PSM audit program that follows the Plan-Do-Check-Act model of modern management systems. This includes the policies and procedures described above. These management systems, once implemented, should be successfully implemented (Figure 1.2), which is based on 19011 (ISO 2002), shows diagrammatically how an audit program is managed as a Plan-Do-Check-Act model. The continuous improvement step fulfills the “Act” portion of the model. The numbers in each of the boxes of Figure 1.2 are the appropriate sections of 19011 that define and describe each aspect of an audit in more detail.
1.1.2 Legal Issues

There are several legal issues that might affect the conduct of a P3E4 audit: privilege and liability. A brief discussion of each issue follows. Any company anticipating employing the concepts described herein should consult with counsel.

1.1.2.1 Privilege

The results of a P3E4 audit may be used as evidence by a government agency during confiscation litigation, and in civil or even criminal litigation. If, however, an audit is conducted under privilege, certain portions of it may be protected from disclosure to the government or third parties. Any company that seeks to keep a P3E4 audit confidential should consult legal counsel about whether and how the audit can be protected from disclosure. The following are three privileges applicable to P3E4 audits:
1) OSHA has adopted a policy regarding voluntary self-audits, which states that the agency will not "automatically request" voluntary self-audit reports and "will not use such reports as a source of identifying hazards upon which to focus inspection activities." 63 Fed. Reg. 48,039 (July 13, 2001). While the policy leaves some "loopholes," the policy generally states that OSHA will only request such reports if the agency has "independent basis" to conclude that a hazard exists, and even then, requires the owner of a voluntary self-audit addressing that hazard. In addition, OSHA will not issue a citation predicated upon a hazard identified in a voluntary self-audit if the hazard is corrected before the inspection or any accident, illness or injury occurs. Similarly, "if an employee is responding in good faith to a violative condition identified in a voluntary self-audit," OSHA will not use the voluntary self-audit to prove that the violation is "willful." For OSHA audit purposes, the same important limitation in OSHA's policy is that the audit must be "voluntary." An audit conducted pursuant to paragraph (a) of the PSM standard is mandatory, not voluntary, and OSHA's self-audit policy would therefore be inapplicable. An employer may, however, perform additional audits related to PSM elements that are not intended to comply with paragraph (a) or may perform an audit for purposes not covered by the OSHA PSM standard, and those audits may fall under OSHA's policy. Also, the privilege applies only in OSHA enforcement matters; the OSHA policy has no relevance to actions involving other government agencies or to civil or criminal litigation.

In addition to the OSHA policy on self-audits, a few courts have recognized a common-law audit privilege, but most courts have declined to recognize the privilege and have required disclosures of audit reports in litigation. The courts that have recognized the common-law privilege have generally looked at four factors to determine whether the privilege applies: whether information at issue was generated during a self-audit; whether the company intentionally preserved the confidentiality of the information; whether there is a strong public interest in encouraging audits of this type; and whether there is a strong likelihood that not applying the privilege in this context will discourage companies from conducting the particular type of audit.

2) Portions of an PSM audit report may be protected by the attorney-client privilege, which is intended to facilitate candid communications between attorneys and their clients. The privilege applies to all communications between the client and attorney, and the document at issue must have been created for the purpose of assisting the attorney in providing legal advice to the company. Counsel must be actively involved in the audit process for the report to be protected by the attorney-client privilege, and
the privilege will be waived if the information is disclosed to a third party. With regard to PSM audits, a report prepared pursuant to paragraph 4(a) will not be protected by attorney-client privilege because the PSM Standard mandates that the company prepare a report and makes it available to OSHA in the context of an inspection or enforcement litigation. At the same time, a company may choose to involve counsel in certain parts of the audit and prepare a separate report that may be protected by the attorney-client privilege. For example, the company may seek for a legal opinion regarding whether a particular practice complies with the standard. The advice provided and communications would typically be covered by the attorney-client privilege.

3) The attorney work product doctrine may protect a report from disclosure under certain circumstances. For the doctrine to apply, the information must have been created in anticipation of litigation. For example, an accident or incident report may be prepared under the direction of an attorney because civil or criminal litigation is likely. The work product doctrine generally applies only to legal analysis and conclusions, and does not apply to factual information. Also, a third party may overcome the doctrine by showing a substantial need for the information. The work product doctrine will typically not be applicable to a PSM audit unless it is conducted following an incident that may lead to litigation and is designed to address legal analysis of whether certain conditions violated the standard of care.

1.1.9. Liability

The three following basic sources of legal liability may flow from an audit:

- A company or facility that fails to perform an audit or performs it inadequately may be in violation of the OSHA standard or the HRAP regulation, and those failures may serve as evidence during civil or criminal litigation.

- To the extent a company or facility fails to respond to findings or action items resulting from the audit, violations of the PSM standard or HRAP regulation may occur and may constitute evidence in a civil or criminal action. Documenting the purpose, scope, and guidance of the audit and carefully preparing the report can minimize liability.

1.1.10 PSM Audit Program Purpose and Objectives

In establishing a PSM audit program, the purpose and objectives of PSM audits should be clearly known and defined. They should define why PSM audits are performed and what the facility and/or company hopes to get out of the activity. Possible purposes for conducting PSM audits include one or more of the following:

- Reducing the process safety risk. The primary purpose for performing PSM audits is to identify and correct practices that have reduced the effectiveness of the PSM program management systems. The identified
practices are those that have increased the likelihood (and perhaps the severity) of a significant release of hazardous materials included in the PSM program and could represent a potential catastrophic incident. Therefore, reducing the process safety risk is the most important reason why PSM audits should be performed. Management's commitment to measuring the effectiveness of the PSM program so that the process safety risk is as low as reasonably achievable is critical to the success of the program.

- **Domestic or international regulatory requirements.** Companies with facilities subject to process safety regulations must generally perform periodic PSM audits. As shown in Table 2.1, nearly all process safety regulations include such a requirement. The most common examples of these regulatory requirements are the United States in the requirement for a site-specific audit for those facilities covered by the OSHA Process Safety Management standard (i.e., the OSHA PSM audit), and the EJWA's Risk Management Program Rule. The citations for these regulations are found at 29 CFR §1910.119(a) and 40 CFR §68.29 respectfully.

- **Company-specific requirements.** Companies with voluntary PSM programs and companies that assess to the voluntary organization process safety or PSM management system programs with similar rules requirements for conducting periodic PSM audits. Examples include ISO 14001, ACC's Responsible Care® initiative, and SCCBQA's Chemical-Works® Program. Often these requirements are similar in intent and identical to those conducted pursuant to the PSM in OSHA regulations.

- **ACC EHSMS® program certification.** ACC's Responsible Care® certification program requires that the system be certified by a third party, which will require audits of the program by the certifying agent.

- **Other obligations on part of employer or acquisition.** Some companies have begun including audits (or less formal assessments or evaluations) as part of the due diligence process when considering whether to acquire another company's facility as a merger with another company. There may be considerable potential cost and regulatory liability associated with not thoroughly examining the structure and implementation of a PSM program in a prospective merger or acquisition situation. See Appendix A for additional guidance regarding PSM audits during mergers and acquisitions.

- **Gap analysis.** Many times, the initial activity in implementing a PSM program is an audit to determine the gap between existing OHS-related policies, practices, and procedures, and the desired implementation of a PSM program. This gap analysis can be used as a starting point for the PSM management system residual for a functional PSM program, i.e., a PSM program that is working as it is designed and meets the relevant governmental requirements.

- **Assurance exercise proposed.** Because the assurance auditor's role is property protection, its goals are different than those of a PSM program. However, since PSM programs are intended to prevent large-scale accidents such as
Investigations of any incident. If the investigation of a process safety incident reveals that one or more of the root causes in the failures of process safety element(s), the company may decide to perform a PSM audit to determine the depth of the failures or to determine what other PSM program elements might have systemic failures. The requirements for a post-incident PSM audit in sometimes included in a settlement agreement with a government agency.

Monitoring PSM program continuous improvement. Although most PSM audits are performed due to an external trigger (such voluntary compliance PSM programs containing PSM provisions, e.g., OSHA 1910.119, contain requirements for periodic audits), a secondary reason to perform them is to measure the condition of the PSM program. A consistently applied set of audit criteria over a period of time (usually three to six years) should show whether the program has made steady progress or has been in stagnation and in its implementation. PSM audits also afford the opportunity to measure the level of knowledge of those persons with responsibilities for the program and its implementation, and how the knowledge level has changed.

The main objectives, or outcomes, of PSM audits are derived directly from the purposes and include the following:

- Reducing the process safety risk
- Compliance with regulatory audit requirements, and
- Compliance with internal audit requirements.

However, there may be secondary reasons for performing PSM audits. These might include the following:

- Sharing of successful or best practices. Another reason to perform PSM audits is to catalogue successful policies, practices, and procedures. These can then be shared with other facilities within the same company, and perhaps even with the remainder of industry. Although, like measuring the summation of the PSM program, this is not a primary reason for performing the audits, it is a highly useful by-product of the activity and shifts the focus to the positive things that were identified, rather than just the deficiencies that require correction. Auditors should take time to include the facility/company staff of these successful PSM practices. Some companies will include a summary of the good PSM practices in the audit report.

- Training of auditors. PSM audits are excellent training opportunities for prospective auditors, others with PSM responsibilities, or those who are
expected to take on such responsibilities to learn how the PSM requirements are interpreted and applied for the facility in question, and also how to properly review documents/standards, interview personnel, and observe activities within the context of auditing a PSM program.

- Communications of Information. As with training of personnel, PSM audits are another mechanism for disseminating information to PSM program personnel on how the PSM Standard or individual PSM requirements are to be interpreted and applied at a particular facility or within a specific company.

- Feedback. PSM audits represent an opportunity (sometimes the only opportunity) to provide formal feedback on the efficiency of the PSM program.

- Performance measurement. PSM audits also offer an opportunity for the facility to be measured with respect to the effectiveness of its PSM program. Care should be taken to ensure that the measurements for the facility are absolute and not to leave any impression that the results represent a "report card" for any individual.

Purpose and objectives that will be common attributes in a facility or company PSM audit program should be described clearly and formally in the PSM audit management system procedures, even when they seem straightforward and obvious. This will highlight these principles and help ensure that they are incorporated into the planning of each individual audit (see Section 2.1.2.1).

1.2 PSM Audit Program Scope:

The scope of a PSM audit refers to what will be audited, that is, what plants, sites, processes, or 4/5 PSM programs are to be subject to a PSM audit. It is important that the scope of the audit program be clearly defined. Failure to do so can lead to misunderstandings among the facility being audited, the auditors, and the recipients of the audit reports. Failure to define the scope of an audit program can also lead to inconsistent and inaccurate audit results, to findings being missed, or to the inclusion of inappropriate observations in audit reports.

Among the parameters that can be used to define the scope of the audit program are the following:

- Type of facility (manufacturing, storage/retention, terminals, etc.);
- Ownership (publicly owned, joint ventures, builders, etc.);
- Geographical location;
- Facility ownership (all units versus selected units); and
- Program content (all processes safety management elements versus selected elements).
A PSM audit program should, at a minimum, include all facilities covered by the company's PSM program, as directed by the program definition guidance. Examples of these types of facilities include the following:

- Processes and operations covered by applicable PSM regulations;
- Facilities in the company that manufacture, store, use, handle, or transport defined hazardous chemicals or materials at or above certain threshold amounts;
- Facilities of wholly owned subsidiaries that manufacture, store, use, handle, or transport defined hazardous chemicals or materials;
- Joint ventures and partnerships that manufacture, store, use, handle, or transport defined hazardous chemicals or materials;
- Chemical processes that manufacture, store, use, handle, or transport defined hazardous chemicals or materials (often known as "hazards");
- Distribution operations for defined hazardous chemicals or materials; and
- Vendors of defined hazardous chemicals or materials.

The use of either management or control systems (e.g., self-assessment or internal reporting) may also influence decisions on the scope of the PSM auditing program. Where there are many effective PSM program management control systems in place in a given facility, it is comparatively less important that the PSM audit program includes frequent and broad in scope. However, where there are few PSM internal control systems in place and the PSM audit is a principal mechanism for providing process safety management feedback to management, it is important that the coverage be broad and the frequency higher. In making this judgment, truly effective management control systems should be differentiated from those that lack substantiation or effectiveness.

It may be possible to take credit for parts of PSM audits through the conduct of other activities that assess the quality of the design and implementation of individual PSM element(s) or part(s) of them. To do so, the activities should be conducted using the remainder of the guidance presented in this book. For example, if a quality review of the PHA program is undertaken separately from the PSM audit and uses the same personnel as described in Chapter I, and the personnel conducting the review are qualified in accordance with the guidance shown in this chapter, it may be possible for the PHA portion of the next PSM audit to take credit for the quality review. Some facilities have chosen to audit roughly one-third of the elements each year during a three-year period, which is also an acceptable method of determining the scope of PSM audit activities.

PSM audits can also provide useful input for determining the scope of PSM audits. Deficiencies found in PSM program areas/topics when periodically measured can be used to flag deficiencies in parts of an audit. Also, the facility/company should not fall into the common trap of believing that traditional safety statistics are an
adequate measure for the efficiency of PSM programs. Traditional statistical measures of a safety and health program (e.g., injury rate, experience modification rate, reportable injury and illness statistics) evaluate occupational safety program performance, but bear little relation to the effectiveness of the PSM program. Facilities with excellent safety and health programs, as determined by these traditional statistical measures, have still suffered major PSM incidents. CCPS has developed a set of metrics for measuring PSM programs (CCPS, 2007b). A key objective in the development of industry metrics that would become the benchmark across the chemical and petroleum industry for measuring process safety performance is that CCPS has identified the following types of metrics:

- "Leading" metrics: the description of the incidents that met the threshold of severity that should be reported as part of the industry-wide process safety metrics.
- "Leading" metrics: a set of metrics that indicates the performance of the key work processes, operating disciplines, or layers of protection that prevent incidents.
- "Near misses and other internal logging" metrics: the description of less severe incidents (i.e., below the threshold for inclusion in the industry logging metrics) or unusual conditions that activation one or more layers of protection. Although these events are actual events (i.e., a "leading" metric), they are generally considered to be a good indicator of a condition that could ultimately lead to a severe incident.

The CCPS Guidelines for Risk-Based Process Safety contain additional guidance for establishing PSM metrics. See Section 2.1.2 for additional guidance about establishing the scope of a specific PSM audit.

1.3 PSM AUDIT PROGRAM GUIDELINES

The guidance for PSM audits are the "ground rules" for how the audit program works, as well as the bases for the individual audits are conducted. The audit program guidance that should be defined in the management system procedures for the PSM audit program should include the following:

- The scope of the PSM audit program, which plants, areas, processes, and/or PSM programs are to be subject to PSM audits (see Section 1.3.1). The PSM audit criteria to be included in the audits (Given the large amount of work to be performed in included all of the criteria described in Chapter 3, it will likely be necessary to select which criteria will not be included in a given audit, given the typical time and resource constraints). See Section 2.1.3.2 for additional guidance on selecting which audit criteria to include in a given PSM audit).

- The frequency of PSM audits to be conducted (see Section 1.4). The number, importance, complexity, similarity, and locations of the process safety activities to be audited.
• How the PSM audit protocols will be prepared: the statutory, regulatory, consensus industry standards, and company requirements that will define the criteria to be audited against.

• The need, if any, for auditor recertification or registration/credentialed audit personnel so this can be documented.

• The need for certification of individual auditors and how this is to be documented.

• Any language, cultural, and social issues that are sensitive for the company and how they should be addressed in the audit plan for a particular facility PSM audits.

• The guidance for documenting audit issues and assigning auditors to these issues.

• If PSM audits are to be scored, the assignment of the point values of each question/criteria, and if applicable, how each PSM program element or individual question/criteria will be weighted.

• Guidance on managing PSM audit documentation:
  - Format, content, and review/approval of audit reports
  - Disposition of field notes and other working papers
  - If the audit is being conducted under attorney-client privilege, how this legal requirement will be satisfied
  - How to handle compliance findings and results as opposed to the findings and results from the modifications (see Section 1.7.1).

• Whether recommendations will be included in the audit report or whether the formulation of recommendations to correct the deficiencies identified is to be a separate activity. Most PSM audit teams are charged with the responsibility for providing preliminary recommendations as part of their whole scope, although this is not a mandatory requirement.

See Section 2.1.2.2 for additional guidance about establishing the ground rules of a specific PSM audit.

This book assumes that a PSM audit will be treated as an activity planned and executed on its own. However, some organizations choose to perform their PSM audits as part of corporate HAT audits or similar activities that have other/additional purposes, objectives, or strategies. As long as the PSM portion of these other types of audits follows the guidance presented in this book, it can be performed as part of other audits.
1.4. PSAW Audit Frequency and Scheduling

1.4.1 Establishing the Audit Interval

The frequency with which PSAW audits are conducted is dependent on the objectives of the audit program and the nature of the operations involved. Thus, the audit frequency (i.e., the minimum interval between the audits) should be defined as part of the design of the audit program. There may be the need to define different frequencies for different facilities in a company's PSAW program because the factors described below may have varying influences at different locations. PSAW audits should not be unannounced or surprise activities. They should have programmed activities scheduled in advance, with adequate notice for both the audited facility and audit team to prepare.

Among the factors to consider in establishing audit frequencies are government regulations, voluntary consensus PSAW program requirements, company policy, degree of risk, process safety management program maturity, results of prior audits, and incident history. Each of these factors should be considered in establishing audit frequency.

- **Governmental regulations.** Government regulations often specify a required audit schedule. For example, OSHA's PSAW Standard specifies that OSHA PSAW audits be conducted at least once every three years. EPA's RMP Rule for sites with Program 2 and 3 processes also has a triennial audit requirement for the prevention portion of the RMP. Since the RMP and IHMIP Program 3 prevention programs are nearly identical in requirements for all elements, and to date, EPA has not clarified its interpretation of the RMP Rule to establish any different prevention program audit requirements from when OSHA audits for PSAW, these two audits are often conducted in a single activity and add no measure of efficiency to process safety audits. Sometimes companies will perform PSAW audits at more frequent intervals as part of a settlement agreement with regulators following an incident. Even if those are government regulations, there may be other factors that dictate the need for more frequent audits — perhaps more frequently than what is specified in the regulatory requirements.

- **Voluntary consensus PSAW programs.** Most voluntary consensus PSAW programs do not specify PSAW program audit frequencies and only require that they be performed "periodically" or at "appropriate intervals." Table 1.2 summarizes the required or suggested audit frequencies for regulatory and voluntary consensus PSAW programs. As Table 1.2 shows, there are very few mandatory requirements for PSAW audit frequencies. Most U.S. companies audit the PSAW program of their domestic facilities once every three years because of the OSHA PSAW requirement; and, in the absence of more definitive requirements, the majority of their frequency has been adopted in many cases for non-PSAW domestic facilities, and international facilities of the same companies.
Company policies. Company policies may specify a frequency that is different from those in the pertinent regulations and in voluntary consensus PSM programs. In most cases, company procedures simply repeat the requirements of the relevant governing regulatory or voluntary program.

Degree of risk. If there are no governing regulations or no guidance associated with voluntary consensus PSM programs, other factors will be used to establish the frequency of PSM audits. Degree of risk of process safety incidents (i.e., either higher consequences, greater frequency of occurrence, or both) is an important factor in determining the appropriate frequency of the audits. Generally, the audit frequency will be higher for operations that pose higher levels of risk. Higher risk may result from the particular hazardous nature of the materials present, the type of process involved (e.g., one that operates at elevated pressures), or the proximity of potentially exposed populations or resources. For example, a chemical/processing facility with a large inventory of liquid chlorine onsite (e.g., multiple 20-ton rail cars) located in a densely populated area would have a higher risk than a water treatment plant that has one 1-ton chlorine cylinder and is located in a more remote area.

Process safety management program maturity. Operations that have new or evolving PSM programs may need more frequent auditing than operations that have established, well-developed programs. With the former type of operation, there is a greater chance for the PSM system to fail down, either due to confusion or mistakes made when implementing the new program; or through poor design of the program. In a location with a more mature PSM program, it is more likely that the management systems have been integrated into the normal, everyday operations. As a result, less frequent reviews and verifications may be adequate. Changes to either the PSM program or the audit criteria may prompt reconsideration of established audit frequencies. If a new program or a new performance criterion is introduced, it may be desirable to perform an audit sooner than originally planned to verify program implementation. This is especially true if the new criteria have been established by government regulations and are considered new compliance requirements. Changes in personnel or management or in business priorities can also influence PSM program quality or effectiveness.

Reorganization. If the PSM program or the company is reorganized, an audit may be warranted. Reorganization may result in significant changes in PSM program responsibilities, or significant changes in the method, type, or content of PSM program activities.

Results of prior audits. When the results of an audit indicate significant gaps in process safety management system design or implementation, this may indicate the need to perform the next audit sooner than the program schedule would normally indicate.
1.4.2 Measuring the Time Between Audits

When regulatory requirements, a voluntary consensus PSM program requirement, or a company policy specify a frequency for PSM audits, there should also be some guidance on how the frequency is to be measured. Since PSM audits are not instantaneous events, but are processes where the activities modelled over a period of time, there are different ways to measure the interval specified.

a) From the date of the previous audit report: Since the issuance of audit reports is sometimes delayed and these delays will vary from audit to audit, audit report dates are generally not used as a measure of audit interval, although some companies have done so because it is a conveniently documented date.

b) From the start date of the previous audit on-site activities: Since most PSM audits are designed to be into a period of one year or less, the start date of the previous audit on-site work is often the date used to measure the required frequency. This date is almost always permanently documented in the audit report or other records and is easily referenced.

c) From the date of the previous audit closing meeting: The closing meeting generally marks the end of the on-site audit activities and is usually the end of the scheduled and budgeted audit period on-site. Other companies document the closing meeting as the beginning of process safety activity where a detailed review, interviews, etc. As a result, some companies measure their audit frequency by the previous audit closing meeting date.

d) From the certification date of the previous audit: Process safety program audits performed pursuant to OSHA’s PSM Standard or EPA’s RCRA Rule are required to be certified. See Section 1.4.6 for audit certification guidance. This certification is dated and serves as a prominent date that
can be used to measure audit interval. However, since these audits are usually certified when the report is finalized, the certification date can be significantly later than the completion of the audit itself. OSHA has issued a clarification in their Compliance Guidelines for the PSM Standard (OSHA, 1992) saying that the three-year frequency required for PSM audits is measured from the certification date of the previous audit.

When the ending date of the previous audit overlaps activities. Although the on-site portion of most audits ends with a closing meeting, some interviews, record checks, or other activities may extend beyond the specified period because of unforeseen events onsite, the unavailability of necessary personnel, or other reasons. In these cases, the closure of the on-site activities may take several more weeks, and this delay will not be a regular occurrence. Therefore, the ending date of previous audits on-site activities is usually not used as an interval measure.

In summary, despite OSHA’s clarification regarding measuring PSM audits based on the certification date of the previous audit, many companies have chosen to measure their PSM audit intervals from the start date of the previous audit on-site activities. In reality, the functionality of PSM programs is not dependent on a few days or even a few weeks delay in measuring its efficiency. Therefore, several of the guidelines Irene described above provide an adequate and regular basis to measure whether the PSM program is working as intended. However, when regulations specify a frequency, delays of even a few days can result in regulatory action, so care should be taken in these situations to schedule the audits in order to meet the frequency specified. Also, the frequency measurement should not be used to extend the frequency in ownership of the company or site changes. The time between audits applies to the PSM program and its activities, not to what entity is conducting them. Once a method of measuring the interval between PSM audits is established, it should be consistently applied unless a compelling reason emerges to adjust it.
<table>
<thead>
<tr>
<th>CCPS RBPS</th>
<th>CCPS Technical Mgmt of Process Safety</th>
<th>OSHA PSM &amp; EPA RMP</th>
<th>ACC Responsible Care RCMS®</th>
<th>ISO 14000 EMS</th>
<th>SOCMA ChemStewards®</th>
<th>SEMP</th>
<th>Seveso II</th>
<th>ILO C174</th>
</tr>
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<tbody>
<tr>
<td>No specified or recommended frequency</td>
<td>No specified or recommended frequency</td>
<td>3 years</td>
<td>No specified or recommended frequency</td>
<td>Appropriate interval</td>
<td>No specified or recommended frequency</td>
<td>Periodically, but with a maximum interval of 4 years; initial audit should be within 2 years of establishing the program</td>
<td>Periodic</td>
<td>No specified or recommended frequency</td>
</tr>
</tbody>
</table>
1.5.4 Composition of Audit Teams

Conducting a comprehensive PSM audit normally requires a team effort; although this is not a regulatory requirement, involving a multi-person team in the audit process brings more than one perspective to bear, provides an opportunity for inter-team discussion of observations, and allows involvement of personnel with a variety of disciplines, skills, and experiences. A limited scope audit (e.g., assessing only one or two elements of a PSM program) can be conducted by an individual, but most PSM audits are performed by teams. When it is not possible to analyze a team to perform a PSM program, the single auditor should have the skills and experience of the audit team leader. This situation, while sometimes unavoidable, should only be allowed when the PSM program being evaluated is very simple in scope and complexity, and the person has less potential consequences.

PSM audit teams usually consist of two to six members. Team size for any particular audit may vary and depends on the following:

- The size of the facility;
- The scope and complexity of the PSM program, and
- The scope and guidance of the audit, i.e.,
  - The number of audit questions/criteria in the overall protocol;
  - The number of audit questions/criteria per PSM program element;
  - Which of these questions/criteria will be used during the audit, given its scope and guidance; and
  - Whether compliance and related criteria will be evaluated.

These factors will determine the amount of individual work expected of any given auditor and will help determine how many auditors will be required.

The objectivity of the audit team is a very important consideration; although the current PSM regulations do not address this issue explicitly, OSHA's book Risk Based Process Safety (OSHA, 2000a) defines auditors by their level of objectivity as follows (with some personal additions):

- **First party.** Auditors from the facility being audited. First-party auditors have the least objectivity (but have the most detailed knowledge of the PSM program being audited).

- **Second party.** Auditors from the same company as the facility being audited but from another location, such as a centralized corporate auditor safety/operational safety group, or from another production facility within the company. Second-party auditors have better objectivity than first-party auditors, but may still suffer from some amount of interest or bias. Sometimes second-party auditors have a conflict of interest because they realize that today's auditors are tomorrow's auditors and that they might be on the receiving end of an audit performed by the same people they are auditing.
Third party auditors from an independent organization, such as a consulting firm. Third party auditors generally have the highest degree of objectivity (and could be utilizing recommendations to create additional work for themselves).

Important considerations that should be weighed when composing, audit teams and their objectives include the following:

- **Avoiding conflicts of interest.** Staffing an audit team with only first-party auditors has positives and negatives. While the team will have familiarity with the firm’s operations and personnel, it may be difficult to avoid conflicts of interest in instances where an auditor is involved in recommending and evaluating the design or implementation of ISSM program policies, practices, and procedures for which he/she has at least some responsibility or involvement. Conflicts of interest also arise when one or more of the auditors report to the manager whose activities are being audited or where the audit team leader reports in the facility’s management. These conflicts, whether real or perceived, can compromise the objectivity of the audit and should be carefully avoided if possible.

- **Avoiding bias.** Staffing an audit team with only first-party auditors may result in an audit that is more susceptible to auditor bias. Points of authority may cause such auditors to overlook issues in the policies, practices, and procedures they are evaluating, or to work hard in efforts to obtain those results, while those issues should not be considered as findings. Possibly, bias in another scheme to consider audit teams with secondarily or third-party auditors as well as first-party auditors.

- **Information sharing.** This approach can also help facilitate information sharing and sharing across facilities in the same company.

- **Avoiding acceptance of the status quo.** A disadvantage of both first- and second-party auditors is the potential acceptance of the status quo, i.e., the lack of overt acceptance of the validity of current and historical ISSM program policies, practices, procedures, and achievements, with little or no challenge. The philosophy that “this is the way we do it here” may minimize some aspect of an adequate program, but would discourage issues that have developed themselves in the thinking process of the personnel involved in previous audits. However, status quo acceptance can affect not only those closest to the problem, i.e., first-party auditors, but also second-party auditors from other parts of the company where the status quo has proven successful.

- **Delegation of work.** The difficulty of having facility staff from their regular duties to conduct audits at their own or other facilities often means that an individual will only be able to participate infrequently in.
PSSM audits. As a result, the audit team may lack ownership with strong auditing skills. Therefore, some companies employ a staff of dedicated second-party auditors, usually assigned to corporate staff or to a part of the company outside the operating facilities that will be subject to PSSM audits. Sometimes these staff members comprise the audit team, and other times they are used as team leaders with groups of facility staff members available through inter-facility exchanges. Dedicated second-party auditors are best able to develop strong auditing skills and develop a broad perspective on the topics being audited, because they see a wide variety of operations and PSSM programs. The use of a dedicated corporate audit staff can help provide continuity when follow-up audits are performed, and can help avoid possible conditions of interest or bias. In some companies, audit teams are staffed with a mix of dedicated second-party auditors and temporarily assigned first-, second-, or third-party auditors. Assigning that the audit scope, schedule, and schedule period, required teams also facilitate PSSM auditor training: skills gaining audit experience, the sharing of best practices through a company, and the increasing depth of subject knowledge. Strong consideration should be given to using dedicated audit teams when the audits are complex so that the resources are assigned appropriately and the results will allow the types of comparisons that counting provides.

External vs. internal auditors. Sometimes third-party auditors are used in some PSSM audits. These may conduct audits as independent audit teams, local teams comprised of company staff, or audit to the available internal staff working under the direction of an internal team leader. The use of third-party auditors usually provides the greatest degree of objectivity to the PSSM audit process, and such auditors may help supplement resources internal resources. However, during an audit there is an opportunity to gain valuable knowledge about and appreciation for the PSSM program design and implementation, and if third-party auditors are used exclusively, the company or facility may fail to capitalize fully on, and in because facilities, the processes safety knowledge of the internal staff. The use of third-party auditors also provides the benefits of having "fresh eyes" looking at a PSSM program and increase the probability of status quo acceptance. The National Commission (Nelson, 2002) noted in its final report:

The Panel recognizes that benefits can be gained from using employees on audit either when, such as providing best practices and sharing lessons across facilities. This approach has limitations, however. PSSM process safety audit teams generally did not benefit from sufficient experience or perspectives of audit team members because they relied primarily on a pre-existing, institutionalized views. . . The Panel believes that this institutionalized view likely obscured the effectiveness of the audits because the auditors did not have perspectives beyond their own organization, as to process safety performance.
OSHA PSM audit team requirements. OSHA's PSM standard has a specific requirement regarding audit team composition. Paragraph (a)(2) of the PSM standard requires that "the compliance audit shall be conducted by at least one person knowledgeable in the process." This means that this "knowledgeable person" should be a member of the audit team. The term "knowledgeable in the process" is not defined. Some companies have used auditors with general process knowledge or the facility being audited. Others have assigned auditors from the facility being audited who have specific knowledge of the process in the audit team. This person generally acts as an advisor to the audit team. In this role, the knowledgeable person provides an interface between the audit team and the facility and helps identify the right people to interview, sets up the interviews, locates documents and records, and to see them through as a logistical resource. This advisor may be a management or maintenance employee. If the "knowledgeable person" is going to actively perform audit interviews and record reviews, they should be responsible for observing conditions and formulating audit findings, then this person; whether management or maintenance, should not have any responsibility for the design or implementation of the PSM program or being audited. This preserves the impartiality of the audit team. However, it is the person will be formally considered part of the audit team but not provide direct information about the program/operation and their technology and operations, and serves as an ambassador between the audit team and the facility, then this person need not be independent of the PSM program being audited. The planning process for a PSM audit should evaluate this role, decide whether the "knowledgeable person" will serve as an actual auditor or in an advisor role, and then identify the person who will fulfill this role.

14.2 General Qualifications of Auditors and Audit Team Members

ISO 19011, the general IS0 guidance for auditing quality and environmental management systems (1992), devotes considerable attention to the auditors' qualifications and experience. The portion of this guidance: appropriate to PSM audits are summarized below. Many of the same attributes and technical skills are also described in OSHA's Process Safety Management Guidelines for Compliance (OSHA, 1993).

14.2.1 Auditors

In order for a facility/company to have any confidence in the results of a PSM audit, and to rely on these results to justify that its PSM program is working properly, or to use these results to make changes in the program, persons performing the audit should be considered to do the work. This competence is based on the demonstration of the following:

- The personal attributes of the auditor(s) and
**Principle of Knowledge and Skills:**

Knowledge and skills gained through education, work experience, auditor training, and audit experience.

**Personal Attributes:**

Auditors should possess the personal attributes that will enable them to act in accordance with the principles of auditing. An auditor should (ICAI, 2002):

- **Morally sound:** i.e., be fair, truthful, sincere, honest, and discreet.
- **Open-minded:** i.e., be willing to consider alternative ideas or points of view.
- **Diplomatic:** i.e., be careful in dealing with people.
- **Patient:** i.e., be even-tempered and not show impatience.
- **Observant:** i.e., be actively aware of physical and environmental stimuli.
- **Perceptive:** i.e., be instinctively aware of situations.
- **Willing:** i.e., be able to adjust readily to different situations.
- **Thorough:** i.e., be persistent, focused on achieving objectives.
- **Decisive:** i.e., reach timely conclusions based on logical reasoning and analysis.
- **Self-reliant:** i.e., act and function independently while interacting effectively with others.
- **Passionate:** i.e., display inquisitiveness or healthy skepticism.
- **Practical:** i.e., not too easily during PSM audits, which are physically demanding and often involve long days.
- **Thick skinned:** i.e., the ability to be strongly challenged and remain calm and professional.

These attributes are a function of the character and personality of the people themselves and not their acquired skills and experience. While these attributes are desirable qualities for any type of work, they are particularly important for auditors. The nature of PSM audits often requires that auditors interpret what they are seeing and hearing against a set of requirements that are highly performance-based, with very little in the way of mandatory, specific, or prescriptive performance measures. The ability to successfully perform a PSM audit often requires a continuous learning process and the process being audited than the auditor’s interpretations are correct. Several attributes listed above are necessary to accomplish this. Being temperamental without giving offense is also a delicate skill. Often auditors will hear a response to a question and instinctively know that they are not hearing the complete story or an answer to a different question than the one they asked. The auditors have to probe until revealing all relevant facts in required components. The process being audited. The difference between understanding an issue and being with additional questions and “cross-examination” an interviewee in a delicate balance; that a successful audit must require.
Technical skills and knowledge relevant to auditing. In addition to having the desirable personnel attributes, auditors should have technical knowledge and skills in the following areas (ISO, 2002):

- Plan and organize the work effectively so that the audit is conducted within the agreed time schedule.
- Prioritize and focus on matters of significance.
- Collect information through effective interviewing, listening, observing, and reviewing documents, records, and claims.
- Understand the appropriateness and consequences of using sampling techniques for auditing.
- Verify the accuracy of collected information.
- Confirm the sufficiency and appropriateness of audit evidence to support audit findings and conclusions.
- Assess those factors that can affect the reliability of the audit findings and conclusions.
- Use work documents to record audit activities.
- Prepare reports to audit managers.
- Maintain the confidentiality and security of information.
- Communicate effectively, both verbally and in writing (for international audits that might require foreign language skills or the use of interpreters).
- Understand and use process safety terminology and language.
- Understand process safety management auditing principles and their application.
- Have general process knowledge, i.e., a basic understanding of the design, operation, maintenance, emergency response, and administration of the type of facility being audited. PSM audits are not required to be experts in any of these facets of the facility being audited, but they must have knowledge deep enough to be able to interpret the requirements, as described by the audit criteria, to the technology and operations of the facility being audited.
- Auditors should be computer literate.

Applicable laws, regulations, and other requirements relevant to process safety. PSM auditors should be thoroughly familiar and conversant with, and be able to work within, the process safety requirements that apply to the organization being audited. This would include all applicable process safety laws, regional, and national codes, laws, and regulations, as well as contracts and agreements, international treaties and conventions, and other requirements to which the company and facility are subject or in which they participate.

Ability to successfully interpret the governing requirements. Auditors of PSM programs should be able to comprehend the organization’s operational context with respect to the governing requirements of the regulations, voluntary consensus standards, local, regional, and national codes, contracts, and agreements;
international trends and conventions; internal company policies; and other
relevant process safety requirements to which the organization subscribes and that
apply to the facility being audited. Specifically, auditors should thoroughly understand the following:

- Application of PSM program management systems to different organisations.
- Interaction between the elements of the PSM program management
  system.
- Process safety management system standards, applicable procedures, or
  other management system documents used in audit criteria.
- Recognising differences between and priority of the different process
  safety management systems or reference documents that may affect a
  given facility.
- Application of the management systems or reference documents in
  different audit situations.
- Application of their interpretive ability with respect to the cultural and
  social customs of the facility as they apply to the PSM program, its
  design, and its implementation. These cultural and social customs may be
  very different between U.S. domestic facilities and those that are
  overseas, even within the same parent company.

The ability to properly interpret how performance-based process safety
requirements apply to the specific facility being audited is the most important
technical skill in a PSM auditor should possess. Questions of interpretation during a
specific audit are usually answered collaboratively within the audit team. The audit
team leader, as well as company legal staff (if they are available), play an
important management role in this area. This is also why audit findings and
recommendations (when recommendations are included) are carefully vetted (see
Sections 2.1.6 and 2.6.2).

1.6.3.2 Audit Team leader

In addition to the skills required of auditors, the team leader of a PSM audit should
have greater knowledge and skills in audit leadership to facilitate the efficient and
effective conduct of the audit as follows:

- Plan the audit and make effective use of resources during the audit.
- Lead the audit meetings (opening, daily, check-out, and final closeout meetings).
- Organise and direct audit team members to ensure that the audit protocol
  is followed and completed consistently with the agreed-to audit scope.
- Lead the audit team in generating the findings and recommendations (when
  recommendations are included).
- Prevent and resolve conflicts.
To perform PSIM audits successfully, auditors and audit team leaders should have the following education, work experience, training, and audit experience:

- They should have completed an education sufficient to acquire the knowledge and skills described above.
- They should have PSIM-related process safety work experience that contributes to the development of the knowledge and skills described above. This work experience should be in a technical, managerial, or professional position involving the technology and operations they will be expected to audit. Part of the work experience should be in a position where there is direct responsibility for or participation in PSIM program activities.
- They should have completed another training that contributes to the development of the knowledge and skills described above. This training may be provided by the person's own organization or by an external organization.
- If at all possible, they should have audit experience in process safety. Their experience should have been gained under the direction and guidance of an auditor who is considered to be an audit team leader in process safety.
- Audit team leaders should have participated in several PSIM audits before being assigned to lead one.

1.3.2.3 Obtaining Audit Skills
Audit team leaders and team members usually obtain these skills via one or more of the following methods:

- Professional training in PSIM programs and their interpretations.
- Formal training in auditing, either conducted internally by the company/facility, or externally.
- Successful service as a facility PSIM manager/Coordinator.
- Successful service as a PSIM consultant.
- Successful service as an observer or assistant auditor during PSIM audits.
- Successful service as an audit team member (for qualification as an audit team leader).

Company/facility PSIM audit procedures should describe the training and experience necessary for qualification as an audit team leader and member, how these skills are obtained, and how much experience is required in each skill before the prospective team leader or member can perform those duties independently.

In summary, PSIM auditors should be expert in PSIM, that is, skilled in interpreting the PSIM regulatory requirements for different types of operations; skilled in designing or recommending the design of policies, practices, and
programs that encompass PSM programs, skilled in performing audits; and unbiased and objective. For this role, they are assigned to perform. Most of these skills are obtained via experience and sometimes through training. Sometimes, an auditor team at a specific facility will require the assistance of subject matter experts to help assess the technical aspects of a particular PSM program practices.

1.6 Certification of Auditors

There are no requirements that PSM auditors be certified to perform their work, with rare exceptions. Presently performing audits for RCMS or IEC14501 certification must be certified third-party auditors in accordance with ACC procedures: RCMS-54 (ACC, 2005), which requires that the auditors be certified by either the National Association of Environmental, Health, and Safety Auditors Certifications (NIEIC) (www.nieic.org) or RINAQA International, Inc. (a merger of the Registered Auditors Certification Board and the Quality Society of Australia International on January 1, 2005) (www.repauso.com). Neither organization offers auditors specifically in process safety. IEIC has its HSE audit certification, but this is designed to certify knowledge and skills in a broad range of occupational health and safety topics. The environmental audit certifications of both organizations focus on environmental management systems (EMS) as required by IEC14501. Although the types of aspects of concern in a process safety/risks management program are covered by IEC14501, neither of these programs is designed specifically as a process safety management system. The general auditing principles of this standard are applicable to PSM audit programs and the standard is referenced and used in this book; however, it does not address PSM audits specifically. Note that these auditor certifications are required for those that perform the third-party audits supporting certification under the program itself. However, those that perform internal periodic RCMS programs audits that are part of the Process Chemical Audit management system are not required to be certified auditors.

IEC 17024 (IEC, 2003) is the new globally accepted benchmark for personnel certification and focuses on defining and examining the competence of personnel and the competence of the examine of personnel. RINAQA certification is based on IEC 17024.

1.7 PSM Audit Criteria and Protocols

In creating PSM audit programs, criteria should be established by which the programs will be measured. These criteria should be developed and then reviewed, along with their basis and rationale, in the management system procedure for the auditing program. The audit criteria form a reference point against which the design and implementation of PSM programs are measured. The criteria form the basis for compiling a protocol for each individual facility audit.

Audit protocols are the written documents provided to the auditor that guide their fieldwork. Audit protocols are referred to different forms: audit checklist, audit questionnaire, audit work plan, audit guide, etc. Audit "protocol" is used
herein because it is the most common form. The protocol will contain the questions/criteria that should be used to collect that necessary evidence to draw cogent conclusions about the status of PSM programs. Most PSM audit protocols are arranged so that a separate list of questions/criteria is developed for each PSM program element, although it is not mandatory that it be formulated in this manner.

While there are many pre-designed PSM audit protocols available, including one in this book, readers should review these protocols carefully to customize them for use in a specific company. The following should be considered when customizing a protocol for use:

- The scope of each individual audit will determine which of the questions/criteria are to be used (see Section 2.1.2).
- The generic protocol must cover the purpose, scope, and guidances of not only the PSM audit program, but also individual audits.
- Generic protocols must be modified to include company- and facility-specific requirements of PSM-related policies and procedures.
- Any local PSM regulatory requirements missing from the generic protocol must be included. For example, in some communities and municipalities in the United States have their own PSM regulations. Also, generic protocols designed primarily for use in the United States will require significant revision for use in international locations.
- Questions in auditor guidance that summarizes any PSM citations issued to the company as well as any citation information from other inspections that the user becomes aware of should be included.
- The protocol should provide guidance to auditors on sampling and testing, both for records to review and for people to interview.
- Well-crafted PSM audit protocols contain the necessary guidance for the auditor so that the types of responses to be considered, people to be interviewed, and observations to be made are described. This helps the auditor interpret the requirements in the audit question/criteria for the facility being audited. The guidance should also provide enough information so that the auditor can complete what he/she is seeing and hearing in the field to the guidance and decide if there is a finding or not.
- When formulating audit questions, it is important to write them in a format so that the answer always follows the same convention. For example, if the answer to an audit question would be "Yes," it should always mean the same thing, e.g., that the facility is meeting the requirement posed by the question completely. All audit questions should be prepared so that a "Yes" always indicates a positive aspect of a PSM program. Conversely, a "No" or "Partial" answer should always indicate a finding. Although this is the natural convention used in most PSM audit protocols, the opposite context could be used. What is important is that a PSM audit protocol uses a consistent convention.
1. PROCESS SAFETY MANAGEMENT AUDIT PROGRAMS

1.1.5 Scope of PSMS Audit Criteria and Questions

Measuring PSMS program sufficiency has typically been a compliance-related activity because in the United States process safety has become, to a large extent, synonymous with OSHA PSMS. The OSHA Guidelines for Blood Basin Process Safety (2006) explain what a complete PSMS program requires, as well as some of the elements common to PSMS programs that focus on a management system approach rather than just an enumeration of performance-based requirements. Also, incorporating these additional requirements into the PSMS program typically adds substantial value to an organization by way of increased capacity, availability, reliability, quality, etc. Performance-based requirements almost always contain many inferred elements, unclear interpretation issues, incomplete rules for documentation, and other important considerations that should be sorted out when the audit criteria are being developed. The key inferred issues that should be examined in a PSMS program are as follows:

- Interpretation of the requirements;
- Good practices, successful practices, common practices, and best practices;
- Level of acceptability practices;
- Management systems and internal controls;
- Process safety culture;
- Documentation, and
- Compliance requirements vs. criteria from related guidance.

The audit criteria/questions derived from these inferred issues, together with the compliance criteria/questions, constitute the scope of the criteria/questions included in the PSMS audit program. The compliance criteria/questions are relatively straightforward to identify; however, they may require significant interpretation to audit successfully. The related criteria will require quite a bit of thought and planning before integration into a PSMS audit, because including them may establish a performance requirement that does not exist. The interpretation of the compliance requirements does the same thing. The audit criteria/questions should flow from the defined and approved program requirements and not the other way around.

1.1.5.1 Interpretation of the Requirements

Since PSMS program requirements are largely performance-based, it is necessary that each company and facility with a PSMS program successfully interpret the requirements that drive the program within the context of their business. Even...
where process safety regulations are applicable, there is ample reason for interpreting
what compliance with those regulations means. For example, in asset integrity and
reliability, what does "inspection and testing shall follow recognized and generally
accepted good engineering practices" mean for a particular site? In hazard
identification and risk analysis, what does "facility limits" mean for different sites?
In RCMs, what does "information sharing" mean? Neither the audit criteria can be
developed nor the program measured until the governing requirements have
been interpreted (or defined) for the facility under consideration. Although the
basic meaning of an interpretation will not change for different facilities, the
manner in which the interpretation is accomplished or reflected in a particular
PSM program might vary somewhat from company to company. The regulations
and instructions of technology companies PSM programs have published
clarifications and interpretations of various PSM issues. In addition, facilities and
their parent companies (if any) have often interpreted how the requirements apply
to their specific facilities and operations. Therefore, the audit criteria should
include tests of whether the interpretations have been made properly.

Here it is: interpretations from government regulatory agencies have become
good/common/successful practices, questions about the impact of these
interpretations upon compliance obligations are raised. For example, if a majority of
facilities or companies have adopted an interpretation as a standard practice, then
is it a requirement? The answer to this question varies complex legal issues.
Specifically, a government agency like OSHA may state that a provision of a
performance standard like the PSM standard requires a facility to take corrective
actions. The issues raised by this type of interpretation include whether OSHA is
effectively promulgating a new requirement or whether it is simply providing an
interpretation of an existing requirement. In general, an OSHA interpretation of a
provision in a performance standard may become a de facto requirement as long as
the interpretation is reasonable.

Despite these legal complexities, the performance of a successful PSM audit
discusses that the specific requirements of the performance-based standards be
deliberated and analyzed against, and it often utilizes science to model required
interpretations, voluntary consensus standards, and other related criteria. In
addition, distinguishing in the audit report between regulatory requirements and
"good, common, or successful practices" is important. For example, in PSMs, it is a
very common practice to apply a qualitative risk-matrix scheme to identified
hazard scenarios. Most PSM practitioners have used these risk measurement
methods for many years and they have truly become a common practice. Several
years ago OSHA issued an interim interpretation stating that the use of qualitative
risk-matrix schemes fulfills the requirement in the PSM Standard (under the PSM
definition) that PSM addresses "an evaluation of a range of the possible safety
and health effects of failure of controls on employees in the workplace." Does this
interpretation by OSHA establish a firm requirement? As stated before,
OSHA will likely look for their use in PSMs.

In short, interpretations issued by regulatory agencies have been treated as related
criteria because until either they have been formally included in the PSM Standard or
the Occupational Safety and Health Review Commission (OSHRC), an administrative body independent from OSHA, has ruled that they can be construed as written, they could be challenged upon appeal and found to be invalid interpretations of the regulations. The evolution of interpretations to good, successful, or common practices and their treatment in PSMI audits is discussed below.

1.7.4.2 Good, Successful, Common, and Best Practices

In determining how the PSM requirements should be interpreted for a given facility, several important issues will likely be considered. The following issues are, for some facilities and companies, represented significant differences for establishing their PSM program:

- What does a good practice or common practice in process safety become a “requirement” in process safety?
- What should be considered a “best practice” in process safety?
- How should the components of one facility’s PSM program be compared to the program contents of another facility?
- In such comparisons, are appropriate, especially when formulating PSM audit criteria?

These are often difficult questions. However, some common practice and assumptions regarding these issues have evolved over time. Typically, regulations like the “safety in numbers” concept and will expect to see a facility adopt a process safety practice that has been demonstrated as successful over time at other facilities with similar operations, equipment, or hazards. At the very least, they will expect a clear rationale as to why the practice has not been adopted and how the same hazard has been abated using some other method. Regulations put great impetus on solutions to common process safety problems (and other OSHA problems) that have been voluntarily developed by industry without a formal requirement or direction from the regulatory agency. This is particularly true when the common solution has been established on a consensus basis and written down. Some regulations will expect to see the same philosophy employed when early one company or facility adopts a particularly clever or successful practice, and some regulators will wait until enough companies or facilities have adopted the practice before considering it a good, successful, or common practice.

Does this mean that such a practice becomes a requirement? Certainly, regulatory action cannot be taken (i.e., citations, fines, other official penalties) without the practice having been formally included in the relevant regulations. However, regulations often expect such practices to be adopted and can “get their way” without new penalties by having the company or facility agree in writing to adopt the practice in return for other regulatory considerations. Moreover, this does not mean that good, successful, or common practices are mandatory or compliance requirements. The continuance of the voluntary measures PSM programs typically do not have the same implications of these measures on achievement, and do not attempt to get one company to adopt another’s process safety practice.
An example of this type of common on successful practice is vibration monitoring of rotating equipment. No industry consensus RAC/ACIP requires vibration monitoring, and not all original equipment manufacturer (OEM) recommends it to be performed. However, many chemical/processing facilities periodically measure the vibration of their rotating equipment. In many cases, this practice has been adopted as equipment reliability reasons are directly related to process safety, and in some cases the adoption has several rationales, including the reduction of process safety-related risks. When the OEM does recommend periodic vibration monitoring of its equipment, that could easily be interpreted as a RAC/ACIP requirement; however, it would then be a requirement only for that manufacturer’s equipment. What about other monitoring equipment in the same or similar service manufactured by others?

The phrase “best practice” is a very common term in industry, often used synonymously with “good/common/successful” practice. However, the term “best practice” implies that a particular practice is better than all other options. Care should be taken in labeling a practice as a “best practice” without some evidence that it is in fact superior to other solutions to the problem.

Not all good, successful, or common practices are of equal importance and possible impact. Some of these practices simply represent useful or clever improvements to how certain PSM issues are documented or described in a management system procedure; however, some of them have more impact on process safety risk reduction. Some of these practices have been derived from written clarification of regulations and, while not mandatory, certainly indicate how the regulations believe a certain part of PSM should be practiced. Some of the practices derived from written regulatory clarifications and interpretations have become common industry practices in PSM. Therefore, some of the good, successful, or common practices have evolved into a widely known and followed level of acceptable practices. These practices and guidelines are informal in nature; however, both industry personnel and government regulators often form conclusions on judgment or justification regarding compliance to them. In particular, some regulations have concluded that these are recognized and generally accepted practices formulated by industry or that they represent best practices, and suggest using them in place because they have been implemented in several other locations. Of course, an informal practice, regardless of how long it has been practiced or its effectiveness, does not have the same impact as a formal, documented RAC/ACIP that is published and maintained by an consensus industry organization. However, some regulations, auditors, and PSM practitioners tend to treat these informal practices and guidelines in the same manner and use them to define levels of acceptable practice. Auditors and PSM practitioners should not interpret an informal level of acceptable practice as a mandatory requirement. Most of these deserve strong consideration for being implemented; however, each facility must have the flexibility to design its own approach to implementing a PSM program. Several examples of PSM practices or guidance that have evolved into informal levels of acceptable practice include the following:
PSM Applicability. The use of the commercially available examination to determine whether a toxic or reactive chemicals should be included in the PSM program has evolved into a level of acceptable practice for this issue. OSHA has included this classification in the PSM Compliance Directive (OSHA Instruction CPL 02-00-153). Although the PSM Standard itself has not been changed to include this classification, industry has adopted it as a level of acceptable practice.

Hazard Identification and Risk Analysis. It is a very common, although not a universal practice to apply qualitative risk-assessment schemes during the conduct of JHBA to prioritize the risks identified and any recommendations to reduce those risks. This has been a common and successful practice in industry for many years and is used to satisfy the regulatory requirement that the JHBA include a qualitative evaluation of the range of possible safety and health effects of the failure of controls on employees in the workplace. Many companies with PSM programs have designated risk-assessment schemes that fit their own needs. Approximately 10 years after the adoption of the PSM Standard, OSHA issued a written classification on this issue, describing a qualitative risk-assessment scheme as one method (and a common method) for satisfying that requirement, thereby unmistakably mandating an industry practice that had been in place for many years. Therefore, the use of risk-assessment schemes in JHBA has become a level of acceptable practice.

Any risk reduction measures, including good, successful, or common PSM practices, should also be consistent with the “as low as reasonably practicable” (ALARP) principles so that resources are applied wisely and the highest risks receive the most attention. In addition, the evaluation of PSM management systems and the internal audits they attempt to perform is performed using related audit criteria. This is because the requirement for such management systems is part of a comprehensive requirement.

In summary, PSM audit criteria should include related criteria that examine whether widely adopted, well-known, and well-established practices have been adopted at the facility being audited. However, this is a voluntary practice rather than a regulatory requirement. Collectively, good, successful, common, and best practices are referred to in this book as “related criteria.”

4.1.4.10 Management Systems and Internal Controls

Most PSM program requirements, both regulatory standards as well as voluntary consensus standards, do not explicitly require that procedures be written, approved, and implemented to manage all process safety activities. Most requirements simply require that an activity or an element be carried out. However, without carefully designed and implemented management systems, i.e., a Plan-Do-Check-Act approach, it is very difficult to successfully organize, execute, and control most PSM program activities. In addition, functional PSM management systems that impose the appropriate internal controls also serve to institutionalize the PSM activities they address so that PSM activities become embedded in the
Facility's or company's everyday technical, business practices. Institutionalizing PSRM practices helps ensure that all personnel change responsibilities and join the practices remain in place. In assessing the strengths and weaknesses of management systems, auditors typically look for the following characteristics for management systems and the internal controls:

- The existence of written policies, procedures, and plans for each PSRM program element. These policies, procedures, and plans should incorporate adequate administrative controls and requirements. These documents institutionalize the management system practices necessary to ensure that activities are conducted in an organized and consistent manner.
- Written PSRM policies, procedures, and plans that are formally approved, issued, and maintained in a controlled manner.
- Clearly defined responsibilities in the written policies, procedures, and plans.
- An adequate system of authorizations that reflects the criticality of the tasks and activities.
- Capable personnel throughout the organization (i.e., adequate training for the activities of each element).
- Division of duties to avoid organizational conflicts of interest and to establish the necessary checks and balances as appropriate.
- Complete documentation of the activities.
- Periodic independent verification that activities are being carried out in accordance with the management system procedures.
- Independent review activities that adjust the program requirements by carefully reviewing the verifications in the annual reviews (and periodic review) of the Plan-Do-Check-Act management system loops.

Evaluating each of these characteristics usually requires significant judgment on the part of the auditor since there are no widely accepted standards to use as a guide to what constitutes acceptable internal controls. Many auditors will rely on the audit criteria for guidance about what constitutes satisfactory internal PSRM controls. Therefore, audit questions should seek to confirm procedures are in place for each element of a PSRM program. Further, these procedures should characterize appropriate internal controls for each element in question. Except where a PSRM program element explicitly requires a management system procedures plan (e.g., ISO, workplace involvement/employee participation), the requirement that each element of a PSRM program have management system procedures with internal controls in place and control its activities are related criteria and not compliance requirements.

4.2.1.4 Process Safety Culture

The investigation of process safety incidents, when conducted thoroughly, often reveals root causes that are related to the process safety culture in the company or at the facility involved. The proper culture in which a PSRM program thrives at a facility is established by many of the characteristics of the "technical" side of these...
PSM-related procedures are designed, implemented, and evaluated. Some of these characteristics are dependent on human resources, financial operations, management commitment, leadership, and other non-technical policies and practices that underpin loss control or facility functions. The OCCPS Guidelines for Risk-Based Process Safety (OSHA, 2017a) examine this topic in detail, both as a distinct element of a PSM program and how it influences the success (or non-success) of the other elements as well. Therefore, the related audit criteria for a PSM program should include an examination of process safety culture. As mentioned earlier, process safety culture is not a mandatory requirement. Chapters 3 and 5 discuss the topic of auditing process safety culture in more detail.

**PSM Documentation**

In several places in the OSHA PSM Standard, documentation is explicitly required. For example, in paragraphs (b)(3) of the standard, test and inspection records are required, and the regulation stipulates the minimum information that must be retained. However, in most PSM Standard and RMF Rule elements, the requirement for documentation is inferred. This is consistent with the nature of performance-based regulations, of which the PSM Standard and RMF Rule are prime examples. Several examples of the inferred PSM Standard documentation requirements and their impacts include the following:

- Paragraphs (c)(1) of the PROC element requires that a MOC procedure be developed and implemented; however, it does not contain an explicit requirement for MOC forms or other records that will demonstrate compliance with that paragraph. These will include technical reviews and audits/inspections that are essential to the purpose of the MOC be complete without record-keeping. The MOC program would not be functional without a system of record-keeping in support of its execution.

- Paragraph (b)(3) of the PSSR element requires that certain forms be checked and verified prior to startup of new or modified processes; however, there is no explicit requirement that PSSR forms or other records proving these items were checked and verified are maintained. Paragraph (c)(3) of the PHA element requires that the studies address certain technical issues; however, there is no explicit requirement that PHA worksheets or reports be generated to show that these issues were considered. Given the variety of technical information generated in a PHA of even a moderately complex process, it is not reasonable to expect the study participants to remember all the issues, consequences, safeguards, risk reductions, and other important information that requires this documentation and shows how the chosen PHA method was applied to each process studied.

- Paragraphs (c)(1) of the PHA element states that PHAs shall be retained for the life of the process. Without PHA reports and/or worksheets, how is it to be retained? Unless a record of each PHA is created and maintained, facilities will not be able to retain their PHAs. There is a very
strong influence in this requirement that some sort of written record be made from the PHLA.

- Although the resolution of the PHLA recommendations must be documented in accordance with paragraph (a)(6) of the PHLA elements, without PHLA reports and detailed PHLA worksheets, it will be very difficult to resolve these recommendations because much technical information generated during the PHLA discussions, understanding the recommendations, and providing the rationale for making them, will be missing. Personnel assigned to resolve the recommendations often do not actually participate in the PHLA that generated them. Therefore, they will be unaware of what has occurred during the recommendations.

Without PHLA reports and detailed PHLA worksheets from the previous PHLA, it will be impossible to evaluate each PHLA every five years in accordance with paragraph (a)(6). The personnel who participated in the previous PHLA cannot be expected to remember all of the detail from the previous study, and in a five-year period it is likely that some personnel will no longer be employed at the facility.

While several states provide more detailed documentation requirements for specific pieces of PSM-related information, the requirements are, for the most part, also performance-based and contain many informal documentation requirements. The voluntary measures (PSM) programs are even less prescriptive about documentation than the regulatory programs.

- Individual PSM program documentation requirements could result in the information retained on the economies of the people who undertake the PSM program activities. PSM audits would then be performed by thoroughly interviewing those personnel. Interviewing personnel to test their recall of past PSM activities that took place months or even years ago is not practical, and an effective evaluation of compliance would require no memory "tests." Clearly, the administration of a PSM program where the records are based mainly on memory of "knowledge" is unpractical. The unavailability of human memory, personnel changes, job transfers, transfers, resignations, reductions-in-force, and other human relations events would comprise the documentation system based on the memories of those involved in the activities of the PSM program completely unworkable. A review of the PSM Standard presents as well as the recommendation Appendix C PSM program guidance clearly contains numerous instances where guidance states that PSM activities should be documented, even when the PSM Standard itself does not require explicit documentation. While the preamble and Appendix C are not the PSM regulations themselves and citations cannot be written against them, they can be published in the Federal Register and Code of Federal Regulations. They are important PSM guidance documents that not only indicate OSHA's intent and thought processes, but also explain the rationale for the final content of the regulations.

- The other end of the PSM documentation interpretation spectrum can be captured by the uncompromising phrase: "If it isn't written down, it never
happened.” While this measure may be satisfying to some because it indicates that for a PSM program to be successfully implemented, every single PSM-related activity must be completely recorded in the most detailed fashion. This philosophy is not practical, nor is it necessary. A properly designed management system for PSM elements or activities within these elements should ideally define what should be documented and how this should be done. The documentation an individual should enable those responsible for the PSM elements, as well as those with an understanding of the element, to have enough information to both continue the activities in an efficient manner and provide adequate evidence that allows a complete and fair evaluation of the PSM element periodically. This combination includes financial audits, as addressed in this book, as well as internal, internal assessments to check that ongoing activities are being carried out properly. Documentation that ensures supporting these goals or any others established by the facility or company is unnecessary. Beyond the practical functions of the PSM program, the process safety risk—both regulatory and actual—will be increased without a well-designed and implemented management system for PSM program documentation. As a strong system of PSM program documentation is also an important component of a sound PSM culture.

In order for the PSM program to operate in a practical manner and be institutionalized within each facility/company, this program must include defined, consistently applied methods of documentation for its key activities, even where these documentation requirements are inferred and not explicitly stated in the preceding regulations. However, the format, content, level of detail, style, and method of documentation (i.e., hard copy or electronically maintained records) can be chosen by each facility or company based on its own needs, requirements, and resources. In other words, for a PSM program to be successful it should have the direction of the “if it wasn’t written down, it never happened” mantra, but it does not need to be as absolute as that statement implies.

Therefore, PSM audits should expect to find some level of documentation for each activity that accomplishes a requirement in an audit protocol, including the compliance criteria. Facilities should create a clear audit of records describing what happened and when for each PSM-related activity. OCCPS has published separate guidelines (OCCPS, 1993) on PSM program documentation that is not included in the regulatory compliance guides, but rather is intended to foster the proper documentation practices so that the time and effort invested in PSM program changes and activities are recorded and inventoried. The OCCPS EPICP Guidelines (OCCPS, 2009) also provide guidance on this important topic.

Chapters 3 & 4 contain detailed guidance for auditors to evaluate both the explicit and inferred requirements for PSM documentation. With the key PSM program activities, as well as the nature of the documentation that should exist for those activities, are described, the questions as to what documentation is to be documented can be answered. The traditional or current information to be documented and criteria for consent of the necessary, conditions will leave in determining whether the documentation exists and records presented meet the inferred documentation requirements, and provide
example information, together with the interviews and observations, to be able to draw cogent conclusions regarding the quality of the PSM program being evaluated.

12.4.3 Compliances, Related Audit Criteria

In assembling the audit criteria, the following two types of criteria generally emerge:

- Compliance criteria and questions: These criteria/questions that measure the adherence level of a successful PSM program and examine mandatory issues.
- Related criteria and questions: These criteria/questions that examine inferred, interpretative, comparative, benchmarking, and cultural issues and generally do not examine issues that are considered mandatory.

When government process safety regulations exist, the categorization of criteria/questions as compliance vs. related is relatively straightforward. However, there are still some important interpretative issues to resolve:

- If the company or facility has voluntarily established in its own management system procedures process safety requirements that exceed the requirements of the relevant regulations or are different from them, these requirements should be considered as compliance issues and the audit criteria/questions derived from them should be so categorized. Many regulations have historically treated these requirements as mandatory, and some of them have issued citations for facilities that do not follow their own procedures. This conclusion could vary between regulators, and these citations, like any others, may not survive upon appeal or may be declared or modified during negotiation with the regulator.

- What constitutes compliance when performance-based requirements are found in the governing regulations or other program driver(s)? Simply converting these general performance-based requirements into questions/criteria will not assist the auditors in using such criteria consistently. Each aspect must be considered carefully and may result in different findings and recommendations. When the audit question/requirement are developed from performance-based requirements, define audit guidelines or additional, more detailed follow-up questions are needed in order for the auditor to perform their work in a consistent manner.

If the PSM program is completely voluntary, the company or facility process safety management systems will determine which audit criteria are compliance requirements and which are related criteria. For example, if the facility is located in the United States but it is not an AOCI or SCOGMA member, and is not subject to the PSM or RMP regulations, there will be no externally imposed drivers for that PSM program, with the exception of the general duty clause (GDC). The GDC, which is included directly in the Occupational Safety and Health Act of 1970, authorizes OSHA to require that employers "furnish to each of his employees, employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees." OSHA may issue citations using the GDC even when no specific regulations exist to cover a perceived health and safety issue. If the company or
Facilities have voluntarily established a PSM program in a proactive manner to the prudent because it uses, stores, or manufactures hazardous materials, then whatever written requirements it has established would constitute the compliance requirements in its PSM audit criteria. Issues that may be compliance for other facilities because of an external driver(s) might be considered a related issue for a facility with a completely voluntary PSM program. The contents and requirements of the PSM systems form the basis for defining which audit criteria are compliance criteria and which are related criteria. Compliance, in this context, means that whenever process safety drivers the company has subscribed to or is required to follow sets the definition of which audit criteria are compliance requirements and which are related criteria. In the examples described above, whereas the PSM program is voluntary, its existence might be considered a level of acceptable mandatory practice. However, by voluntarily deciding to design and implement a PSM program in writing via various policies and procedures, the existence as well as the contents and requirements imposed by these policies and procedures result in those being generally treated as compliance requirements.

The criteria and guidance described in this section and in subsequent chapters do not represent conclusive solutions to PSM program compliance, design, implementation, or interpretation. They represent the collective experience of many people in the chemical-processing sector who have performed many PSM audits, and the consensus opinion prevailing from that experience. The compliance criteria are derived from the regulations that govern PSM programs in the United States; however, these regulations are all performance-based. Performance-based regulations are good oriented and there can be multiple pathways to fully complying with them. Therefore, there may be alternate, but equivalent interpretations and solutions to the issues described in the compliance tables, particularly the auditor guidance presented.

The inclusion of the related criteria in no way indicate that these criteria must be implemented for a PSM program to be successful, nor does it indicate that a PSM program will be deficient without them. As with the compliance criteria, there may be other, more appropriate solutions for an individual facility or company. In addition, the use of the related criteria in a PSM audit is intended to be completely voluntary and not a mandatory requirement. They should be used cautiously and with careful planning so that they do not inadvertently establish unintended performance standards. Companions should be sought within and between facilities and their parent companies before these criteria are used. Finally, the related criteria and guidance utilized for consideration are neither endorsements of nor agreements with the written or verbal clarifications made by the regulations. PSM citations issued against the regulations, other PSM guidance published by the regulations, or the successful or common PSM practices used by any given company.
1.7.2 Sources of PSM Audit Criteria and Questions

The major drivers for the PSM program, whether external regulations, external voluntary consensus programs, or an internal voluntary PSM program, should be the principal sources for the audit criteria/questions. These include the following:

- Domestic federal process safety regulations, e.g., PSM Standards and/or RMP Rules (OSHA, 1992) (EPA, 1992) for facilities in the United States
- Domestic state and local process safety regulations for facilities in states or other jurisdictions with such laws or regulations, e.g.,
  - New Jersey Toxic Catastrophic Prevention Act (NJ, 1996)
  - Contra-Costa County (California) Industrial Safety Ordinance (CICL, 2000)
  - Delaware Hazardous Substances Risk Management Act (DE, 2006)
  - Nevada Chemical Accident Prevention Program (NV, 2005)
- International process safety regulations for companies with facilities in jurisdictions with such laws or regulations, e.g.,
  - International Labour Organization Prevention of Major Industrial Accidents (ILO, 1992)
  - United Kingdom Control of Major Aircraft Hazards (COMAH) (UK/COMAH, 2005) (the U.K.'s promulgation of the European Union’s Seveso II directive)
  - Canadian Environmental Protection Agency Environmental Emergency Planning (CEA, 2003)
  - Australian National Standard for the Control of Major Hazard Facilities (AS/NZS, 2002)
  - Korean OSHA PSM Standard (KOSH, 2007)
  - Malaysian Department of Occupational Safety and Health (DOSH) Ministry of Human Resources Malaysia (MHR, 2004)
  - Taiwan Article 26 of the Labor Inspection Law, promulgated in 1994
- Voluntary consensus PSM programs containing PSM provisions, e.g.,
  - ACC IRC110(r) (ACC, 2004)
  - ACC IRC14001 (ACC, 2003)
  - ISO 14001 (USA, 1996)
- OSHA Compliance Directive (CPD) for PSM (OSHA, 1994). The PSM CPD document contains OSHA's enforcement guidance for the PSM Standard. Appendix A of the CPD document contains OSHA's PSM audit checklist. This checklist is simply the PSM regulation converted into questions (i.e., "The employer shall . . .", becomes "Has the employer . . .?"). While some additional guidance and examples are included for some of the questions. This checklist is often referred to as the PQM (Program Quality Management) checklist. Appendix B of the CPD document is the repository for interpretations and clarifications of the PSM Standard. This document has not been updated since 1994, except to reconcile the document, and the Appendix B clarifications represent OSHA's thinking very early in the implementation of the PSM Standard. However, many of these early interpretations and clarifications have become common practice in PSM. As with any written clarification, the question of enforceability is pertinent. OSHA cannot issue citations against one's own interpretations; only the regulations themselves as they are published in the Code of Federal Regulations. However, as stated, OSHA's interpretations of the requirements of a predominant standard like the PSM standard may also be used to show that a facility failed to comply.

- Written clarifications of the regulatory or voluntary PSM consensus standards for process safety. ACC has published interpretations of the RC1500® technical specification (ACCI, 2004 and ACCI, 2005); however, most voluntary consensus PSM standards do not have supplemental guidance such as ACCI's. On the regulatory side, OSHA has issued a large number of written interpretations of the PSM Standard since 1994. These are lessons in response to questions submitted in writing by those that are unsure or suspect that they might be covered by the PSM Standard, internal OSHA memorandum interpreting the standard for the field offices, and cases law related to PSM (e.g., rulings of the OSH
Verbal clarifications of the regulatory or voluntary consensus PSM standards for process safety. Regulations are developed in accordance with strictly defined administrative procedures, which generally involve public notices and comment on regulatory proposals. (Unless the agency in question has administrative order authority granted via statute that does not involve public notice and comment). Therefore, regulators generally may not verbally impose requirements and thereby contravene in regulations. Also, the verbal response to a given question from one regulator may differ greatly from another from the same agency. Therefore, verbal interpretations and clarifications should not be taken as written guidance nor be regarded as final or official. However, OSHA and EPA employees have presented them in open forum on several occasions for the express purpose of answering questions on the PSM Standard and RMP Rules for the regulated community. OSHA’s PSM Standard and EPA’s RMP Rule are performance-based regulations for which there are many unanswered questions in compliance. Much of these opportunities for open forum verbal clarification took place in the early-mid 1990s, and some of the answers to PSM-related questions presented at that time have evolved into common industry PSM practices. For example, the use of qualitative risk-ranking matrices in SMS to fulfill the requirement that a "qualitative evaluation of the range of possible safety and health effects of failure events on employees in the workplace" (paragraph (c)(3)(VII) of the PSM Standard) was emphasized in a response to a question in one of these early PSM questions and answer sessions with OSHA, and it remained an unemboldened clarification until 2005 when OSHA issued a written letter of clarification on the subject. Opportunities for individual dialogue with those regulations directly responsible exist for a given facility on an ongoing basis. Like written interpretations and clarifications, verbal
Process safety regulation citations issued by regulators. Although PSM and RMP final citations might appear to be a source of compliance-related audit criteria, they should be treated as a source of related criteria for several reasons. First, what constitutes a violation of a process safety regulation is not uniformly accepted as a measure of the adequacy of a facility's program. Second, for OSHPA regulations, whether the citation was based on a violation of PSM, RMP, or state requirements, the facility was not consistently cited by the two agencies. Third, state and local process safety regulations often overlap with federal requirements, creating the possibility of differences in opinion between the state/local agencies. Finally, the facilities in New Jersey may be subject to New Jersey's Toxic Catastrophe Prevention Act (TCPA) regulations, which incorporate RMP and PSM elements. Therefore, the cited PSM and RMP standards are not mutually exclusive. The same might be true of facilities in Delaware. In Contra Costa County, California, a facility could be subject to Contra Costa County's Industrial Safety Ordinance (ISO), the California Accidental Release Prevention (CalARPS) regulations, and California OSHA's (CalOSHA) Process Safety Management regulations. Fourth, regulatory agency priorities can change, and may not reflect the political landscape, and government's analysis. These priorities will have a profound effect on the effectiveness of compliance of a regulatory agency charged with enforcing process safety regulations. In summary, process safety citations certainly indicate that some noncompliance has been identified, but may not reflect the adequacy of the regulatory program, and all concerned should be aware of these limitations and not repeat them (especially in the same jurisdiction). However, it is recommended that citations be treated as a source of related audit criteria.
examined historical events, a special commission was formed to independently investigate the circumstances and contributions of the accident, e.g., the Halder Commission (Haldor, 2007) following the Texas City accident in 2005 (which was convened to examine the PSM program in the PSM’s North American refineries), and the Piper Alpha incident in 1988 (TRA, 1990). These publicly available reports might represent valuable resources for developing PSM audit criteria.

Publicly available incident reports of accidents that do not involve chemicals or are in other industry sectors but have relevance for PSM programs. Conceptually, the root causes of these accidents include many contributing factors from vessel management systems or have significant cultural contributions. Both of these issues are very important in process safety. For example, both the Challenger (Stevens, 1986) and the Columbia (NASA, 2003) space shuttle disasters included lessons learned regarding management systems and cultural issues relevant to the chemical/processing industry, and the reports of these two events should be used as a resource for related audit criteria.

Internal incident reports, including ones from other facilities within the same company describing process safety incidents and near misses. A PSM investigation of the Texas City accident is an example (TRI, 2005). Near misses represent particularly valuable learning opportunities because the causes of process safety incidents are experienced without having to suffer through the consequences. Therefore, the incident reports of process safety incidents should be used as a resource for related audit criteria.

Special emphasis programs established by government agencies to examine a specific industry sector, a specific set of process safety questions, or a specific type of process safety incident/task. Three examples of such programs are the National Emphasis Program (NEP) for PSM in the refining sector published by OSHA in June 2007 (OSHA, 2007a), the NEP for PSM in the chemical sector published by OSHA in July 2009 (OSHA, 2009a), and the NEP for other industries in October 2007 (OSHA, 2007b). OSHA has defined a number of issues, along with specific audit questions to examine them, as a result of the accident at the PSM refinery in Texas City in 2005. These issues and the associated enforcement questions are published in OSHA's compliance directives entitled Petroleum Refinery Process Safety Management: National Emphasis Program (NEP) (OSHA, 2007a) and PSM Corrected Chemical Management National Emphasis Program (OSHA, 2009a). Special emphasis programs were often developed to address compliance deficiencies to evaluate a particular protocol in a standard and then issue citations. As such, special emphasis programs may be involved in developing audit criteria. NEP issues have been treated in this book as related guidance because the NEP program interpretative have not yet been tested in either the administrative or judicial processes. Although OSHA would be presided over the making a citation against the published instructions for the special emphasis programs, the instructions
situations are intended to allow a closer consideration of an existing requirement in the regulations, and the citation, if necessary, would be limited against that regulatory requirement. Therefore, it may be prudent to regard these special compliance programs as mandatory compliance requirements until an appeal demonstrates differently.

Safety cases. Within the European Union, a different approach has evolved, which is inspired by the "safety case" philosophy. That is, under the Network III directive, each facility establishes its level of safety in a safety report and constructs a major accident prevention policy (MAPR) based on the identified risk rather than just implementing a prescriptive set of requirements set out by a regulatory agency. For companies/facilities that utilize this philosophy for setting their PSM program requirements, the MAPR would represent a source of questions/criteria for PSM audits. The safety report would also be used for this purpose.

Generic, successful, and common industry PSM practices. As stated in Section 1.7.1, generic, successful, and common industry practices in PSM may be relevant because regulations may consider them standard industry practices. They may simply be general ideas whose use companies or facilities discovered a particularly clever way of solving a process safety problem or making an improvement in the design or implementation of a process safety activity. Those practices may come to the attention of the company via the open literature, in discussions/conferences with colleagues from other companies in a meeting or conference, via the work of a consultant who has worked widely in the industry and has seen many different ways to continuously improve PSM programs, or via other ways. However, these ideas become known, they should be carefully reviewed, and if found to be applicable and suitable for a given company and facility, considered for use as a source of related audit criteria. The use of these criteria helps benchmark a PSM program against practices that have proven to be successful and/or common. Some generic/common practices have evolved into levels of acceptable practices as described in Section 1.7.1.

The inclusion of audit criteria and questions derived from related concepts, particularly those issued by governmental (e.g., written clarifications and the CILMAP documents), should be used carefully. These criteria are usually generic in nature, but should always be scrutinized based on a specific situation, or an operator's or facility's specific PSM program, they may not apply universally.

1.7.2 California Oilfield Communities

PSM audit criteria are not static. They should be updated to reflect new thinking in process safety. New or modified process safety regulations will certainly add different criteria, new/modified voluntary consensus PSM program requirements will emerge; clarifications by regulators or modifications of voluntary programs will be issued; the investigation of major accidents will alter process safety thinking, and practices collectively: some of these in a substantial way. New conditions
RAGAGEPUs will be issued that present new ways of improving the technology of process safety (e.g., new facility integrity-related guidance, e.g., API RP 750, API RP 753, and 755). Citations may be issued that have to be applied company-wide on a national basis to foreclose the possibility of a repeat finding for the company. The audit criteria for the PSM program of a given company or facility should not be this new or modified detailing and methods. A facility or corporate party should be assigned the responsibility of preserving audit protocols current and comprehensive.

Changes should be processed using the document control procedures in place, and should be reviewed by appropriate parties; for example, the PSM coordinator, the PSM committee/working group, corporate safety council, and others as required before being approved for use.

While PSM or auditing procedures that contain the audit criteria are living entities, the timing of any changes should be carefully planned. For example, if periodic PSM audits are required and multiple facilities must be audited, it may not be advantageous to alter the audit questions/criteria during a given audit cycle. That way, each facility in the given cycle of audits will be evaluated against the same questions/criteria. This consistency within an audit cycle may be important if the audits are to be graded, or if the results will be used to develop company-wide PSM policies or procedures. For some companies, consistent audit protocols within an audit cycle are not an important consideration.

1.3 AUDIT REPORTING

The management system procedure for the PSM audit program should address audit reports. In designing the reporting process and executing the actual preparation of reports, there are a number of issues to consider, each of which is discussed below.

1.3.1 Audit Report Content

Each company should establish the requirements for the format, content, and level of detail for each section and subsection of PSM audit reports, and should publish these requirements in the audit program management system procedure. The chosen report format and content should be consistent with the objectives of the audit program. There is no single correct definition for the format and content of an audit report. However, it is important that since the report requirements bases have been developed, subsequent audits produce reports that are consistent with them. It can be confusing and misleading for both facility managers and senior executives when different audit teams within a company include different types of information in their respective audit reports.

For facilities performing PSM audits to comply with OSHA's PSM Standard or EPA's RMP Rule, this is one of the new PSM or RMP elements where a written report for the element activities is an explicit requirement. In 29 CFR §1910.119(o)(3) it states: "A report of the findings of the audit shall be developed." However, no regulation provides any further detail as to the content or content of the audit report.
In general, ISM audit reports have several potential audiences, depending on the purpose(s) of the audit:

- Stakeholders, both local and corporate;
- Technical reviewers, both local and corporate;
- Regulators;
- Insurance carriers;
- ISO registrars;
- Legal; and
- Facility employees (while the full report may not be communicated to facility personnel, the overall results of the report are often communicated to facility personnel, and there is a requirement under the Workforce Involvement element to provide access to all information required to be developed under the standard).

Since the reports might have to satisfy the needs of several types of readers and users, they should be structured to meet their various needs. Therefore, a consistent report format should be used to facilitate review and use of the report by these multiple audiences.

A suggested outline for ISM audit reports is described below. Although this mandatory outline contains minimal information that fully explains the why, when, who, and how of the audit, as well as the results (along with recommendations if they were within the scope of work for the audit team to formulate), the reports must satisfy any governing regulatory and internal audit procedure requirements. For the ISM ISM Standard, the findings and the date of the audit would be the minimum information contained in the audit reports. However, to place the findings and conclusions in the proper context, facilities and companies should consider including some or all of the information described below in their ISM audit reports:

- Executive Summary
- Glossary of Terms
  1. Introduction
  2. Purpose, Scope, and Guidance
  3. Audit Approach
  4. Audit Findings
  5. Appendices
    A. Description of Audit Technique
    B. Audit Issues
    C. Audit Worksheets
    D. Action Plan
    E. Audit Protocol (unless this is included with the audit worksheets)
    F. Audit Sampling and Testing Plan
Each section of the suggested outline is described as follows:

**Executive Summary.** The Executive Summary is targeted for management, who typically does not have the time to review the audit report in detail, at least not initially. The Executive Summary should provide a brief overview of the what, whom, when, why, who, and how of the audit, as well as a brief summary of the key findings. It is usually only three pages in length. It is best written after the remainder of the report has been drafted.

**Summary of Terms.** This section of the report defines acronyms and abbreviations used in the report.

**Introduction.** The introduction provides a brief description of the facility and PQM program being audited, and then describes the contents of the report by section. Sometimes author bios, if necessary, are included here.

**Purpose, Scope, and Guidance.** This section of the report describes:

- The reason(s) the study is being performed (e.g., OSHA or EPA compliance audits, PQM baseline audit, company-required audit, NOTA P-01 certification, NOA P-02 certification).
- The scope of study including:
  - The units and processes that were reviewed during the audit. If the facility was too large to include all of the units and processes, in the PQM program in the scope of the audit, these units and processes designated as representative units, along with the rationale for making these choices should be described. If representative units were not used, the sampling strategy used to ensure that large facilities were audited completely.
  - Which PQM program elements were included in the scope of the audit.

**Audit Approach.** This section of the report includes the following:

- Identification of the activities that took place during the audit, i.e., planning, opening meetings, daily briefings, closing meetings, etc.
- List of the auditors who led the audit. For example, if the purpose of the audit was to perform a triennial audit to comply with OSHA 1908, did the audit also evaluate related criteria?
- Identification of the audit protocols used, including the sources of the questions/criteria, and the allowable/used responses to the protocol questions for the audit being reported.

- A brief description of how the audit was conducted (a more detailed description of how the audit was conducted is sometimes included in an appendix).

- Identification of the audit team members, including their name, title, affiliation, area of expertise, and the elements of the PQM program they audited.
Description of the facility personnel interviewed. This can be accomplished by including the names of management and non-management personnel interviewed, or by describing the types of positions interviewed. Care should be exercised not to reveal the specific people interviewed because the interviews, particularly the non-management employees, would more likely not want to be identified by name outside the report.

Identification of any facility events or activities that were observed as part of the audit.

Audit Findings. This section is generally a summary discussion of findings. It usually focuses on the findings rather than the positive results, but in many reports statements that describe particularly strong aspects of the PSM program are included. The total number of questions posed during the audit, the number of questions that resulted in deficiency findings, and a number of recommendations may be helpful to include. Tables displaying the protocol question answers by program elements, or number of deficiency findings by program element are useful summaries of the audit data and may assist reviewers to understand the overall results and the context of findings. See Section 1.2.3. for a description of the protocol of audits where this type of qualitative and quantitative information is described in more detail. Other descriptions or displays of any trends or patterns in the results are often useful and informative. If the audit was limited in scope and complexity, or if the number of deficiency findings is small, this section of the report can include a complete listing of all the findings. An appendix that contains the full audit worksheets so to include all findings and recommendations in the next report would be redundant. This section of the report should also highlight any situations that may require immediate action, if any such situations were identified during the audit.

Appendices. In general the appendices for an audit report provide related supplemental information, but do not involve information or conclusions from the actual conduct of the audit, or contain information that is too detailed or voluminous to include in the body of the report. Typical audit report appendices include the following:

- A description of audit technique and protocol used (typically a checklist description).
- A listing of the documents and records reviewed during the audit (usually by PSM program element).
- The detailed worksheets from the protocol that contain findings of the audit.
- The recommendations based on the findings, if the formulation of recommendations was one of the objectives of the audit.
- The actual audit protocol used, unless this is included as part of the audit worksheets.
The audit planning and testing plans in the audit's sampling strategy in terms of statistical validity and common sense results.

See Appendix D for examples of audit report formats.

Other issues to consider when preparing PSM audit reports include the following:

- Some companies prefer to document their audits by exception. That is, the audit report only includes those audit criteria/questions where findings resulted, and the other criteria/questions that were satisfied would not appear in the report.

- If not documenting PSM audits by exception, companies should establish guidelines for how the satisfied criteria/questions are to be presented. That is, if the answer to an audit question is "yes," is it necessary to provide explanatory remarks? In general, the criteria/question itself along with a positive answer or statement usually satisfies; however, there may be the need to ensure completeness of the response with additional information. The management system procedure should provide the necessary guidance for when this should be done so that it is presented consistently.

- Companies should have a policy for handling repeat findings in their PSM audit reports. Repeat findings are specific issues that have recurred in successive audits (e.g., a 2006 audit finding appears open recommendations from a 2004 PMSA that still need to be addressed by the time of the 2009 audit), continuing evidence of similar previously closed management system failures (e.g., the recommendation from the 2004 PMSA were closed before the 2009 audit, but others from 2004/2009 are still open). A repeat finding is important because the same PSM finding occurred in successive audits and is an indication that some aspect of the PSM program is not functioning and that there is a systemic problem. If a government regulator observes these repeated findings, this significant situation could result, and repeated findings could also have an adverse impact on civil litigation. The potential liability of having repeat findings reported explicitly should be weighed against the importance of facility management knowing that these issues exist. Perhaps another way to report these findings is to include them but assign the recommendation(s) a higher priority rather than explicitly stating in the report that the finding is a repeat finding from the previous audit. Moreover this report is intended for these issues, if they occur; it is very important that they be included in the report so that the proper action can be taken to prevent any recurrence or recurrence of the same finding.

- All PSM audit reports should be dated. As discussed in Section 14.2.2 the time between audits can be measured several different ways; however, in order to assess the time, the audit report should contain the date of the audit and what the date represents.

- Some PSM audits are performed to comply with government regulations, for example, the audits required by paragraph (a) of OSHA's PSM
Standard. Any deficiency against a compliance requirement will have to be corrected, and since the audit is required by the regulations, both the finding and its correction becomes a compliance issue. During the inspections OSHA may request for any reports that are required by their regulations. However, some OSHA issued that are not compliance issues may be identified during the audit, either because the auditor discovered them while assessing compliance issues or because the audit committee identified questions designed to evaluate related criteria simultaneously. Because related criteria are not explicitly required by regulation, they are not required to be in a document that a regulation would require. Therefore, any findings associated with related questions in the audit protocol can be addressed in a report separate from the compliance report; then, the report of related findings would not have to be developed for a regulation.

The review process for PSCA audit reports should be defined in the audit program management procedures. Reasonable time limits for reviewing audit audit reports and submitting comments should be established so that the facility has the opportunity to correct any factual errors that appeared past the one issue activities of the audit but do not result in a financial decline in the instance of the final audit report. Most disputes in the context of a PSCA audit report will not involve straightforward factual issues, but will usually relate to interpretations of performance-based governing requirements. A process to resolve these interpretations and any findings and recommendations that result from them should be established so that this process is consistent with the company’s processes, safety philosophy, and management system procedures, and is applied consistently. Regulatory interpretations processes should include company and facility PSCA H&L regulatory advice, legal, and management personnel, and the results of their work should be internally published and disseminated to those managing the company’s PSCA programs; as well as those who audit them.

Audits that are performed pursuant to PSCA regulations must contain supporting information required by those regulations. For example, the requirement under OSHA’s PSCA standard, paragraph (a) that “The compliance audit shall be conducted by at least one person knowledgeable in the process” requires an explicit requirement that the audit report, which is the only document that will be used to assess compliance by the regulator and future auditors, clearly indicates who that person was. The PSCA standard also requires that the audit be performed “at least once every three years.” As stated earlier, the only way for a regulator or future auditor to determine if this time period has been met is for the audit reports to clearly indicate the dates and how they were defined. The PSCA standard also requires that “Employees shall certify that they have evaluated compliance with the provisions of this section... in verifying that the procedures and practices developed under the standard are adequate and are being followed.” This means that the PSCA audit...
must address each element of the PSM Standard. Again, the only way to show compliance with this requirement is to clearly include each element of the PSM program in the audit report and show it was analyzed. The same would be true of company- or site-specific PSM program requirements. If there is a company or site procedure governing PSM audits, then the audit report documenting compliance with those requirements should clearly indicate how those requirements were satisfied.

- Audits performed under the attorney-client privilege should be rendered unannounced in accordance with the instructions of counsel. Otherwise, most PSM audit reports are marked “Confidential” to ensured recipients that they should not be shared widely, especially external to the company.

1.5.2 Distribution of Reports

Once PSM audit reports have been prepared, they should be distributed to appropriate parties. Some of these parties will simply review them and may offer comments. Other parties will need to study the reports more closely in order to begin planning follow-up actions. Distribution of the audit reports may be determined by corporate policy. Typically, the recipients of the audit reports include: the manager of the facility being audited, and at least one level of supervision above that manager. In some organizations, the distribution may be more extensive. In many companies, the corporate process safety manager (if assigned) will also receive the audit reports. The PSM audit management system procedure should specify the distribution of the reports.

Because of concern for the sensitivity or confidentiality of audit reports, other persons and organizations external to the company should not receive copies, unless there is a compelling reason and a written permission is made in the act. Internal distribution should be controlled in the event possible; however, the responsibilities of the workforce in a facility and those versed in provisions of the PSM program should also be observed (see Chapter 3). Audits conducted under legal privilege must also have limited distribution, as directed by legal counsel. When there are concerns for protecting a legal privilege, some organizations prefer to have audit report distribution managed by their legal staff. Some companies number the copies distributed so that they can recover them. In recent years report distribution has become complicated by the use of electronic means to generate and distribute documents. It is now almost a universal practice to use word-processing software and e-mail to accomplish these tasks, and this has greatly increased both the efficiency and speed for document management. However, copies of document may reside on each computer or server used in the process of developing and distributing the documents, and more something is transferred electronically, there must be an increased level of control over its further distribution. Documents that require a higher level of document control, password protection may be used.

The same sensitivity about the documentation of audit findings has sometimes led to the suggestion that audit findings be reported only orally rather than in writing. This approach is not recommended as the sole means of reporting audit results. It is effectively solves the audit findings and for tracking and follow-up of the resulting recommend-
1.1.2.4 Languages of Audit Reports

When writing ISOF audit reports, it is important that great care be taken to use appropriate wording. Audit reports should clearly communicate the findings and observations of the audit team. Moreover, they should be written carefully so as not to imply findings or observations that are not substantiated or supported by the evidence collected, or that create unquantified legal/regulatory liabilities. Alternate wording that conveys the same technical meaning, but that avoids possible legal difficulties can often be found. In addition, personnel and organization-level wording styles and phrasing can often develop for companies as part of their audit programs, and that guidance should be followed if available. The following is general guidance for secondary audit reports, including the audit findings:

- The facts should be reported clearly and concisely. Every finding or statement should be supportable.

- Findings should have the following characteristics:
  - Findings should be written in the form of a statement of fact and should not be written in the form of a recommendation (i.e., findings should not contain the words “should” or action-oriented verbs). Recommendations, if within the scope of auditors, should be written as separate statements.
  - Findings should be based on only financial evidence; speculation should be avoided.
  - Findings should not be based on anecdotal evidence, e.g., a statement made by one person. However, a pattern that encompasses financial information would constitute a finding.
  - Findings should be actionable, i.e., a finding for which a measurable and observable recommendation cannot be issued is not a useful finding.
  - Findings should be focused on systemic issues (rather than on just the symptom).
  - Findings should use wording and language that is understandable by site personnel and senior management, and avoid jargon or acronyms that cannot have common usage in the facility or company in question. Findings should be written in consistent tones (either past or present) and persons (either first or third persons) in a given audit report.
  - Findings should be accompanied by sufficient evidence and specific detail to clearly demonstrate why the requirement was not satisfied.
  - Findings should not use absolute terms (e.g., “across” or “all”) in findings; instead, these statements can be supported by evidence.
  - Findings should not use intensifiers (e.g., “very,” “extremely,” “particularly,” “hardly,” “severely”) as these terms are not objective.
  - Findings should not discuss conclusions or conclusions on their mistakes. Avoid the use of nouns or adjectives in findings.
Findings should include details of sampling methodology whenever possible. (e.g., “of the 25 documents reviewed, 5 showed ...” or “1 file in category 10 was reviewed ...”).

Findings should not reference testing levels and budgets. Audit reports should reflect the findings as they are supported by the facts discovered by the auditor and address only the requirements contained in the audit criteria or questions. Underlying reasons and secondary causes for an audit finding should be investigated as part of the follow-up process for the findings and recommendations.

Bases in work sheets should be accurate and complete but no conclusions possible. The preparation between contains and conclusions should be carefully considered. The report should be complete enough so that the intended audience can clearly understand what has been identified and concluded, but should not contain unnecessary information that does not explicitly apply to the audit question being answered. It may be necessary to cut on the side of completeness in order for all readers of the report to understand the finding without any conclusions.

Do not use work sheets as “electronic scrap paper.” Be careful with the use of the “RECOMMEND” or “CONSIDER” columns or audit work sheets if they are available or can be invented. These columns should not be used to provide supplementary findings, conclusions, or amplifications on clarifications of the findings or recommendations. These columns should only be used to provide administrative information about the audit question, finding, or recommendation such as a reference, document number, person interviewed, date of observation, etc.

Record only audit team consensus opinions and conclusions in the audit report and work sheets. Unless UDOAs and other hybrid analyses, which are performed by a team concurrently, audit team members usually perform their work independently, and then present their findings, conclusions, and recommendations (when recommendations are formulated by the audit team) to the remainder of the team and the analytical facility separately. Therefore, achieving consensus in an audit is not the same as in a UDOA, and it should not be achieved. Dissenting opinions are not allowed in audit reports or work sheets. As in other aspects of process safety, consensus amongst the team is needed, and all lines with the findings, conclusion, or recommendations; even though they all may not completely agree with it.

Table 1.3 provides guidance on language in report in audit reports, and examples of appropriate report planning.
# Table 1.3 Examples of Audit Report/Worksheet Phrasing

<table>
<thead>
<tr>
<th>Do not say . . .</th>
<th>When you mean . . .</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;The plant does not have . . .&quot;</td>
<td>&quot;We were unable to confirm that . . .&quot;</td>
</tr>
<tr>
<td></td>
<td>&quot;We were unable to determine that . . .&quot;</td>
</tr>
<tr>
<td></td>
<td>&quot;The audit team was not able to verify . . .&quot;</td>
</tr>
<tr>
<td></td>
<td>&quot;Plant personnel were unable to locate copies of . . .&quot;</td>
</tr>
<tr>
<td></td>
<td>&quot;The plant did not provide . . .&quot;</td>
</tr>
<tr>
<td>&quot;. . . is a violation of law&quot;</td>
<td>&quot;The . . . procedure did not include some of the provisions contained in . . .&quot;</td>
</tr>
<tr>
<td>&quot;. . . practice is found to be negligent.&quot;</td>
<td>&quot;records did not include some of the information required by . . .&quot;</td>
</tr>
<tr>
<td>&quot;... was a sloppy operating practice&quot;</td>
<td>&quot;operating practice was not in accordance with approved Procedure . . .&quot;</td>
</tr>
<tr>
<td>&quot;It appears that . . .&quot;</td>
<td>&quot;The . . . did not . . .&quot;</td>
</tr>
<tr>
<td>&quot;We think . . .&quot;</td>
<td>&quot;We think . . .&quot;</td>
</tr>
<tr>
<td>&quot;It seems that . . .&quot;</td>
<td>&quot;It seems that . . .&quot;</td>
</tr>
<tr>
<td>&quot;We feel . . .&quot;</td>
<td>&quot;We feel . . .&quot;</td>
</tr>
<tr>
<td>&quot;We believe . . .&quot;</td>
<td>&quot;We believe . . .&quot;</td>
</tr>
<tr>
<td>&quot;The . . . records were incredibly deficient.&quot;</td>
<td>&quot;The . . . records did not contain the information required by . . .&quot;</td>
</tr>
<tr>
<td>&quot;The . . . was totally noncompliant with . . .&quot;</td>
<td>&quot;The . . . was totally noncompliant with . . .&quot;</td>
</tr>
<tr>
<td>&quot;The . . . program was the worst observed.&quot;</td>
<td>&quot;The . . . program did not contain the provisions required by . . .&quot;</td>
</tr>
<tr>
<td>&quot;The level of documentation of . . . was awful.&quot;</td>
<td>&quot;The level of documentation of . . . was awful.&quot;</td>
</tr>
<tr>
<td>&quot;... must be . . .&quot;</td>
<td>&quot;... should be . . .&quot;</td>
</tr>
<tr>
<td>&quot;... shall be . . .&quot;</td>
<td>&quot;... should be . . .&quot;</td>
</tr>
</tbody>
</table>

The following is other guidance with regard to sensitive wording and the examples in Table 1.3:

- Several of these terms have special meanings in a legal environment, e.g., "negligent" or "negligence" is a legal concept in the assignment of liability, and should be avoided.
- Do not use words that directly infer illegality or are legal conclusions, e.g., "criminal," "violation," "liable," "perjured," or "fraudulent."
- Any wording that indicates the deficiencies were not mistakes but intentional acts should be avoided, e.g., "intentional," "willful," or "deliberate." These situations have disciplinary implications within the company, and possibly legal ones as well. Any investigation of intentional behavior or actions should be performed outside the PSM audit.
- Colorful language to characterize deficiencies, such as "stupid" or "dumb," should be avoided. In addition to being unprofessional, such
Language may cause undue attention on a deficiency that is no more important than any of the others in the audit.

Common pitfalls in communicating PE&RS audit findings are presented below in the form of examples. These have been adapted from the pitfalls presented in Corthell et al., Environmental, Health, and Safety Audits, 3rd ed. (Corthell, 2001).

- "The Asset Integrity program was deficient and could be improved. This is a serious concern." (The All program deficiencies are not described.) "This is a serious concern" is not a fact. It is a conclusion that is not appropriate in an audit finding.
- "Safety calculations for 5 pressure relief valves were not available." (Which five valves?)
- "Electrical classification drawings were not available for the chemical storage tank farm. The possibility of a flammable release and vapor cloud explosion is high in this area." (The second sentence is not a fact and is speculative. Describe the possible consequences of findings at this stage, not an audit finding.)
- "Not all of the maintenance personnel have received training in an overview of the process and its hazards." ("Not all" is not definitive enough. Which maintenance personnel have not received the training?)
- "An operator stated that inside operators occasionally leave the control room during their shift to attend training meetings in violation of facility policy." (This is hearsay evidence and should not be included in a finding. Also, "violation" or "violated" is a legal conclusion and should be avoided.)
- "The emergency response plan should be improved to reflect the most up-to-date information." (This is a recommendation, not a finding. What is deficient about the emergency response plan? "Should be improved" is still vague and is not specific.)
- "It appears that operating procedures are not annually validated." (Simply state the fact; "appears" is not appropriate wording.)
- "There are insufficient safeguards included in the 2007 lay-out plan with FMEA." ("Insufficient" is not specific or appropriate wording.)
- "Based on a review of their training files, it appears that Robert Jones, Dena Steward, and Kenneth Percy have not received annual P Houc Refractor training." ("Appears" is not appropriate wording. Using the names of individuals in written findings is not an appropriate audit practice.)
- "Almost all of the contractors currently skiing without documentation of pre-qualification forms in the files." ("Almost all" is not appropriate wording.)

Audit reports and workpapers should be subjected to internal legal review to ensure that the wording of the documentation does not cause any of the problems enumerated above.
1.4.3 Audit Document Retention

The management system procedure for the PSRM audit program should establish the policy on the retention of final and draft audit reports as well as backup records (including working papers and correspondence). There is little formal industry guidance on retention policy for PSRM audit documents, with the exception of OSHA’s PSM Standard, which states in 29 CFR § 1910.119(a)(5) that “employees shall retain the two most recent compliance audit reports.” The ISPE guideline for e-records platforms requires that audit reports be retained until the completion of the next Audit.

The retention of field notes, working papers, interview notes, copies of records and procedures that support the findings, and other temporary documents should be retained only as long as it takes to issue the final audit report; thereafter, these records are rendered unnecessary, and their retention is not a longer period. After that, the proper disposal scheduling or burning of these documents should be arranged. In addition, drafts and review/peer copies of the audit final report and schedules should be disposed of once the final audit report has been issued. The disposal of all these documentation should also include the deletion of electronic files and e-mails stored on various computers and other electronic media (e.g., flash drives, CDs, backup servers). There is no legal, regulatory, or technically valid reason to retain any of the temporary documents associated with a PSRM audit, unless they are subject to a subpoena. In fact, these temporary documents can represent potential legal problems. Field notes, interview notes, and supporting documents of the report, or other such documents may contain information different from the previous final audit reports. This is not unusual, as the audit team and audited facility work through their different points of view. In a court setting, attempting to explain these differences of opinion may be very difficult, and even a simple statement in an auditor’s notes may be given great weight in that setting when in reality it is not important to the final audit findings or recommendations.

1.4.5 Grading of Audits

Some companies have elected to establish formal assessment or grading systems for their PSRM audits. This is often done when a company has multiple facilities subject to the same PSRM program requirements. This can be accomplished either quantitatively or qualitatively.

1.4.5.1 Quantitative Grading

The quantitative assessment or grading of PSRM audits is usually accomplished by assigning a value, or number of “points,” for each question/criterion. Some question/criteria may be assigned a point value that is different from others, thereby indicating its importance in relation to the others, which can further be indicated by assigning weighting factors to the individual questions/criteria, the program elements, or both. For example, the question/criteria for the MOC element may be assigned a weighting factor higher than the employee participation element, or certain MOC questions may have different weights than others MOC.
questions. Rules and assumptions are also established for assessing the points for each question so that each member of the audit team does this consistently. For example, if a question has a total value of five points, then zero points would be assigned if the facility had not achieved any progress towards implementing what is required by that question. The same question would be assessed four points if the facility had fully implemented what is required by the question and the interview, record review, and/or observation activities of the audit confirmed that it was fully implemented and functional. If the facility had made partial progress towards implementing what was required by that question, then a score of two, three, or four points would be awarded based on rules established in advance, e.g., two points could be assigned if 25 percent of the progress had been achieved, three points if 50 percent had been achieved, and four points if 75 percent had been achieved.

The number of points can be determined by element and for the entire audit. The final score for the audit can then be calculated as a ratio of the total points awarded to the total points available for each element and for the entire audit.

Numerically grading audits makes comparisons between facilities subject to identical PSM program requirements easier, and it provides an objective measure of PSM program improvement or degradation from one audit to another. An important potential disadvantage of numerically grading audits is that it fosters competition between facilities and increases facility and company management more on the scores and not the nature of the audit findings that created the scores. This is a natural and unavoidable outcome of quantitatively assessing PSM audits.

In addition, in order to create a simple numerical grade, all audit questions/criteria have to represent either compliance requirements or related criteria, but not a mix of both. It is not possible to accurately combine compliance and related criteria issues in the same score. If a quantitative assessment system is implemented and it is desired to audit both related criteria and compliance criteria, it will be necessary to grade and report them separately. Also, when PSM audits are numerically assessed, dedicated audit teams should be used, if possible, to help ensure consistency of assigned scores among all facilities being audited in a given audit cycle. If possible, some of the same auditors should also be assigned from one audit cycle to the next, so that there is some consistency in the numerical assessments between audits from different cycles. This will allow a more objective comparison of the improvement or degradation of the PSM program that quantitative assessments permit.

1.5.1.2 Qualitative Grading

Qualitative assessment or grading of PSM audits is usually accomplished by establishing a set of qualitative grades or categories and then assigning each audit finding and its recommendation(s) (when recommendations are formulated by the audit team) to a category. This creates qualitative measures of importance that is not numerically based but ranks the findings and recommendations by their relative importance to the PSM program and its process safety risk compared to other audit findings/recommendations. A simple example of such a system is a high-medium-
how qualitative assessment results. Each of these three categories would be assigned qualitative definitions in a manner similar to the qualitative severity, likelihood, and risk management schemes used in OSHA. Each finding/recommendation should then be assigned one of those qualitative measures. The results of the PSM audit as a whole are sometimes assigned a narrative, although sometimes only the individual findings are assessed. This is a difference in qualitative versus quantitative assessment systems, where in the quantitative systems the grades are almost always automatically combined to render an overall grade.

The same caution described for quantitative assessment systems for PSM audits apply for qualitative assessment systems; although the lack of numerical scores presently transpose some of the perception and accountability issues.

However, there can be some pressure on auditors to not assign certain categories of qualitative grades because of the perceived severity of the category, and sometimes facilities/companies impose inflexible guidelines on the assignment of the findings associated with the qualitative assessment categories that are difficult to achieve.

1.3.5 Certification of Audits

OSHA's PSM Standard, in 29 CFR §1910.119(d)(1), requires that "Employers shall certify that they have evaluated compliance with this section . . . ." This requirement is repeated in EPA's RMP Rule in 40 CFR §68.279. These regulations, however, provide no further guidance as to what "certify" means or how it should be performed and documented, what certification language is acceptable, nor who should be the certifier. However, common practice suggests that certification of PSM audits subject to the PSM Standard means that a signature and date affixed to a document stating that the audit was performed, which often by including a certification page in the compliance audit report. A PSM audit intended to satisfy OSHA's PSM Standard or EPA's RMP Rule that did not result in any findings would still be required to be certified. Appendix C contains some sample certifications. Audit reports of findings from both the revised criteria would not require certification because these reports would generally not be made available for review by a regulator. There are no regulations as to who should sign said certification: the PSM Standard only says that "Employers shall certify . . . ." Therefore, each company or facility should designate an appropriate person in the PSM audit management system procedures. Typical choices are the plant facility manager, RMP manager, PSM manager/coordinator, or the audit team leader. However, these are not mandatory choices, and others could be designated.

An important concept here is that the PSM compliance audit report is not being certified, the PSM audit is being certified. Therefore, it is not necessary that the certification documentation be included in the audit report, although many facilities file their audit certifications with the audit reports as a matter of convenience.

The other voluntary consensus PSM programs do not require certification of PSM audits. However, an additional requirement exists in ACGA's ACCPS™ program, wherein certifications under the program is achieved via a third-
party audit performed by a certified auditor (see Section 1.2). This is different from the regulatory requirement under FSMA/MDR. Each ACC member is required to achieve PCMS® certification according to a schedule published by ACC.

1.9 AUDIT FOLLOW UP

1.9.1 Action Plan

The recommendations from a FSMA audit should be resolved in a thorough, timely, and documented manner. The definition of “timely” in this context is provided in the OIG metric and is not limited to any particular duration. The difficulty and complexity of resolving and implementing the audit recommendations should be addressed based on the specifics of each recommendation on a case-by-case basis. FSMA auditors should determine how facilities have defined “timely,” after they have applied their definitions, and if the definition and its application for each recommendation are reasonable and defensible. This is a crucial function of any visible FSMA program, and the same concept extends beyond audit recommendations to any FSMA-related recommendation or action item, e.g., those arising from NPIAs, incident investigations, or emergency drill critiques. FSMA audits required by regulation must properly consider this aspect of the audit program. For example, FSMA’s FSMA Standard, in 21 CFR § 119.10, 119.11(2)(4), requires that “the employee should promptly determine and document an appropriate response for each of the findings of the compliance audit and document that deficiencies have been corrected.” There are also possible legal ramifications for failing audit recommendations. However, in most cases, the resolution of the recommendations generated by the audit findings is not considered part of the audit聲明s here is a key part of the FSMA audit program.

Following issuance of final audit reports, an action plan should be developed, which should include: the timeframe for resolving the recommendations generated by the audit, and the person responsible for each indicated action. Accordingly, the action plan represents both a project schedule for the follow-up activity, and if needed, an internal control document that can be used to monitor the status of corrective action. If the audit generated findings that require support action, then the recommendations associated with those findings should be addressed as criteria before the final audit report is issued and the action plans are formulated.

The action plan should be developed by the management(s) responsible for the audited facility or operation. This individual is ultimately responsible for the FSMA program at the facility, and should take responsibility for implementing actions based on audit results. There should be established systems for review and approval of the action plan by appropriate levels of management documented in the FSMA audit program management system procedure.
1.2.2 Management Systems for Resolution and Tracking of Audit Action Items

In most cases, the recommendations generated by the audit are managed through tracking systems, databases, or other management systems that are designed to accommodate and manage recommendations and actions from other processes, safety activities (e.g., EHS, incident investigations, emergency response, skill critiques). In some organizations, PSM audit recommendations are managed within a system dedicated to all EHS-related recommendations and action items. If this audit was conducted as part of an overall EHS compliance assurance program audit, the PSM audit findings may be managed in a different corporate system. If this is the case, PSM audit recommendations will be co-managed with environmental, health, occupational safety, and other PSM recommendations and action items. Such systems usually involve computerized records and systems, but this is not mandatory.

The characteristics of management systems designed to track and manage recommendations generated by process safety or EHS activities include the following:

- Standard: The management system for audit recommendations should have a defined schedule that describes the various steps for resolving the recommendation, including implementation, the final action item(s). The scheduled dates should be timely and reasonable. Within the context of process safety, these dates mean that the scheduled dates for resolution and implementation should be commensurate with the scope, complexity, and risk of the finding being corrected. The definition of "timeliness" would differ for a recommendation to confirm the design basis of the facility's relief devices and a recommendation to change the wording in the incident investigation procedures. In some cases, the resolution and implementation of recommendations may take months and even years, particularly if large-scale changes are necessary to implement recommendations, e.g., if the operating procedures have been found to be technically deficient. Recommendations involving large capital projects can also take a long time to resolve and implement, although programmatic measures such as PSM audits generally do not result in recommendations that involve large capital projects (see Section 2.4.3). Some of them, however, may involve a significant amount of technical work, e.g., a recommendation to confirm the design basis of the facility's relief devices or a recommendation to implement the SIL Standard. Conversely, some PSM audit recommendations should be relatively quick to resolve and implement. For example, if a change to the incident investigation procedures is recommended as necessary during the audit, that recommendation should be completed in a relatively short period of time, probably measured in a few months, depending on the documentation control process in effect at the facility or company. If the facility is large, and a number of people are required to review procedural changes (as when the document is a corporate or division procedure), a reasonable time may be required to achieve. The approval process, plus the implementation steps,
Informational: A large group of employees, often resulting in a relatively simple procedural change, making manual or computerized changes.

Responsibilities: The management system for audit recommendations should identify who is responsible for each step of the resolution and implementation process. It is recommended that responsibilities be described in terms of actual names or titles rather than department, section, or position. Assigning an assignment to "Operations," for example, is less useful than identifying the specific person or department.

Status: The management system for audit recommendations: should provide a clear indication of the status of the recommendation, e.g., completed, pending, technical review, awaiting final disposition, under review, rejected. The system should also be designed to allow supplemental information describing the rationale for decision making (or the reason for rejection).

System and filtering: The management system should be capable of monitoring and following for the potential efficacy of the audit recommendations. Periodic reviews can be conducted and reviewed. In particular, the management system should easily produce a list of recommendations where the required action has exceeded the amount of time and are overdue for resolution or implementation.

Computerized systems: While not mandatory, it is recommended that the system for managing audit recommendations be computer-based. Computer-based management systems offer many advantages, including ease of entry and manipulation of data and access to audit records in remote locations. When used in conjunction with the information systems, ease of searching, filtering, and reporting of the data and its variations, ease of storage, and ease of quick information retrieval and transmission can be achieved.

However, if a single facility has a very small number of audit recommendations to manage at any given time, it is possible to manage them using a manual, paper-based system. Where sophisticated computerized systems will provide a record of who made a modification to the database, as well as what action was taken, only manual reminders to be sent automatically to those who have stored responsibilities in the follow-up process, and generate summary reports for periodic management review.

Security: The management system should be capable of controlling access and viewing capability. While FTSM programs have employee participation and decision elements, access to the audit recommendations management system should be limited to employees and those contractors whose jobs require access. In addition, the ability to edit certain fields in the system should be limited to those who need to enter or manipulate the
information. For example, the ability to select or reject recommendations or edit a score change could be limited to only a few managers. Using a computer-based system enhances this type of needs-to-know, needs-to-edit access control.

- Communication: The communication system should facilitate the communication of audit results. This includes making basic audit results available to the employees and certain contracts as part of employee participation portals, as well as for ease in processing safety-related training and other similar activities.

On a regular basis, the tracking system should be updated to indicate which items are complete and the status of other items. As items are completed, the final action taken and the date closed should be documented and kept on file. Periodic (usually quarterly or monthly) updating of tracking systems is essential, but more or less frequent updates may be chosen. This follow-up process ensures that the company documents its intent for resolving the recommendations and the completion of the work, and provides assurance to management that the appropriate steps are being taken and the timing is accurate.

The rejection process for audit recommendations should be addressed in the PSM audit management system procedures. The procedures should describe the following rejection provisions:

- The criteria utilized for rejecting audit recommendations;
- The evaluation process of the recommendations themselves, including whether the root cause persistence, or if the reviewer could reach consensus on the disposition of the recommendations; and
- The documentation requirements for rejecting audit recommendations.

There may be other provisions addressing the rejection of PSM or OSHA-related recommendations that are included in the facility or company procedures. The process for rejecting PSM audit recommendations should be consistent with these provisions.

The rejection criteria for PSM audit recommendations should be reasonable, defensible, and not based solely on potential cost impact. Possible costs should be considered but only where weighted against other pertinent factors, such as the risk to be reduced, the feasibility of the recommendations, and the accuracy and completeness of the input information used to formulate the recommendations. See Chapters 10 and 21 for a discussion of the rejection criteria for INRRA and incident investigation recommendations, particularly audit criteria 10-1.29 and 21.1.6.7, which are derived from clarifications offered by OSHA in the PSM Compliance Directive (OSHA, 1994) on this subject.

11.3.2.9 Verification Audits

Some facilities and companies (usually larger entities) have chosen to extend the PSM audits to include verification or follow-up audits. When the items in the action plan have been completely another audit is performed to confirm that the
action items have been actually completed in the manner specified in the action plan or in an equivalent manner. This activity can be formal, documented, and performed by account or third parties, or it can be an informal check performed by facility personnel. In some companies, an independent group performs these verification audits to help preserve impartiality and prevent conflicts of interest. The scope of verification audits, as their name implies, is usually limited to the items in the final action plan resulting from the original PSM audit. Verification audits are generally not used as an opportunity to perform additional PSM program auditing. The objectives of the verification audits are fairly narrow and usually limited to reviews of PSM-related policies, procedures, as well as some records and field observations to ensure that the original audit action items have actually been closed properly. It is not unusual to find that the facility's interpretation of what constitutes successful closure of an action item differs from the interpretation of an outside knowledgeable party. Also, the facility may have arbitrarily and improperly rejected an audit recommendation or action item. Verification audits are not mandatory requirements and require the allocation of additional resources. However, they are an effective way to ensure that PSM audit action items are followed up and closed properly.

1.10 QUALITY ASSURANCE

Quality assurance is an important issue in a PSM audit program. Those being audited and those relying on the results should have confidence that the program is being carried out in a consistent and thorough manner.

The development of performance criteria for the audit program is one method of helping to assure quality. Criteria for an acceptable audit often evolve as the audit program develops. The types of issues addressed in the performance criteria for a PSM audit program might include the following:

- The existence and functionality of a PSM program or PSM audit management system procedures;
- Audit team composition;
- Auditor qualifications;
- The conduct of PSM audits, including interviews, records and documents, reviews, sampling, observations, and informing the audited facility on the results;
- The wording of audit reports;
- Audit reviews and;
- Audit follow-up.

Independent review of the audit process is another quality mechanism sometimes used in audit programs. This may be done during or after the PSM audits themselves, and in other accomplished in the following manner: The reports, follow-up, and other aspects of previous audits are reviewed by auditing the audit program as another element of the PSM program. A set of pertinent questions
representing the criteria will be required. In some programs, an independent quality assurance person accompanies the audit team on some function of the audit to observe the audit process, but this can be costly. In other cases, the audit reports and worksheet are reviewed by someone not involved in the audit, who can provide a second check for accuracy and completeness. The independent check must not be performed by someone external to the company, namely by someone not involved in the audits being reviewed.

Periodic critiques and evaluations of the PSM audit program can be helpful in identifying program weaknesses. Such reviews can be performed by a task force comprised of employees not involved in the audit program, by the company internal audit function, by a group of external peers (e.g., an auditor from another company), or by an outside consultant. This overall review on a periodic basis is a good way to avoid the audit program devolving into a "check the box" attitude.

There are numerous factors that can result in a poor quality audit. They include the following:

1. Lack of a clear audit management system procedure. Without such a procedure the audit program will be missing direction and consistency. Audits will be performed according to the personal discretion of the audit team leader and/or the audit facility. Documentation will likely not properly record the activity, and follow-up will likely not occur in a timely fashion, if it happens at all.

2. Poor planning. There are a number of issues that should be resolved to adequately plan for PSM audits (see Section 2.1.1). In particular, the purpose of the audit and its guidance (e.g., "ground rules" and assumptions) should be carefully thought out, discussed, and documented. If these details are not attended to properly, the audits will be difficult to perform or the results may be missed and not fulfill the desired purposes or follow the specific guidance. To prevent this from occurring, ensure that the audit planning process is described in the audit management procedures and that a written audit plan addressing all items required by the procedures is issued for each audit.

3. Improperly selected audit team. Auditors that are improperly trained, lack knowledge, or experience in process safety, or that are inexperienced auditing PSM programs will not perform this work well. In particular, the ability to accurately interpret what the governing PSM program requirements mean for the facility being audited is a key skill. Also, auditors with conflicts of interest will allow these issues to influence with producing a fair, accurate, and comprehensive assessment. To prevent these problems from occurring, the minimum skill/ experience and potential conflicts of interest issues for PSM auditors should be addressed in the audit management system procedures, as well as in the training that auditors should receive before performing this work.

4. Improperly skilled. While there will always be pressure to perform PSM audits as quickly as possible, effort to reduce the risks and to reduce the time...
that facility personnel must devote to supporting the audit. Adequate time must be allocated to performing the audit, given the scope of the PSM program and the number of processes and units included in the program. The time allocated for an audit and the personnel staffing should be commensurate with the scope and guidance of the audit, particularly the selection of which criteria/questions will be used in advance to ensure the goals of the audit can be accomplished given the time and resources allotted.

- **Key information not available.** The audit will be hampered if information that is needed to properly perform them and answer all of the protocol questions cannot be located. This may indicate a basic problem with the PSM program itself, and if the information cannot be found, then findings are likely. Proper planning can prevent this from occurring by locating in advance the information needed to support the audit.

- **Facility staff not available for interviews.** Not having the key management or non-management personnel available will, as with unavailable information, result in incomplete audits. Some audit work may have to be deferred until the necessary persons become available. Sometimes this happens due to unforeseen events despite adequate planning, and sometimes it happens because of poor planning. All facility and/or company personnel needed for interviews should be identified and advised of their required participation in advance.

- **Poor data gathering.** Poor auditing technique on the part of the auditors, whether it is poor interviewing techniques, inadequate sampling, or incorrect interpretation of the information collected versus the intent and scope of the protocol questions, will result in flawed audits. Proper experience and training of the auditors will help alleviate this problem.

- **Inadequate documentation.** Audit reports and supplements that do not adequately describe what occurred during the audit, or that describe the findings and/or recommendations in a manner that is factual enough or in a manner that cannot be understood by anyone but the auditor, will be of little use after the audit is completed. A quality review of the final audit products of the audits can help alleviate this problem. The audit team leader usually manages this aspect of audit quality, but anyone assisting the audit team members or have external staff (e.g., legal) available to assist on a large or lengthy audit.

- **Inadequate follow-up.** If the recommendations from well-performed PSM audits are not resolved, the time and resources spent on performing the audit will have been wasted. Including a properly designed tracking system in the PSM audit program, as described in Section 1.3.2, along with regular and careful review by management of the status of the recommendations, will alleviate this problem.

Chapter 2 describes how individual audits are conducted. Many of the issues discussed in that chapter provide remedies to the problems associated with PSM audit quality.
SUMMARY

The design of a PSM audit program requires a number of choices on issues such as scope, frequency, staffing, reporting, follow-up, and quality assurance. While there is no simple front way to structure a program that will be uniformly effective for all organizations, it is important to clearly define program goals and actions on a consistent approach before beginning a program of PSM audits. A final outcome: refining initial parameters that a PSM program is well-designed on that it is functioning properly, any more that inspections can guarantee product quality. PSM program quality cannot be "audited in." The PSM program must be properly conceptualized and controlled to be successful.

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