DEPARTMENT OF LABOR AND INDUSTRY

MNOSHA Instruction **CPL 2-2.45B**
December 19, 2022

# SUBJECT: 29 CFR 1910.119 and 29 CFR 1926.64, Process Safety Management of Highly Hazardous Chemicals - Compliance Guidelines and Enforcement Procedures

## Purpose:

This instruction establishes uniform policies, procedures, standard clarifications, and compliance guidance for enforcement of the standard for Process Safety Management of Highly Hazardous Chemicals, 29 CFR 1910.119 and 1926.64 ("PSM standard"), and amendments to the standard for Explosives and Blasting Agents, 29 CFR 1910.109.

## Scope:

This instruction applies OSHA-wide.

## References:

1. 29 CFR 1910.119, Process Safety Management of Highly Hazardous Chemicals, Final Rule.
2. 29 CFR 1926.64, PSM for Construction, Final Rule.
3. 29 CFR 1910.109 Explosives and Blasting Agents.
4. Federal OSHA Directive CPL 02-02-045 - CPL 2-2.45A CH-1 - Process Safety Management of Highly Hazardous Chemicals -- Compliance Guidelines and Enforcement Procedures, dated 9/13/94.

5. Federal OSHA Directive CPL 03-00-021 - PSM Covered Chemical Facilities National Emphasis Program, dated 1/17/2017
6. Federal OSHA Memorandum, Coverage of Stored Flammables Under the Process Safety Management Standard, May 12, 1997
7. Minnesota Instruction ADM 2.1, Scheduling Plan for Programmed Inspections, Most Current Revision
8. Minnesota Instruction ADM 3.18G, Serious Injuries, September 16, 2021
9. Minnesota Instruction ADM 3.19C, Fatalities, February 8, 2022
10. MNOSHA Instruction CPL 2.94E, MNOSHA's Emergency Response Contingency Plan, January 14, 2022.
11. MNOSHA Field Compliance Manual (FCM).

## Cancellation:

This instruction cancels MNOSHA Instruction CPL 2-2.45, dated August 9, 2017.

## Background:

Minnesota OSHA adopted the Process Safety Standards, 29 CFR 1910.119 and 1926.64, on August 3, 1992.

1. In the 1980s, a number of catastrophic accidents in the chemical industry have drawn attention to the safety of processes involving highly hazardous chemicals. OSHA has determined that employees have been and continue to be exposed in their workplaces to the hazards of releases of highly hazardous chemicals which may be toxic, reactive, flammable, or explosive.
2. The requirements of the PSM standard are intended to eliminate or mitigate the consequences of such releases. The standard emphasizes the application of management controls when addressing the risks associated with handling or working near hazardous chemicals.
3. In addition, the PSM standard has been developed in fulfillment of OSHA's obligation under the Clean Air Act Amendments (CAAA) of 1990, section 304(a). The final rule is consistent with the mandate of the CAAA.
4. In *Commissioner v. Interplastic Corp. (2012)*, the ALJ ruled that MNOSHA's PSM citations of covered processes containing flammable liquids in atmospheric storage containers were impermissible. The ALJ noted the confusing text in the standard and stated that MNOSHA's language on its website was insufficient notice to employers of MNOSHA's intent to enforce the

requirements in the standard. Therefore, with this directive change, MNOSHA will follow the May 12, 1997 federal OSHA Memo which was issued following the *Sec. of Labor v. Meer* decision.

5. A Federal OSHA Memorandum, dated July 18, 2016, provides guidance on how to enforce the standard for Appendix A chemicals where no minimum concentration is listed, this is a change from previous policy. Appendix A chemicals with no minimum concentration listed will now be subject to the one percent test whereby the total weight of the chemical in the process at a concentration of one percent or greater will count towards the threshold quantity listed. The employer does not need to include the weight of such chemicals in any portion of the process where the partial pressure of the chemical in the vapor space under handling or storage conditions is less than 10 millimeters of mercury.

## ACTION:

## A. Enforcement Activity Related to the PSM Standard.

29 CFR 1910.119 and 1926.64 have broad applicability to potentially hazardous processes that may exist in a wide variety of industries. Accordingly, enforcement activities related to the PSM standard – either to determine if an employer is covered by the standard or to assess the employer's compliance with it – may take place in any of the inspection types described below. Clarifications and interpretations are provided in Appendix B of this instruction. Appendix B (or a subsequent revision) and federal OSHA's Standard Interpretations shall normally be the first points of reference in interpreting 1910.119 and 1926.64. The federal directive shall be checked on the federal website for recent revisions of this Appendix B.

1. Programmed General Industry and Construction Inspections

   In all programmed safety and health inspections in general industry and construction, a determination should be made as to whether the establishment has any processes covered by the PSM standard.

   If it appears that the establishment may be covered under PSM, OSHIs shall contact an OSHI with training in PSM or the OSHIs supervisor to confirm that the establishment does fall under PSM and for guidance in conducting the PSM portion of the inspection. This may include onsite back-up depending on the site and the experience of the initial inspecting OSHI. If the site is determined to be covered under the PSM standard, the initial OSHI and any potential backup OSHI shall contact their Area OMT Directors/Supervisors to determine whether the site will be evaluated for compliance with the PSM standard, and the amount of back-up involvement required.

2. Programmed National Emphasis PSM Inspections (CHEMNEP)

   On a limited basis, MNOSHA will identify and inspect facilities based on the potential for ammonia, chlorine or other highly hazardous chemical release from those facilities. Facilities with the potential for highly hazardous chemical release to be inspected will be identified on an annual basis.

3. Unprogrammed PSM-related Inspections

   Complaints and referrals should be screened by the Complaint Desk and/or Area OMT Director for possible coverage by the PSM standards, 29 CFR 1910.119 or 1926.64.

   a. If a formal complaint or referral relating to the PSM standard is received, the PSM items should be investigated by OSHIs that have had training in PSM.

   b. If a complaint or referral is not initially identified as being PSM-related, but upon further investigation appears to be, OSHIs shall contact an OSHI with training in PSM or the OSHI's supervisor to confirm that the establishment does fall under PSM and for guidance in conducting the PSM portion of the inspection. This may include onsite back-up depending on the site and the experience of the initial inspecting OSHI. If the site is determined to be covered under the PSM standard, the initial OSHI and any potential back-up OSHI shall contact their Area OMT Directors/Supervisors to determine the amount of back-up involvement required.

4. Responses to Accidents and Catastrophes.

   Responses to accidents and catastrophes involving PSM shall follow the guidelines contained in the MNOSHA Field Compliance Manual and as appropriate ADM 3.18 and ADM 3.19. PSM-related accident investigations should have one or more OSHIs with training and experience in PSM investigations involved as early as possible.

## B. Staffing Needs

PSM inspections shall normally be performed by OSHIs that have attended OSHA Training Institute Course 3400 (formally 340), "Hazard Analysis in the Chemical Processing Industries", or a similar course of sufficient duration that covers the entirety of the PSM standard. OSHIs shall also have had experience conducting PSM inspections with more experienced investigators prior to conducting inspections on their own. The OSHA Management Team shall ensure that there is an adequate number of investigators with the training and experience on hand to conduct PSM inspections as needed.

## C. Screening for PSM Coverage.

1. This determination shall follow the criteria in 29 CFR 1910.119(a) and 1926.64(a), including appropriate reference to Appendix A (List of covered chemicals and threshold amounts) of the respective standard. A PSM Screening Tool can be found in Appendix C.

2. Some common indicators of PSM standard coverage include use or storage of the following materials in large quantities at or above the threshold quantities:

   a. Ammonia - 10,000 pounds or more;
   b. Chlorine - 1500 pounds or more;
   c. Chlorine Dioxide - 1000 pounds or more;
   d. Flammable liquids - 10,000 pounds or more, (see paragraph. C.3 below)
   e. Flammable gases – 10,000 pounds or more
   f. Sulfur Dioxide - 1000 pounds or more.
   g. Explosive and pyrotechnics manufacturing – Any quantity

3. PSM coverage of flammable liquids:

   The exception in 1910.119(a)(1)(ii)(B) applies only to flammable liquids which are not already in the process and which are stored in atmospheric tanks below their normal boiling point without benefit of chilling or refrigeration. A process will be covered if it contains more than 10,000 pounds of flammable liquids without including any amount in an atmospheric storage tank.

## D. Inspection Procedures

1. Determine process is covered: OSHIs should determine as early as possible during the inspection whether the site has any process covered by the PSM standard.

2. Emergency Procedures: If the OSHI identifies PSM covered processes, or has reason to believe covered processes may be present, the OSHI should determine what emergency response and evacuation procedures are in place before conducting the walk around. OSHIs also should be accompanied by management/employees that are familiar with the facility's emergency procedures.

3. Protective Equipment: OSHIs need to identify and obtain any specialized PPE such as flame-retardant clothing, and direct reading equipment needed for their own protection.

   a. Flame-retardant coveralls or clothing shall be worn in all areas of the plant where there is potential for flash fire, and as may be required by company policy.

      NOTE 1: Clothing made of hazardous synthetic fabrics shall not be worn underneath flame-retardant coveralls.

NOTE 2: OSHI may determine that flame-retardant clothing should be worn, even though the employer does not require it.

b. Respirators, including escape SCBA, may be needed in some areas such as bleach plants in paper mills, and certain units in refineries. Respirators that may be used by OSHIs must be provided in accordance with MNOSHA's respiratory protection program.

c. Direct reading monitors with alarms may be needed, such as $H_2S$, $Cl_2$, and combustible gas indicators. OSHIs must ensure the monitors have been calibrated and bump tested.

4. Cameras: Intrinsically safe cameras are not available to OSHIs. If photographs are needed in hazardous (classified) locations, several options are available:

a. If the employer has a properly calibrated oxygen/combustible gas indicator, the atmosphere may be checked by the employer before each photo is taken. Some employers will complete a Hot Work Permit to allow OSHI to bring a camera into the area.
b. OSHI may be able to use a mechanical disposable camera that does not have flash capability. This type of camera does not have any spark producing parts.
c. OSHI may use a properly calibrated oxygen/combustible gas indicator to determine the atmosphere is safe before each photo is taken.
d. OSHI may be able to take photographs from outside the hazardous location using a telephoto lens.

5. Overview of Process: OSHIs should request that the management representative(s) provide them with a reasonably detailed overview of the covered processes at the facility.

6. Training: If the host employer requires contractors to receive safety and health training provided by the host before beginning work, the employer may require OSHIs to receive this training as well.

7. Walk around: A walk around inspection generally should be conducted before an extensive review of the PSM program occurs. Additional walk around time may be necessary after review of program elements begins. During the walk around inspection, OSHIs should note the following:

a. Labeling of equipment, piping, valves, vessels;
b. Locations of vessels and piping, and risk of impact;
c. Locations of relief devices;
d. Condition of equipment (e.g. corroded or leaking equipment, pipe insulation in poor repair);
e. Unit or control room locations/siting.

8. Selection of Processes: If more than one covered process exists at the site, one or more processes should be selected for evaluating compliance with the standard. This selection shall be based on the factors listed below, and shall be documented in the case file:

    a. Factors observed during the walk-around;
    b. Incident reports and other history;
    c. Age of the process unit;
    d. Nature and quantity of chemicals involved;
    e. Employee representative input;
    f. Current hot work, equipment replacement, or other maintenance activities; and
    g. Number of employees present.

9. Document requests: OSHI should request access to, or copies of, the documents listed in Appendix F, section B.5. Also refer to Appendix E, Exhibit 2 for additional guidance.

    Initially, to expedite the inspection process, only access to documents should be requested. During the inspection, as potential violations of the standard are observed, copies of specific written documentation should be requested to substantiate citations.

    It is recommended that the OSHI provide the employer with a written request for the documents, with a reasonable time allowed for employer to comply with the request (see Appendix E section “Documents”.)

    OSHIs should track the receipt of documents requested. Occasionally, an administrative subpoena may be necessary in order to gain access to the documentation.

10. Evaluation of program: Refer to Appendices A and B for guidance.

    Other plans/programs required by the PSM standard (Emergency Action Plan, Emergency Response, Hot Work Permitting) also should be evaluated.

11. Employee interviews: Process employees (operators) and maintenance employees should be interviewed. Engineers and contractor employees also may be interviewed, depending on the nature of the inspection.

    Refer to Appendix A for guidance on questions to ask.

## E. Case File Documentation

The file shall include a determination that the process is covered by the PSM standard, and a description of the process. The determination and the description of the process must be included (or referenced) in the Instance Description of all 1Bs.

Citation documentation should include references to specific supporting documentation in the file, such as operating procedures, compliance audits, batch tickets and tank inventories.

# F. Citation guidance

1. No PSM Program: If it has been determined that the employer is covered by the PSM standard, but a PSM program has not been implemented, the OSHI should cite the following paragraphs as appropriate (Note: the employer may have some elements of the standard in place, but not as part of a formal PSM program):

    a. Process Safety Information: Under 1910.119/1926.64(d) there are three subparagraphs, (d)(1), (d)(2) or (d)(3), for the three different types of information the employer is required to have. Cite 1910.119/1926.64(d) for deficiencies in all three types of information. If the employer has some of the required information, cite the appropriate subparagraph(s), group as necessary.

    b. Process Hazard Analysis: Cite 1910.119/1926.64(e)(1), which requires the employer to perform an initial PHA. Under certain circumstances, this citation may be grouped with, or replaced with, 1910.119(i)(2), which requires the employer to perform a pre-startup safety review.

    c. Operating Procedures: Cite 1910.119/1926.64(f)(1) for lack of, or deficiencies in, operating procedures.

    d. Training: Cite 1910.119/1926.64(g)(1) for lack of, or deficiencies in, training.

    e. Contractor Safety: If contractors work on or near covered processes, cite 1910.119/1926.64(h)(2) if host employer did not evaluate contractor safety.

    f. Mechanical Integrity: If the employer does not have written procedures to maintain the mechanical integrity of process equipment, cite 1910.119/1926.64(j)(2). This may be grouped with appropriate subparagraphs of 1910.119/1926.64(j)(4) inspection and testing.

    g. Management of Change: Cite 1910.119/1926.64(l)(1) for lack of written and implemented management of change procedures.

    h. Other Elements: Other paragraphs of the standard may also be cited depending on the specific circumstances surrounding the investigation.

2. PSM Program with Deficiencies: If it has been determined that the employer is covered by the PSM standard, and a PSM program has been implemented, but has deficiencies, the specific subparagraphs violated should be cited.

3. Grouping: Generally, grouping within a paragraph may be appropriate, but grouping violations of different paragraphs should be avoided except where the violations are very closely related, such as 1910.119(e)(1) and 1910.119~~(j)~~ (i)(2). See FCM Chapter V “Grouping Related Violations”.

4. Violation Classification: Classification of violations of 29 CFR 1910.119 and 1926.64 will be in accordance with the FCM, Chapter VI. Because violations of the PSM standard may represent conditions which could result in death or serious physical harm to employees, such violations shall normally be classified as serious.

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Distribution: OSHA Compliance and WSC Director

Attachments: Appendix A - PSM Audit Guidelines

Appendix B - Clarifications and Interpretations of the PSM Standard

Appendix C - PSM Screening Tool

Appendix D - References for Compliance with the PSM Standard

Appendix E - Recommended Guidelines for PQV Inspection Preparation

Appendix F - PQV Inspection Procedures

(All appendices are non-mandatory)

# Appendix A - PSM Audit Guidelines

**Purpose**

This appendix contains audit guidelines intended to assist the OSHI in investigating an employer's compliance with the PSM standard. It shall be used in conjunction with Appendix B, Clarifications and Interpretations of the PSM Standard, and current federal OSHA Letters of Interpretation, as the primary source of compliance guidance on 29 CFR 1910.119.

**Structure**

The guidelines present a Program Summary, Quality Criteria References, and a Verification checklist for each of the PSM elements.

1. Guidelines for paragraphs **c, g, h, k, m,** and **n** are designed so that OSHIs who may not be specifically trained in chemical process plants or in the PSM standard can make a preliminary review of the required elements.

2. Guidelines for elements **d, e, f, i, j, l, o**, and **p** are oriented toward more detailed investigations.

**Use of the Verification Checklist.**

The verification of each program element is divided into three parts: Records Review, On-Site Conditions and Interviews.

1. The Records Review section describes the documentation of the programs as required by the PSM standard. During a preliminary inspection, the OSHI shall review the documentation for the entire PSM program to ascertain that all of the elements are developed.

2. Sections labeled On-Site Conditions and Interviews guide the OSHI in confirming that the programs are implemented. This confirmation involves observing conditions and procedures, and interviewing the operators, maintenance personnel, engineering support staff, contractors and contractor employees, as appropriate, to determine whether the implemented program matches the program outlined by the documentation.

NOTE: Several questions in the "Interviews" sections refer to interviewing engineers. The PSM standard does not require an employer to employ engineers, and these questions should not be construed as imposing a new requirement that an employer do so. All questions in this appendix that refer to interviews of engineers shall be understood to mean "engineers, if any, or other qualified persons capable of providing the information requested."

3. The OSHI shall initially perform a representative number of observations and interviews for elements c, g, h, k, m, and n. A more detailed investigation will cover all 14 elements. During these detailed assessments, the OSHI shall review components from a representative number of processes, if multiple processes exist. To confirm implementation, the OSHI shall compare the conditions and the interview results with both the minimum requirements of the PSM standard and the program outlined by the employer's documents.

**Audit Guideline Documentation.**

As noted at P.2. of the body of this instruction, the Audit Guidelines are constructed as a series of questions relating to each of the pertinent provisions of the standard.

1. The questions are designed to elicit a determination of "Yes" or "No" by the OSHI as to whether compliance with the provision has been met. This shall be indicated in the column labeled Met Y/N. A "Y" or "Yes" in this column indicates the subsection meets requirements. An "N" or "No" indicates the employer does not meet the standard and an "NA" signifies that the subsection does not apply.

2. A determination of "No" for any provision indicates noncompliance; thus, **any "No" shall normally result in a citation for a violation of that provision.**

3. The OSHI shall thoroughly document each such determination in the case file.

The Field Note Reference(s) space is used to cross-reference the PSM subsection with the OSHI's field notes. Field notes need not be rewritten when using these guidelines. The OSHI may record field note page numbers, videotape frame identification, photograph identification, and other documentation that refers to the requirements of the standard's elements.

**Basic Audit Information.**

In order to gather the information needed to audit the program, the OSHI shall answer the following questions for each element:

Who? What? When? Where? Why? and How?

1. Who are the officials responsible for developing and implementing each of the program elements?

2. What are the requirements and the contents of each program element?

3. When are the required actions for each element completed and when are they required to be completed?

4. Where have actions been implemented or changed?

5. Why have the implementation decisions and priorities been made as recorded in the PSM documentation?

6. How is the program implemented and how is the program's effectiveness evaluated and improved (monitoring performance, follow-up and closure of outstanding items, etc.)?

**Interrelationship of Elements.**

An essential part of verifying program implementation is to audit the flow of information and activities among the elements. When information in one element is changed or when action takes place in one element that affects other elements, the OSHI shall review a sample of the related elements to see if the appropriate changes and follow-up actions have taken place.

The following example demonstrates the interrelationship among the elements:
During a routine inspection of equipment **(Mechanical Integrity)**, the maintenance worker discovers a valve that no longer meets the applicable code and must be changed. Because the type of valve is no longer made, a different type of valve must be selected and installed **(Management of Change)**. The type of valve selected may mandate different steps for the operators **(Operating Procedures)** who will require training and verification in the new procedures **(Training)**. The rationale for selecting the type of valve must be made available for review by employees and their representatives **(Employee Participation)**.

When the new valve is installed by the supplier **(Contractors)**, it will involve shutting down part of the process **(Pre-startup Safety Review)** as well as brazing some of the lines **(Hot Work Permit)**. The employer must review the response plan **(Emergency Planning)** to ensure that procedures are adequate for the installation hazards.

Although **Management of Change** provisions cover interim changes, after the new valve is in place the **Process Safety Information** will have to be updated before the **Process Hazard Analysis** is updated or revalidated, to account for potential hazards associated with the new equipment. Also, inspection and maintenance procedures and training will need to be updated **(Mechanical Integrity)**.

In summary, 11 PSM elements can be affected by changing one valve. An OSHI would check a representative number of these 11 elements to confirm that the required follow-up activities have been implemented for the new valve.

Three key elements shall be routinely reviewed to verify that changes have been implemented. They are:

* Operating Procedures;

* Process Hazard Analysis; and

* Training.

These elements shall be crosschecked to see if they show that the changes have been followed through to completion.

**1910.119(c) - EMPLOYEE PARTICIPATION**

The intent of this paragraph is to require employers to involve employees at an elemental level of the PSM program. Minimum requirements for an Employee Participation Program for PMS must include a written plan of action for implementing employee consultation on the development of process hazard analyses and other elements of process hazard management contained within 1910.119. The employer must also provide ready access to all the information required to be developed under the standard.

***Records Review***

**1. Does a written program exist regarding employee participation?**

[.119(c)(1)]

☐ Yes ☐ No

Tip: The written program should be considered the "Plan of Action" on how the employer is going to implement the employee participation requirements of the standard. The facility is required to outline how employees are involved in the development of the PSM written program, the process hazards analysis, and in ongoing development of PSM-required components. In addition, it is important for facilities to include information regarding how employees would be trained in the PSM standard.

**2. Does the written program include consultation with employees and their representatives on the conduct and development of process hazard analyses and on the development of other elements in the PSM standard?**
[.119(c)(2)]

☐ Yes ☐ No

Tip: Because many companies do not include line employees or operators in the development of the PHA's or the review of the PSM requirements, OSHA wanted to ensure that there was a mechanism for line employees and their representatives to be consulted on the development and conduct of the PHA's and also a mechanism to consult with employees on the development of chemical accident prevention plans. The program should outline how that is done.

**3. Does the written program provide employees (including contractor employees) and their representatives access to process hazard analyses and all other information developed as required by the PSM standard?**
[.119(c)(3)]

☐ Yes ☐ No

Tip: The PSM standard requires that employees have open access to all materials developed under the PSM standard. The program should outline how this is done. Because the program itself is the "Plan of Action" for how employee involvement will be maintained, a copy of this program should be readily available to employees.

***Interviews***

**Conduct interviews with a representative number of employees and their representatives.**

**4. Based on interviews, have employees and their representatives been consulted on the conduct and development of the process hazard analyses?**
[.119(c)(2)]

☐ Yes ☐ No

Tip: Employees involved in the PHA should have been responsible for responses concerning possible consequences from deviations arising from hazards and the existing safeguards to prevent against those hazards. Employees should have been consulted in the development of potential recommendations and should have been involved in the implementation of PHA recommendations. It is critical to ascertain

whether line employees/operators have been consulted during the PHA. OSHA considers the lack of employee involvement as being synonymous to not having a PSM program.

**5. Based on interviews, have employees been consulted on the development of other elements of the Process Safety Management Program?**
[.119(c)(2)]

☐ Yes ☐ No

Tip: Employees interviewed should have been involved in some facets of the PSM program. Typically, employees should be consulted in the development of the following:

- Standard Operating Procedures;
- Mechanical Integrity Programs;
- Training (especially concerning the content of refresher training);
- Emergency Response Plans

Discussions regarding PSM program implementation and employee participation should not be limited to operators and those with direct interaction with the program. Consider others such as Maintenance employees, Technical or others having access to those areas.

**6. Based on interviews, have employees and their representatives and contractor employees been informed of their rights of access and provided access to process hazard analysis and to all other information required to be developed by the PSM standard? (Ask about unreasonable delays in access to information and whether time is given during the working hours to access information required by the PSM standard.)**
[.119(c)(3)]

☐ Yes ☐ No

Tip: As discussed earlier, the PSM materials are to be made available to all employees in a timely manner. The auditor should review access and interview selected employees to ensure that they have been provided prompt and free access to the PSM documents.

**1910.119(d) - PROCESS SAFETY INFORMATION**

The intent of this paragraph is to provide complete and accurate information concerning the process which is essential for an effective process safety management program and conducting process hazard analysis. Therefore, in accordance with the schedule set forth in paragraph (e)(1) the employer is required to compile written process safety information on process chemicals, process technology, and process equipment before conducting any process hazard analysis.

Chemical safety information gathered to support Hazcom/RTK (i.e., SDSs) may be used to the meet the requirements for chemical safety information.

The paragraph also includes requirements for the development of specific information regarding the system

components or the technology of the process. OSHA leaves the level of information to be acquired to the judgment of those completing the process hazard analysis. There are specific requirements for design bases, but specifics of code compliance and requirements for documentation are not in the standard.

For process equipment that has been in service for many years the design codes and standards employed in the construction of the process may not resemble those in use today.

For this type of situation, ensure that the older equipment still functions safely, and is still appropriate for its intended use. Under this approach the employer would be permitted to use any of several methods such as: documenting successful prior operation procedures; documenting that the equipment is consistent with the latest editions of codes and standards; or performing an engineering analysis to determine that the equipment is appropriate for its intended use.

***Records Review***

**1. Has written process safety information been compiled before conducting any process hazard analysis (PHA)?**
[.119(d)]

☐ Yes ☐ No

Tip: The goal of the PHA is to identify potential hazards that exist in a system and review the safeguards in place to prevent the hazardous consequences from occurring. In addition to reviewing records, it will be necessary to talk to a representative number of PHA team members to verify the process safety information was completed before the process hazard analysis was conducted. Compliance with this question is determined by interviews and dates on documents on process safety information and dates of process hazards analysis.

Process safety information may be found in many different locations, such as SOPs, P&IDs and original equipment manuals. The information can either be maintained in a separate, PSM dedicated files or notebooks or a reference listing of where the process safety information is located and maintain the reference listing in various locations at the site (i.e., P&IDs kept in Engineering Department).

**2. Does information pertaining to the hazards of the highly hazardous chemicals used or produced by the process include:** [.119(d)(1)]

- **toxicity information** ☐ Yes ☐ No
- **PEL's (Permissible Exposure Limits)** ☐ Yes ☐ No
- **physical data** ☐ Yes ☐ No
- **reactivity data** ☐ Yes ☐ No
- **corrosivity data** ☐ Yes ☐ No
- **thermal and chemical stability data** ☐ Yes ☐ No
- **hazardous effects of inadvertent mixing different materials that could foreseeably occur?** ☐ Yes ☐ No

Note: SDSs meeting the requirements of 1910.1200(g) may be used to the extent they contain the information required.

Tip: The PSM standard requires that the documented process safety information contain basic information on the physical and chemical properties of the hazardous chemical of concern. The chemical specific information is almost invariably contained on the SDS for the chemical.

**3. Does information concerning the technology of the process include:**
[.119(d)(2)]

- **a block flow diagram or simplified process flow diagram?** ☐ Yes ☐ No
- **process chemistry?** ☐ Yes ☐ No
- **maximum intended inventory?** ☐ Yes ☐ No
- **safe upper and lower limits?** ☐ Yes ☐ No
- **an evaluation of the consequences of deviations?** ☐ Yes ☐ No

Note: Where the original technical information no longer exists, it may be developed in conjunction with the PHA.

Tip: The process information should include information relative to the technology of the process to ensure employees are aware of the basics of how the system works and the confines of safe operation of the system.

To adequately understand a process and its potential hazards, the employee must be able to see how the materials flow through it. A **block flow diagram** is an excellent means of depicting the major unit operations in the process and identifying how the material flows through the process. In visualizing the process flow, the employees are able to identify the places throughout the process where conditions such as temperature or pressure may change and identify necessary process safety enhancements. (There is an example of a block flow diagram in Appendix A of the standard).

The **process chemistry** must be documented. For facilities subject to the PSM requirements that only store a hazardous chemical or transport the chemical through a process without chemical reactions, the documentation for process chemistry may be a brief statement of the physical characteristics of the process.

**The maximum intended inventory** should be documented. This number should not exceed the capacity of the system.

**Safe upper and lower limit** information for process parameters such as pressure, temperature, flow and level should be documented to ensure the operators are aware of the safe boundaries within which to operate the system. This information is often documented in the operation procedures as well as in the original equipment manufacturer's manuals.

Once the operators know the safe operating limits for the system, an evaluation should be done to identify and document the **consequences of deviation** from these limits. This documentation is often contained in the operating procedures. This is also the desired outcome of the PHA.

**4. Does information pertaining to equipment in the process include:**
[.119(d)(3)(i)]

- **materials of construction?** ☐ Yes ☐ No
- **piping and instrument diagrams (P & ID's)?** ☐ Yes ☐ No
- **electrical classification?** ☐ Yes ☐ No
- **relief system design and design basis?** ☐ Yes ☐ No
- **ventilation system design?** ☐ Yes ☐ No
- **design codes and standards employed?** ☐ Yes ☐ No
- **material and energy balances for processes built after May 26, 1992?** ☐ Yes ☐ No
- **safety systems (e.g., interlocks, detection or suppressions systems)?** ☐ Yes ☐ No

Tip: The process safety information should contain detailed information on the equipment in the system so that employees operating and maintaining the system know what components are involved. For example, an employee would need to know the pressure rating for a relief valve when a replacement valve is being ordered to ensure that the safety of the system is not compromised by installing a relief valve with a higher relief setting that the system is capable of handling.

**Materials of construction** data should include the type of material used for the various physical components of the system as well as alternative materials that are suitable for the purpose. Based on the complexity of the process, the process safety information should specify where in the system certain materials are appropriate, based on temperature and/or pressure limitations. In many applications, process piping design specifications contain this information. The employer should ensure this information is documented in equipment files or other appropriate locations.

**Piping and instrument diagrams (P&ID)** are necessary to gain a more in-depth understanding of the operation of the system. P&IDs of the process should show the piping systems (including line sizes) for process lines as well as utilities servicing the process, piping components, instrumentation including indicators, transmitters, and other controls. The components should be tagged for ease of identification. The P&IDs should have a legend to identify the various components of the system; the legend is often tied to the bill of materials that gives the specifications of the individual components. It is imperative that P&IDs are updated whenever changes are made to the process.

**Electrical Classification** information can be documented in a number of ways, including a statement describing the means of determining the code or method used to classify the hazardous area, and drawings of plot plans and equipment plans that depict the hazard classification for appropriate areas.

**Relief system design** and basis should be clearly documented and include, at a minimum, the design basis for the chosen process/system and the specifications of the relief device selected, including size, relief flow capacity, and relief discharge pressure.

**Ventilation system design** and design basis should also be documented. The ventilation system design information includes identification of the ventilation requirements for the system based on applicable uniform building and/or fire codes (UBC/UFC). The documentation should also include any calculations showing that the ventilation systems in place achieve the required airflow requirements.

Documentation of the **design codes and standards** to which the system was designed, constructed, and installed is important because the codes and standards are subject to change. The design code information is often included in bid specs provided by design and construction firms and may be given as UBC or UFC requirements. The information may also be designated as built in accordance with industry standards for different systems.

**Material and energy balance information** is to be documented for those systems built after May 26, 1992. These calculations should show that the mass and energy being put into the system is taken out and is not building up somewhere in the process where problems could result.

**Safety system information** should be documented. This documentation should include the locations and purpose of safety devices. For example, if a process has safety interlocks, the documentation should state where the interlocks are located, what the purpose of the interlocks is, and how the interlocks are activated.

**5. Is there documentation that equipment complies with recognized, generally accepted good engineering practices?**
[.119(d)(3)(ii)]

☐ Yes ☐ No

Tip: Review a representative number of safety devices such as pressure relief devices for proper sizing according to the maximum anticipated pressure.

Also review the documentation for evidence that compliance with the appropriate consensus standards has been researched. Relying upon just the manufacturer's original design specifications is not sufficient. The actual codes or consensus standards that were used to develop those design specifications must also be identified.

Talk to a representative number of engineers to verify the site has documented that the process equipment complies with recognized and generally accepted good engineering practice?

Ask about the technical bases for design and selection of equipment, the materials of construction, electrical classifications, relief devices sizing versus maximum anticipated pressures, installation procedures to assure equipment meets design specifications, etc.

**6. Has it been determined and documented that equipment designed and constructed in accordance**

**with codes, standards, or practices no longer in general use are designed, maintained, inspected, tested, and operating in a safe manner?**
[.119(d)(3)(iii)]

☐ Yes ☐ No

Tip: Documentation may be through methods such as: documenting successful prior operation procedures; documenting that the equipment is consistent with the appropriate editions of codes and standards; or performing an engineering analysis to determine that the equipment is appropriate for its intended use.

Observe a representative sample of equipment designed and constructed according to codes, standards or practices no longer in general use to verify that this equipment is inspected and is operated in a safe manner (as documented by the employer).

The question is for those older systems built to outdated design codes and standards. To ensure compliance, the site should obtain information on the codes or standards to which the system was designed. The site should also consider documenting that the system is operating and maintained safely. The site may look for records showing the history of operations or integrity related problems with the system.

***Onsite Conditions***

**7. Do observations of a representative sample of process chemicals and equipment indicate that the process information is complete?**
[.119(d)]

☐ Yes ☐ No

**8. Do observations of a representative sample of process components indicate that the process complies with recognized and generally accepted good engineering practice?**
[.119(d)(3)(ii)]

☐ Yes ☐ No

Tip: Information that does not correspond to the actual conditions demonstrates incomplete information. Check critical equipment and components to see if they have been properly identified.

Review a representative number of safety devices such as pressure relief devices for proper sizing according to the maximum anticipated pressure. The proper sizing of the relief valve should be reviewed with the engineer, then viewed in the facility.

The site should ensure that SDS information for the covered chemical is readily available to affected employees. P&IDs, equipment manuals, and operating and maintenance procedures for system components containing the majority of the required process safety information should be readily available.

**9. Do observations of a representative sample of the existing equipment designed and constructed according to codes, standards, or practices no longer in general use indicate that this equipment is**

**inspected and is operated in a safe manner (as documented by the employer)?**
[.119(d)(3)(iii)]

☐ Yes ☐ No

***Interviews***

**10a. Based on interviews with a representative number of PHA team members, was the process safety information complete before the process hazard analysis was conducted?**
[.119(d)]

☐ Yes ☐ No

Tip: Ask team members what process safety information was reviewed for the hazardous materials.

**10b. Based on interviews with a representative number of operators, is information readily available to operators who work with hazardous materials?**
[.119(d)]

☐ Yes ☐ No

Tip: Ask operators where they go to find SDS information and whether or not they have easy access to the information.

**10c. Based on interviews with a representative number of engineers, has the site documented that the process equipment complies with recognized and generally accepted good engineering practices.**
[.119(d)]

☐ Yes ☐ No

Tip: Ask about the technical basis for design and selection of equipment, the materials of construction, electrical classifications, relief devices sizing versus maximum anticipated pressures, installations procedures to ensure equipment meets specific specifications, etc.

The site may talk to engineers responsible for the covered process about the design basis chosen for the different aspects of the process, such as how the relief devices were sized, how they determined the proper ventilation rates, and how the materials of construction were chosen for various system components, as well as the possible use of alternate materials.

**1910.119(e) - PROCESS HAZARD ANALYSIS**

The intent of this paragraph is to require the employer to develop a through, orderly, systematic approach for identifying, evaluating and controlling processes involving highly hazardous chemicals. Minimum requirements include:

- Setting a priority order and conducting analyses according to the required schedule;
- Using an appropriate methodology to determine and evaluate the process hazards;
- Addressing process hazards, previous incidents with catastrophic potential, engineering and administrative

controls applicable to the hazards, consequences of failure of controls, facility siting, human factors, and a qualitative evaluation of possible safety and health effects of failure of controls on employees;
- Performing PHA by a team with expertise in engineering and process operations, the process being evaluated and the PHA methodology used;
- Establishing a system to promptly address findings and recommendations, assure recommendations are resolved and documented, document action taken, develop a written schedule for completing actions, and communicate actions to operating, maintenance and other employees who work in the process or might be affected by actions;
- Updating and revalidating PHA's at least every 5 years; and
- Retaining PHA's and updates for the life of the process.

Be specifically concerned with the makeup of the PHA Team. This should be a special concern to the auditor:

In order to conduct an effective, comprehensive process hazard analysis, it is imperative that the analysis be performed by competent persons, knowledgeable in engineering and process operations, and those persons be familiar with the process being evaluated. Some employers may have a staff with expertise to perform a process hazard analysis. This staff will already be familiar with the process being evaluated. However, some companies, particularly smaller ones, may not have the staff expertise to perform such an analysis. The employer, therefore, may need to hire an engineering or consulting company to perform the analysis. The team performing the process hazard analysis must include at least one employee from the facility who is intimately familiar with the process.

A team approach is the best approach for performing a process hazard analysis. This is because no one person will possess all of the knowledge and experience necessary to perform an effective process hazard analysis. Additionally, when more than one person is performing the analysis, different disciplines, opinions, and perspectives will be represented and additional knowledge and expertise will be contributed to the analysis. In fact, some companies even include an individual on the team who does not have any prior experience with the particular process being analyzed to help ensure that a fresh view of the process is integrated into the analysis. Additionally, as discussed in the rulemaking, employees and other experts may be brought onto the team on a temporary basis to contribute their specialized knowledge to the conduct of the process hazard analysis.

Assure that the results of a PHA were fully utilized to improve process safety. The requirement for follow-up to recommendations is not meant to be restrictive of the thought process in developing recommendations.

> …the employer must assure that the recommendations resulting from the process hazard analysis are "resolved" in a timely manner and that the resolution is documented. In this way, when a team recommendation is incorrect, the employer can analyze it and then document in writing why the recommendation is not being adopted or is being adopted with modification.

***Records Review***

**1. Has the employer determined and documented a priority order for conducting initial PHA's based on a rationale that includes at least these factors: (note: all PHA's on existing process should have been completed.**
[.119(e)(1)]

- **the extent of process hazards** ☐ Yes ☐ No
- **number of potentially affected employees** ☐ Yes ☐ No
- **age of process** ☐ Yes ☐ No
- **operating history?** ☐ Yes ☐ No
- **an evaluation of the consequences of deviations?** ☐ Yes ☐ No

Tip: If there are multiple processes subject to the PSM standard, there should be written justification for why the PHA for one system was done before the PHA(s) for the other system(s). Risk ranking techniques may be used to justify one process as being of a greater priority for completing the PHA than the other.

**2. Are the initial PHA's for processes covered by the PSM standard being performed as soon as possible?** [.119(e)(1)]

☐ Yes ☐ No

Tip: There should be documentation that the PHAs were conducted in a timely manner as required by the PSM standard.

**3. Have all of the initial PHA's been performed (i.e. by 5/26/97)?** [.119(e)(1)]

Note: All initial PHA's should have been complete. PHA's completed after May 26, 1987 which meet the requirements of this paragraph are acceptable as initial PHA's; they must be updated and revalidated at least every 5 years.

Tip: The PHAs for each system should be dated.

**4. Does the hazard evaluation use one or more of the following PHA methodologies:** [.119(e)(2)]

- **What-if?** ☐ Yes ☐ No
- **Checklist?** ☐ Yes ☐ No
- **What-if/Checklist?** ☐ Yes ☐ No
- **Hazard & Operability Study (HAZOP)?** ☐ Yes ☐ No
- **Failure Mode and Effects Analysis (FMEA)?** ☐ Yes ☐ No
- **Fault Tree Analysis?** ☐ Yes ☐ No
- **Other appropriate methodologies?** ☐ Yes ☐ No

Note: See Appendix C. Section 4 of the standard for more information.

Tip: The logic behind the chosen PHA methodology should be documented. If the methodology does not fall into one of the defined types, a decription of the appropriate methodology used should be given. Auditors should carefully examine the complexity of the methodology and the comfort level of the

affected employees with method employed (See employee interviews below).

**5. Does PHA address the following:**
[.119(e)(2)]

- **The hazards of process?** ☐ Yes ☐ No

Tip: The PHA should take into consideration the potential hazards that exist concerning the covered process:
- Fire
- Explosion
- Hazardous materials exposure
- Rapid release of pressure.

In particular, the PHA should consider the potential effects of varying releases of hazardous materials on employees affected by the process. Consideration should be given to the adequacy of the safeguards in place to deal with the effects of hazardous chemicals.

- **Previous incidents with likely potential for catastrophic consequences?** ☐ Yes ☐ No

Tip: It is important to review the past history of the covered processes and include them in the PHA. If no incidents have occurred, participants should be queried regarding maintenance issues that are recurrent, difficulties in repairing key equipment or obtaining spare parts and other "weak links" in the process chain.

- **Consequences of failure of engineering and administrative controls?** ☐ Yes ☐ No

Tip: The consequences of failure are at the heart of most of the methods of process hazard analysis. However, some members may focus almost entirely on the failure of engineered components at the expense of administrative controls (including, and most importantly, standard operating procedures). A comprehensive audit of the PHA will review the scope and depth of this analysis.

Examples of failures include: potential injury, maximum release of hazardous materials, property damage, etc.

- **Engineering and administrative controls applicable to the hazards and their interrelationships?** ☐ Yes ☐ No

Note: Such controls may include appropriate application of detection methodologies to provide early warning of releases; inventory reduction; substitution of less hazardous materials; protective systems such as deluges, monitors, foams; increased separation distances; modification of the process temperature or pressure; redundancy in instrumentation; etc.

Tip: Above and beyond the failure of engineering and administrative controls is the suitability and sufficiency of such controls. The PHA should consider the existence of controls, procedures and especially, warning systems, fail-safes, and monitors.

- **Facility siting?** ☐ Yes ☐ No

Note: Review calculations, charts, and documents that verify facility siting has been considered. For example, safe distances for locating control rooms may be based on studies of the individual characteristics of equipment involved such as: types of construction of the room, types and quantities of materials, types of reactions and processes, operating pressures and temperatures, presence of ignition sources, fire protection facilities, capabilities to respond to explosions, drainage facilities, location of fresh air intakes, etc.

Tip: The guideline above provides a good short-list of consideration for facility siting. First, many PHAs do not automatically include facility siting issues. Such considerations (as sell as human factors, below) are not integrated into the traditional HAZOP, FEMA, or fault-tree analysis. Additional consideration may be obtained through a careful review of appropriate building codes. For those wishing to meet "best practices", facilities should be audited against NFPA codes or the UBC.

- **Human factors?** ☐ Yes ☐ No

Note: Such factors may include a review of operator/process and operator/equipment interface, the number of tasks operators must perform and the frequency, the evaluation of extended or unusual work schedules, the clarity and simplicity of control displays, automatic instrumentation versus manual procedures, operator feedback, clarity of signs and codes, etc.

Tip: For most, human factors generally refers to the ergonomic layout of a process control or design of an operation. While ergonomics is an important element of human factors, OSHA wants the PHA facilitator to consider a broader range of factors, most of which lie within the range of human behavior. Any interaction between the process operator and the covered process involving human thought or action (conscious or not) should be considered by the team.

- **A qualitative evaluation of a range of possible safety and health effects of failure of controls on employees in the workplace?**

☐ Yes ☐ No

Tip: This requirement indicates that sites are responsible for determining the level of hazardous chemicals that may be released during a failure event at the facility. Far from a catastrophic event (such as that reviewed by RMP), this review covers even small releases of hazardous materials with potential effects on employees.

This is probably the most difficult requirement to cover during the traditional PHA. In this instance a secondary analysis of potential exposures may be warranted. A range of traditional exposure assessments may have already been completed. Many other toxicological and IH research studies may

exist that can serve as a model.

In general, the final three requirements (siting, human factors and qualitative evaluation) are not generally addressed by the vast majority of PHAs. Especially at fault are what-if/checklist PHAs developed for multiple similar facilities. Such documents are not often properly applied (too generic) and do not include the statutory components.

**6. Are the process hazard analyses performed by teams with expertise in engineering and process operations, including at least one employee with experience and knowledge specific to the process being evaluated and one member knowledgeable in the specific PHA methodology used?**[.119(d)(3)(ii)]

☐ Yes ☐ No

Tip: The PHA team members should be documented for each team session. Team members should include personnel from the facility who are familiar with the process being analyzed and include representatives from Engineering, Maintenance, Operations, etc.

**7. Has a system been established to promptly address the team's findings and recommendations?** [.119(e)(5)]

☐ Yes ☐ No

**Review a representative sample of the documentation. Has the system been able to:**

- **Assure that the recommendations are resolved and documented in a timely manner?** ☐Yes ☐No
- **Document actions to be taken?** ☐Yes ☐No
- **Complete actions as soon as possible?** ☐Yes ☐No
- **Develop a written schedule of when actions are to be completed?** ☐Yes ☐No
- **Communicate the actions to operating, maintenance and other employees whose work assignments are in the process and who may be affected by the recommendations or actions?** ☐Yes ☐No

Tip: The site is required to develop a system to document that recommendations from the hazard analysis is addressed promptly. The recommendations should be documented as they are identified during the hazard analysis. The recommendations may be assigned to designated individuals at the time the PHA is conducted, or this may be done in the follow-up meeting. At this time, due dates should also be documented as a target by which to complete the recommendations. It should be noted that the site is not required to implement all recommendations. For those items that the employer can justify not implementing, the justification for not implementing the recommendation must be documented.

**8. Are the PHA's updated and revalidated at least every five years by a qualified team meeting the requirements in paragraph (e)(4), to assure that the process hazard analysis is consistent with the**

**current process?**
[.119(e)(6)]

☐ Yes ☐ No

Tip: The site should have documented revalidation of each PHA with five years of the previous PHA for a process. The revalidation should address any modifications made to the physical installation as well as any changes to the operation of the system.

**9. Are all initial PHA's updates or revalidations, and documented resolutions kept for the life of the process?**[.119(e)(7)]

☐ Yes ☐ No

Tip: The auditor should ensure that the completed documentation from the initial PHA, as well as any revalidations, is maintained.

***Onsite Conditions***

**10. Do observations of a representative sample of process-related equipment indicate that obvious hazards have been identified, evaluated, and controlled?**
[.119(e)(1)]

☐ Yes ☐ No

Tip: For example, hydrocarbon or toxic gas monitors and alarms are present; electrical classifications are consistent with flammability hazards; destruct systems such as flares are in place and operating; control room siting is adequate or provisions have been made for blast resistant construction, pressurization, alarms, etc.; pressure relief valves and rupture disks are properly designed and discharge to a safe area; pipework is protected from impact; etc.) Use only examples appropriate to the facility.

The auditor should evaluate the recommendations made during the PHA and ensure that these were addressed and that the corrective actions taken were properly documented.

**11. Do observations of a representative sample of process-related equipment indicate that PHA recommendations have been promptly resolved?**
[.119(e)(5)]

☐ Yes ☐ No

Tip: The auditor should review the PHA recommendations made and verify they have been implemented. This may be accomplished in several different ways, depending on the nature of the recommendations: the auditor may walk through the process and verify physical changes or review training programs and records, operating procedures, and process safety information to verify revisions dates correspond to recommendations closure dates.

***Interviews***

**12. Based on interviews with a representative number of the PHA team members, are the PHA methodologies used appropriate for the complexity of the process?**

[.119(e)(1)]

☐ Yes ☐ No

Tip: The site should consult with the employees who participated in the PHA to get their thoughts on the methodology used. Was it thorough? Did it flow well? Did it adequately cover the apparent issues and uncover potential problems may not have been apparent?

**13. Based on interviews with a representative number of the PHA team members, is the priority order for conducting PHA's based on the extent of the process, the number of potentially affected employees, the age of the process, and the operating history of the process?**
[.119(e)(1)]

☐ Yes ☐ No

Note: Initial PHA's should be complete.

Tip: If there are multiple processes, the auditor should ask the team members how it was determined which processes were analyzed first, and whether or not they were involved in that decision-making process.

**14. Based on interviews with a representative number of the PHA team members, have the following been addressed:**
[.119(e)(3)]

- **The hazards of the process?** ☐ Yes ☐ No
- **Previous incidents with likely potential for catastrophic consequences?** ☐ Yes ☐ No
- **Engineering and administrative controls applicable to the hazards?** ☐ Yes ☐ No
- **Consequences for control failures?** ☐ Yes ☐ No
- **Facility siting?** ☐ Yes ☐ No
- **Human factors?** ☐ Yes ☐ No
  (Ask about shift rotations, extended schedules, and other possible sources of error.)
- **A qualitative evaluation of a range of possible safety and health effects of failure of controls on employees in the workplace?** ☐ Yes ☐ No

Tip: The auditor may wish to ask the team members to give an example of each of the items listed above to see how the issues were addressed.

**15. Based on interviews with a representative number of PHA team members, do the members have the appropriate expertise in engineering, process operations, and the process methodology used?**
[.119(e)(4)]

☐ Yes ☐ No

**Does one member of the team have experience and knowledge in the specific process?**

☐ Yes ☐ No

Tip: Ask each team member to name the other team members and their job responsibilities? Who facilitated the PHA, and was this person experienced in simulating through discussion of the topics? Did contractor employees who were responsible for process operation and/or maintenance participate in the PHA? Who determined the make-up of the team and was it adequate?

**16. Based on interviews with a representative number of the PHA team members, does the system established by the employer address the team's findings and recommendations promptly?**
[.119(e)(5)]

☐ Yes ☐ No

Tip: The auditor should ask the team members to describe the process used to address the recommendations, how the action items are assigned and the means used to close the action items when completely addressed.

**17. Based on interviews with a representative number operator and maintenance employees, have the PHA's addressed the recognized hazards of the process and previous incidents which had a likely potential for catastrophic consequences?**
[.119(e)(3)]

☐ Yes ☐ No

Tip: Ask the employees if there have been prior incidents affecting the process, and if so, how ere these addressed in the PHA process. Were corrective actions that were implemented as a result of the incident investigation reviewed and expanded upon?

**18. Based on interviews with operator, maintenance, and other employees who may be affected by PHA recommendations, have actions taken to resolve PHA findings been communicated to these employees?**
[.119(e)(5)]

☐ Yes ☐ No

Tip: Ask employees to describe the means by which affected employees are informed of the corrective actions taken to resolve the PHA recommendations.

**1910.119(f) - OPERATING PROCEDURES**

The intent of this paragraph is to provide clear instruction for conducting activities involved in covered processes that are consistent with the process safety information. The operating procedures must address steps for each operating phase, operating limits, safety and health considerations, and safety systems and their functions.

***Records Review***

**1. Do written operating procedures exist for each covered process?**
[.119(f)(1)]

☐ Yes ☐ No

**Do the procedures provide clear instructions for conducting activities safely?**
[.119(f)(1)]

☐ Yes ☐ No

Tip: It is imperative that procedures for the safe operation and maintenance of the covered process be written. Employees change job responsibilities and leave departments and new employees give the responsibility for operating or maintaining the processes must be able to complete their tasks safely and efficiently.

The site should ensure that written operating procedures for the covered process exist and are written clearly and concisely, in a manner easily understood and implemented by operations and maintenance manuals or may be developed by personnel with the necessary process knowledge to ensure the procedures are accurate and enable the average person to operate the system safely.

**2. Do the operating instructions address, as a minimum, steps for each operating phase, including:**
[.119(f)(1)(i)]

- **Initial start-up?** ☐ Yes ☐ No
- **Normal operations?** ☐ Yes ☐ No
- **Temporary operations?** ☐ Yes ☐ No
- **Emergency shutdowns?** ☐ Yes ☐ No
  - Conditions requiring emergency shutdown? ☐ Yes ☐ No
  - Assignment of shutdown responsibility to qualified operators? ☐ Yes ☐ No
- **Emergency operations?** ☐ Yes ☐ No
- **Normal shutdown?** ☐ Yes ☐ No
- **Start-ups following a turnaround or emergency shutdown?** ☐ Yes ☐ No

Tip: The site should ensure that the written operating procedures include steps for each of the operating phases listed above. Procedures may be organized such that there is a separate procedure for each operating phase. This is often the case for simple processes. For more complex processes, a single procedure for operation of the system may be developed with contains subsections covering the necessary steps for safely conducting each operating phase.

Written procedures for initial startup and normal shutdown are often easily identifiable with specific sequences of parameters to check and controls to activate. For continuous processes, the procedures for normal operations may simply consist of a list of parameters to check on a periodic basis. For batch

processes, the normal operations may be more in-depth. Procedures for emergency shutdown of the process must include both the steps taken to shut down the system safely in the event of an emergency and the process conditions under which the system should be shut down, such as upon a high pressure alarm. The procedure for startup after an emergency shutdown may be the same as the normal startup procedure for simple systems. If this is the case, this should be clearly documented in the written procedure.

Procedures for temporary operation must be documented. If no temporary situations have occurred, the facility may not have such procedures. However, whenever changes are made to the system or tests are being conducted such that the normal operating procedures are deviated from, these procedures should be documented. This forces the operator to think through the steps of safely conducting the non-routine activities.

**3. Do the operating procedures include operating limits that outline consequences of process deviation and steps required to correct or avoid deviations?**
[.119(f)(1)(ii)]

☐ Yes ☐ No

Tip: The operating procedures should contain the safe operating limit information as specified in the process safety information section of the document. Normal process parameter set points as well as alarm set points should also be documented. This information is often presented in tabular format along with troubleshooting guides identifying corrective actions to be taken when the process drifts outside the desired operating procedures.

**4. Have safety and health considerations been included in the operating procedures? Do they include at a minimum:**
[.119(f)(1)(iii)]

- **Properties of, and hazards presented by chemical used in the process?** ☐ Yes ☐ No
- **Precautions necessary to prevent exposure, including engineering controls, administrative controls, and personal protective equipment?** ☐ Yes ☐ No
- **Control measures to be taken if physical contact or airborne exposure occurs?** ☐ Yes ☐ No
- **Quality control for raw materials and control of hazardous chemical inventory levels?** ☐ Yes ☐ No
- **Any special or unique hazards?** ☐ Yes ☐ No

Tip: Safety and health considerations must be included in the operating procedures. The site should verify that the procedures contain chemical-specific information including proper PPE required for different activities; means to minimize the effects of exposure to chemicals; and system controls in place, such as

chemical sensors, and how these are activated and tied into the system operations, as applicable. Information regarding the quality control of raw materials should be documented, including proper chemical purchasing procedures, grade of material required for the process, and acceptable suppliers of chemicals.

**5. Are safety systems and their functions included in the operating procedures?**
[.119(f)(1)(iv)]

☐ Yes ☐ No

Tip: The operating procedures should contain references to the process safety systems. Such documentation may include list of safety interlocks and their functions and steps necessary to recover process operation after an interlock is tripped, process chemical detectors in place with steps to be taken in the event a sensor alarms, etc.

**6. Are the operating instructions consistent with the process safety information?**
[.119(f)(1)]

☐ Yes ☐ No

Tip: For the most part, the operating procedures are taken from the equipment manufacturers recommendations and, as such, should be consistent with the process safety information. The employer should verify that process control limits and set points match the safe operating limits information contained in the process safety information documentation. For those systems constructed in-house, the site should ensure the operating procedures contain the operating limits consistent with the process design.

**7. Are operating procedures readily accessible to employees who work in or maintain a process?**
[.119(f)(3)]

☐ Yes ☐ No

Tip: The operator should ensure that the procedures are located where employees can access them 24 hours a day. If procedures are in electronic version, the employer should ensure there is a hard copy master available for use in the event the computer system is down.

**8. Are operating procedures reviewed as often as necessary to assure that they reflect current operating practice?**
[.119(f)(3)]

☐ Yes ☐ No

**Are they certified annually by the employer that they are current and accurate?**

☐ Yes ☐ No

**Do they reflect current operating practice that have resulted from changes in?**

- **Process chemicals?** ☐ Yes ☐ No

- **Technology?** ☐ Yes ☐ No
- **Equipment?** ☐ Yes ☐ No
- **Facilities?** ☐ Yes ☐ No

Note: The auditor should compare the operating procedures to actual field conditions.

Tip: Operating procedures should be updated whenever the operating parameters of the process change. The site has the responsibility to certify that the procedures are complete and accurate at least annually. This should be reflected on the revision number or date.

The auditor should cross reference operation procedure revision dates with management of change documentation completed for the process.

**9. Have safe work practices been developed and implemented for employees and contractors to control hazards during operations such as:**
[.119(f)(4)]

- **Lockout/tagout?** ☐ Yes ☐ No
- **Confined space entry?** ☐ Yes ☐ No
- **Opening process equipment or piping?** ☐ Yes ☐ No
- **Control over entrance into a facility by maintenance, contractor, laboratory or other support personnel?** ☐ Yes ☐ No

Tip: The site must have written procedures for safe work practices including confined space entry, line breaking and lockout/tagout for each piece of equipment. Also, written procedures should be documented for controlling entrance of personnel into the facility.

***Onsite Conditions***

**10. Does observation of a representative sample of processes indicate that the written operating procedures are being implemented?**
[.119(f)(1)]

☐ Yes ☐ No

Note: The auditor should document verifications that the written operating procedures are being implemented.

Tip: The auditor should look for copies of the procedures in locations where they would be used, such as in the control rooms or on the manufacturing floor. Also, observe the operators and technicians at work to see if they take the procedures with them to complete their work.

**11. Does observation of a representative sample of processes indicate that the written operating procedures are readily accessible to employees who work or maintain a process?**

[.119(f)(2)]

☐ Yes ☐ No

Tip: Look for where the operating procedures are maintained throughout the facility. Verify that employees have access to them 24 hours a day.

**12. Does observation of a representative sample of processes indicate that operating procedures reflect current practice, including changes that result from process chemicals, technology, equipment and facilities?**
[.119(f)(3)]

☐ Yes ☐ No

Note: Observe to see if actual procedures match the written operating procedures.

Tip: If possible, the auditor should observe the operator at work to verify that the written procedure is being followed.

**13. Does observation of representative operations indicate that safe work practices have been implemented for company and contractor employees?**
[.119(f)(4)]

☐ Yes ☐ No

**Do such work practices include, where appropriate:**

- **Lockout/tagout?** ☐ Yes ☐ No
- **Confined space entry?** ☐ Yes ☐ No
- **Opening process equipment or piping?** ☐ Yes ☐ No
- **Control over entrance into a facility by maintenance, contractor, laboratory or other support personnel?** ☐ Yes ☐ No

Tip: Time permitting, the auditor should observe operations and maintenance activities to identify whether or not the safety work practices for lockout/tagout, confined space entry, and line breaking are being followed. It should be fairly evident to see that procedures for controlling entrance to and exit from the covered process areas are being implemented.

***Interviews***

**14. Based on interview with a representative number of operators, are the written operating procedures implemented for each covered process?**
[.119(f)(1)]

☐ Yes ☐ No

**15. Based on interviews with a representative number of operators, do operating procedures provide clear instructions for safely conducting activities?**
[.119(f)(1)]

☐ Yes ☐ No

Note: Specifically ask for conditions requiring emergency shutdown, the operating limits of a particular process or item of equipment, what might occur if a deviation from those limits should take place, steps to avoid the deviation, and precautions necessary to prevent exposure to hazardous chemicals.

Tip: The auditor should talk to the operators to attempt to understand how they approach safely conducting operations. What thought process do they use to accomplish their tasks? The auditor may ask the operators to describe how they would effect a safe emergency shutdown of a key piece of equipment and verify that against the written procedure.

**16. Based on interviews with a representative number of employees who work in or maintain a process, are the operating procedures readily accessible?**
[.119(f)(2)]

☐ Yes ☐ No

Tip: Ask the employees where the procedures are kept in relation to where they conduct their work. Are they able to take copies of the procedures with them if the work is done in a remote location. Have there been occasions when they did not have access to the procedures?

**17. Based on interviews with a representative number of operators and maintenance employees, do the operating procedures reflect current operating practice?**
[.119(f)(3)]

☐ Yes ☐ No

Tip: Ask operators to describe the procedure for updating procedures. Who is responsible for ensuring the procedures are updated when changes are made? What is the lag time for completing the updates? How are employees informed of the updates?

**1910.119(g) - TRAINING**

The intent of this paragraph is to help employees and contractor employees to understand the nature and causes of problems arising from process operations, and increase employee awareness with respect to the hazards particular to a process. An effective training program significantly reduces the number and severity of incidents arising from process operations, and can be instrumental in preventing small problems from leading to a catastrophic release. Minimum requirements for an effective training program include: Initial Training, Refresher Training, and Documentation.

The training paragraph of the PSM standard requires sites to train their employees on the operation of the

process and the hazards inherent in that operation. In this, the training paragraph is intimately connected with both process safety information and the development of accurate operating procedures. OSHA deems that training is integral to workplace safety.

Questions with the PSM standard arise in several areas:

- Employees required to receive training as covered by the standard;
- Content of the training provided to those employees;
- The interval of refresher training provided to the employees;
- Validation/verification of training.

***Records Review***

**1. Do initial and refresher training records exist for employees and contractor employees involved in operating a process?**
[.119(g)(1)(i)]

☐ Yes ☐ No

**Do the records contain the identity of the employee, the date of the training, and the means used to verify that the employee understood the training?**

☐ Yes ☐ No

Tip: Training is required for employees operating a covered process. Training is to be completed before employees start work on a process and at least every three years after that. The employer should ensure that training documentation is in place for operators involved in process operation since 1992. The auditor should verify that the training documentation includes the content of the training, the employee identity, and the means used to verify the employee understood the training.

**2. Has each employee been trained before being involved in a newly assigned process (Except employees involved in operating a process prior to 5/26/92)?**
[.119(g)(1)(i)]

☐ Yes ☐ No

Tip: The auditor should ensure that training records exist for process operators having responsibility for the process since 1992. The auditor may want to obtain a roster of operators and verify that their training is documented.

**3. If initial training has not been given to employees involved in operating a process prior to 5/26/92, is there written certification that they have the required knowledge, skills and abilities to safely carry out the duties and responsibilities specified in the operating procedures?**
[.119(g)(1)(ii]

☐ Yes ☐ No

Note: Review the documents to make sure the certification has not been invalidated by a change in duties.

Tip: If an operator has operated the process prior to 1992, the site may certify that he/she is competent to operate the system safely. This certification may take the place or initial training for those individuals. However, the auditor should look for indication of changes in the operator's responsibilities and ensure the initial training records exist. Refresher training should have been given to the employees involved in an operating process by now.

**4. Has each employee involved in operating a process been trained in an overview of the process and the operating procedures including:**
[.119(g)(1)(i)]

- **Steps for each operating phase?** ☐ Yes ☐ No
  Initial startup, normal operations, temporary operations, emergency shutdown, emergency operations, normal shutdown, and startup following a turnaround or emergency shutdown
- **Operating limits?** ☐ Yes ☐ No
  Consequences of deviations and steps required to avoid deviations
- **Safety and health considerations?** ☐ Yes ☐ No
  Properties and hazards of chemicals used and precautions for preventing exposure
- **Safety systems and their function?** ☐ Yes ☐ No

Tip: The site should ensure that operator training includes instructions in each phase of operation of a covered process system. The site may want to use the operating procedures as the basis for operator training, as each required element listed above is also listed as a required component of the Operating Procedures. The auditor should look for documentation that he operators were trained on each phase and understood the training.

Training plans may be organized in different ways. Matrices are commonly used to identify each of the specific items that an operator might need.

**5. Has the employer consulted with employees involved in operating the process to determine the appropriate frequency for refresher training?**
[.119(g)(2)]

☐ Yes ☐ No

Note: Obtain a listing of the employees who provided consultation to assist in responding to question 60.

**Is the frequency at least once every 3 years?**

☐ Yes ☐ No

Tip: The site should document that the employee requests for additional training have been addressed.

***Interviews***

**6. Based on interviews with a representative number of employees, has their training emphasized specific safety and health hazards, emergency operations including shutdown, and safe work practices applicable to their tasks?**
[.119(g)(1)(i)]

☐ Yes ☐ No

**7. Based on interviews with employees named as having provided consultation, has the employer consulted with employees involved in operating the process to determine the appropriate frequency of refresher training?**
[.119(g)(2)]

☐ Yes ☐ No

**1910.119(h) - CONTRACTORS**

The intent of this paragraph is to require employers who use contractors to perform work in and around processes that involve highly hazardous chemicals to establish a screening process so that they hire and use contractors who accomplish the desired job tasks without compromising the safety and health of employees at a facility. The contractor must assure that contract employees are trained on performing the job safely, of the hazards related to the job, and applicable provisions of the emergency action plan.

Above and beyond the requirements to ensure the training of contract employees, the PSM standard also requires that sites review the suitability of both contract employees and contractors to complete the project or assignment in a safe manner. A number of tools exist for reviewing contractor safety (many discussed below). However, these tools must be applied for all projects and all contractors involved in the covered processes.

NOTE: The term contractor includes subcontractor.

***Records Review***

**Questions 1-9 are for the host employer's program.**

**1. Does the program include all contractor's activities that have the potential for affecting process safety, including - but not limited to - contractors performing maintenance or repair, turnaround, major renovation or specialty work on or adjacent to covered processes?**
[.119(b)(1)]

☐ Yes ☐ No

Note: Contractors performing incidental services which do not influence process safety such as janitorial work, food and drink services, laundry, delivery and other supply services need not be included.

Tip: The site should maintain a list of all of the contractors who work onsite in the vicinity of the covered process and have documentation to support that all contractors have been informed of the Contractor Safety Program in place.

**2. Is the information regarding the contractor's safety performance and programs obtained and evaluated for selection of contractors?**
[.119(b)(2)(i)] [.119 Appendices C & D]

☐ Yes ☐ No

Tip: The site's written policy for contractor selection should outline the information that will be obtained and evaluated in determining a contractor's qualifications for working onsite. The program should also include a baseline for determining what information is reviewed and what is an acceptable program and safety record. When bidding on contracts, the site should require copies of each bidding contractor's safety programs, policies, safe work practices, and historical safety records. The information should be reviewed to ensure that the contractor's policies mesh with the employer's goals. This information should be maintained in contractor files or other designated locations.

Sites should request safety record data such as EMRs. Sites should seek contractors with EMRs better than their industry average (1). Sites may also wish to request OSHA 200 logs from perspective contractors.

The auditor should review the contractor's files to ensure that information on their safety programs is included. This information may include:

- Policy statement on Process Safety;
- Hazard Communication Programs;
- Safe work practices, such as hot work and lockout/tagout, and training and or employees certifications of the completed training; and
- Monitoring of work activities.

**3. Are the contract employers informed, prior to the initiation of the contractors' work at the site, of the known potential fire, explosion, or toxic release hazards related to the contractor's work and the processes?**
[.119(h)(2)(iii)]

☐ Yes ☐ No

Tip: As required by the Contractor Safety Program requirements, the employer is obligated to inform the contractor of the know hazards related to the work as well as the health and safety hazards of the covered chemicals and processes onsite. Common practice is for the employer to develop a contractor orientation program with checklist outlining the company policies, practices, and procedures with which the contractor is expected to comply.

The auditor should look for hard copy documents or meeting minutes detailing the topics discussed with the contractors. The information should include SDS-type information outlining the hazards of the chemical(s) onsite and the personal protective equipment requirements for work on the system. The information should also include safe work practices requirements for working on the system, including access to the processes, lockout/tagout requirements and procedures, and confined space entry.

**4. Are contract employers informed, prior to the initiation of the contractors' work at the site, of the**

**applicable provisions of the emergency action plan required by .119(n)?**
[.119(h)(2)(iii)]

☐ Yes ☐ No

Tip: The site is responsible for informing the contractor of the existence of the emergency response plan and share the appropriate information, including the emergency notification system and procedures for evacuating the facility and ensuring the employees are accounted for.

The auditor should look for documentation that the contractor has been informed of the building alarms, evacuation routes, and the requirement to report to evacuation coordinators to ensure employees are accounted for.

**5. Have safe work practices to control the entrance, presence and exit of contract employers and contract employees in covered process areas been developed and implemented?**
[.119(h)(2)(iv)] [.119(f)(4)]

☐ Yes ☐ No

Tip: The contractor should be informed of the safe work practices in place at the facility. Copies of the employer's procedures may be given directly to the contractor, or the provisions of the procedures may be discussed in a contractor orientation meeting. The safe work practices should include the procedures for lock out/tagout, confined space entry, line breaking, and access to the covered process areas.

The auditor should look for evidence that the contractor is following the employer's practices. This may be documented in hot work permits obtained by the contractor, lockout/tagout tags completed by the contractors, or logs showing contractors entrance to or exit from covered areas.

**6. Are contract employers periodically evaluated for their performance in fulfilling their obligations to:**
[.119(h)(2)(v)]

- **Assure their employees are trained in safe work practices needed to perform the job?** ☐ Yes ☐ No
- **Assure their employees are instructed in the known potential fire, explosion or toxic release hazards related to the job and the applicable provisions of the emergency action plan?** ☐ Yes ☐ No
- **Document the required training and the means to verify their employees have understood the training?** ☐ Yes ☐ No
- **Assure their employees follow the facility safety rules and work practices?** ☐ Yes ☐ No
- **Advise the employer of unique hazards presented by the contractor's work?** ☐ Yes ☐ No

Tip: The contract employer should have a documented plan for ensuring that their employees are trained; that they are informed of the site-specific hazards, safe work practices, and emergency response plan; and that they are following the facility safety rules.

Documentation may include signed contractor acknowledgement records that chemical hazard information was reviewed. The auditor should look for documentation supporting that contractor employees were informed of the chemical-related hazards in SDS or related HAZCOM reviews.

**7. Has the host employer ensured, through periodic evaluations, that the training provided to contractor employees by the contractor employer is equivalent to the training required for direct hire employees?**
[.119(h)(2)(v)]

☐ Yes ☐ No

**8. If the employer has identified deficiencies in the performance of contract employers, what action has the employer taken to correct the deficiencies?**
[.119(h)(2)(v)]

☐ Yes ☐ No

**9. Does the employer maintain a contract employee injury and illness log related to the contractor's work in process areas?**
[.119(h)(2)(vi)]

☐ Yes ☐ No

Tip: The site is responsible for maintaining an injury and illness log for contract employees when working onsite. The auditor should look for the existence of this log.

**Questions 10-15 are for the Contractors' Programs:**

**10. Are all contractor employees trained in the work practices necessary to perform their jobs safely?**
[.119(h)(3)(i)]

☐ Yes ☐ No

Tip: The auditor should look for training records for their employees, based on the work they will be responsible for at the site. Training documentation must include the name of the employee, the topic of the training, the date on which the training was conducted, and the means to ensure that the employee understood the training. If a contract employee is to conduct special tasks, such as hot work or confined space operations, the appropriate specific training and/or certification documentation should be reviewed.

**11. Is each contract employee instructed in the known potential fire, explosion, or toxic release hazards related to his/her job and the processes and applicable provisions of the emergency action plan?**
[.119(h)(3)(ii)]

☐ Yes ☐ No

Tip: The contract employer's records should include documentation that their employees were instructed in the hazards of the process and process chemicals at the facility. There should also be documentation that the employees were trained in the applicable provisions of the emergency response plan, including building alarms, evacuation routes, and procedures for accounting for employees.

**12. Is there documentation that each contract employee has received and understands the required training?**
[.119(h)(3)(iii)]

☐ Yes ☐ No

Tip: The auditor should consider the fact that, with the exception of the site-specific safe work practices and chemical hazards training, not all employees will necessarily complete the same training due to differences in job requirements. Employees responsible for process operations-related tasks should be trained on the procedures for operation of the system. Those employees hired to complete maintenance-related should be trained in lockout/tagout and line breaking procedures, as well as any equipment specific maintenance procedures.

**13. Do the contract employee training records contain the following:**
[.119(h)(3)(iii)]

- **The identity of the employee?** ☐ Yes ☐ No
- **The date of the training?** ☐ Yes ☐ No
- **The means used to verify that the training was understood?** ☐ Yes ☐ No

Tip: Training records must contain each of the items listed.

**14. Are there means to assure that contract employees follow the safety rules of the facility, including safe work practices required in .119(f)(4)?**
[.119(h)(3)(iv)] [.119(f)(4)]

☐ Yes ☐ No

Note: Review evidence of enforcement by the contractor.

Tip: The contractor should document a means to ensure that employees follow the facility safety rules and safe work practices. This verification often takes the form of periodic internal audits of the work area. The auditor should request copies of completed audits and look for documented resolution to audit findings.

**15. Is the employer advised of any unique hazards presented by the contract employer's work or any hazards found by the contract employer's work?**
[.119(h)(3)(v)]

☐ Yes ☐ No

Tip: Based on the nature of the process and the type of work completed by contractors on-site, the auditor may request documentation showing that the site was informed of the unique hazards presented by the

work. Additionally, the site may request that contractors provide them feedback concerning any hazards not covered during initiation and training. Such documentation may include employee-specific training forms and documents and contractor feedback and safety evaluation forms.

***Onsite Conditions***

**16. Based on a representative sample of observations of contractor employees, has the employer's program to control their entrance, presence, and exit been implemented?**
[.119(h)(2)(iv)]

☐ Yes ☐ No

Tip: The auditor should review the procedures for controlling contractor access to verify that they are being implemented. The auditor may want to look for documentation such as sign-in logs or records of daily meetings to review projects and activities that indicate that the employee is aware of contractors' activities.

**17. Based on a representative sample of observations of contractor employees, do they follow the safety rules of the facility?**
[.119(h)(3)(iv)]

☐ Yes ☐ No

Note: These rules include the employer's safe work practices such as lockout/tagout, confined space entry, and opening process equipment or piping; they may also be included in other rules such as excavation procedures or use of PPE.

Tip: The auditor should observe contractor employees at work to verify their conformance with the safety rules. Do they wear required PPE, do they follow the site's safe work practices for lockout/tagout, hot work operations and confined space, or do contractor employees sign in or check in with their site contact as required?

***Interviews***

**18. Based on interviews with contractor employers, did the host employer obtain and evaluate information regarding the contractor's safety performance and programs for selection of contractors?**
[.119(h)(2)(i)] [.119 Appendices C & D]

☐ Yes ☐ No

Tip: Ask contractors what they rates have been and if the site provided feedback on the information provided.

**19. Based on interviews with contractor employers, have they been informed of the known fire, explosion, or toxic release hazards related to their work and the processes in which they are involved**

**prior to the initiation of their work at the site?**
[.119(h)(2)(ii)]

☐ Yes ☐ No

Tip: The auditor may not have the opportunity to interview the contractor employer during the compliance audit. If the auditor does have the opportunity, he/she should ask the contractor employers to describe the means used to inform them of the hazards of the process and compare these to the written plan included in the PSM program documents. What information was shared and how was it presented?

**20. Based on interviews with contractor employers, have they been informed of the applicable provisions of the employer's emergency action plan prior to the initiation of their work at the site?**
[.119(h)(2)(iii)]

☐ Yes ☐ No

Tip: Ask contractors to describe the information they received relative to the site's emergency response plan. If the contractor is responsible for responding, were the employees trained in the required activities?

**21. Based on interviews with contractor employers and employees, have work practices to control their entrance, presence, and exit of covered process areas been implemented?**
[.119(h)(2)(iv)]

☐ Yes ☐ No

Tip: Ask the contractors about the procedures they followed to gain access to the facility. Are there additional requirements to control access to the covered processes?

**22. Based on interviews with the contractor employer, has the employer periodically evaluated the contractor's performance in fulfilling the obligations required in .119(h)(3) to:**
[.119(h)(2)(v)]

- **Assure their employees are trained in safe work practices needed to perform the job?** ☐ Yes ☐ No
- **Assure their employees are instructed in the known potential fire, explosion, or toxic release hazards related to the job and the applicable provisions of the emergency action plan?** ☐ Yes ☐ No
- **Document the required training and the means to verify their employees have understood the training?** ☐ Yes ☐ No
- **Assure their employees follow the facility safety rules and work practices?** ☐ Yes ☐ No
- **Advise the employer of unique hazards presented by the contractor's work?** ☐ Yes ☐ No

Tip: The auditor should ask the contractor for his perception of the follow-through of the employer in pursuing the safety performance record.

**23. Based on interviews with contractor employer, has the host employer ensured, through periodic evaluations, that the training provided to contractor employees by the contractor employer is equivalent to the training required for direct hire employees?**
[.119(h)(2)(v)]

☐ Yes ☐ No

**24. Based on interviews with contractor employer, if the employer has identified deficiencies in the performance of contract employers, has the employer taken action to correct the deficiencies?**
[.119(h)(2)(v)]

☐ Yes ☐ No

Note: Verify by determining what specific actions have been taken (i.e., list examples).

**25. Based on interviews with a representative number of contractor employees, has the contractor employer trained them in the work practices necessary to perform their jobs?**
[.119(h)(3)(i)]

☐ Yes ☐ No

**26. Based on interviews with a representative number of contractor employees, are they being instructed in the known potential fire, explosion, or toxic release hazards related to their work and the processes in which they are involved?**
[.119(h)(3)(ii)]

☐ Yes ☐ No

Tip: The auditor should ask the contractor employees questions to determine their familiarity with the hazards of the chemical and the process. What are the major hazards associated with the chemical or process? What would they do and who would they contact in the event of a chemical release or fire? What is the proper PPE for normal and emergency operations?

**27. Based on interviews with a representative number of contractor employees, have they been instructed in the applicable provisions of the emergency action plan?**
[.119(h)(3)(ii)]

☐ Yes ☐ No

Note: Ask the employees to explain the plan and evacuation procedures.

Tip: Ask the contractor employee to relate their knowledge of the emergency response plan. Who are they to contact in the event of an emergency? Are they responsible for responding to the event? Are they responsible for initiating plant alarms? What are the proper evacuation procedures? Who are contractors to report to in order to ensure that they are properly accounted for?

**28. Based on interviews with a representative number of contractor employees, has the contract employer assured that they follow the safety rules of the facility?**
[.119(h)(3)(iv)]

☐ Yes ☐ No

Note**:** Ask how safe work practices, entry restrictions for the facility, and use of PPE are enforced.)

Tip: Ask the contractor employees to describe the procedure their employer uses to ensure they follow the facility safety rules and safe work practices.

**1910.119(i) - PRE-STARTUP SAFETY REVIEW**

The intent of this paragraph is to make sure that, for new facilities and for modified facilities when the modification necessitates a change to process safety information, certain important considerations are addressed before any highly hazardous chemicals are introduced into the process. Minimum requirements include that the pre-startup safety review confirms the following:

- Construction and equipment is in accordance design specifications;
- Safety, operating, maintenance and emergency procedures are in place and are adequate;
- For new facilities, a PHA has been performed and recommendations resolved or implemented;
- That modified facilities meet the requirements of Management of Change (paragraph 1); and,
- Training of each employee involved in the process has been completed.

***Records Review***

**1. Has the pre-startup safety review been performed for all new facilities and for modified facilities when the modification is significant enough to require a change in process safety information?**
[.119(i)(1)]

☐ Yes ☐ No

Tip: The auditor should review the MOC documentation. If there are process changes, the site should have a documented pre-startup safety review (PSSR) completed prior to starting up the system. The PSSR is usually documented in the form of a checklist with signature verification of each of the listed items listed in the next question.

**2. Do pre-startup safety reviews confirm that prior to the introduction of highly hazardous chemicals to a process:**
[.119(i)(2)]

- **Construction and equipment is in accordance with design specifications?** ☐ Yes ☐ No
- **Safety, operating, maintenance, and emergency procedures are in place and adequate?** ☐ Yes ☐ No
- **For new facilities, a PHA has been performed and recommendations**

**resolved or implemented before startup?** ☐ Yes ☐ No

- **Modified facilities meet requirements of paragraph (l) (Management of Change?)** ☐ Yes ☐ No
- **Training of each employee involved in operating the process has been completed?** ☐ Yes ☐ No

Tip: The PSSR is intended to document that, for new or modified process or process startups after extended shutdowns, the proper engineering and administrative controls have been implemented to ensure safe operation of the system. The auditor may want to look for the following documentation to ensure the items listed above were reviewed prior to startup of the process:

- Design drawings that were traced during the PSSR ensure that the system was installed according to the design. P&IDs may be marked if modifications were made to the system, for instance, as a result of recommendations from the PHA.
- If the PSSR was completed as a result of a major change to a process or for design and installation of a new system, a PA would have been performed. The PSSR should document that the recommendations or the PHA were resolved prior to startup of the process. The auditor will want to look for documented completion dates for action items.
- The PSSR should contain documentation that procedures for operating and maintaining the process have been developed (or updated for modified processes). The auditor may look for revision numbers or dates corresponding to the completion date on the PSSR. Also, the auditor should verify that the technical operating information has been updated appropriately to include specific information related to the operation and maintenance of the new equipment or modified process parameters, such as expanded equipment lists, modified operating parameters information, or additional work items for maintenance of new equipment.
- For modified facilities, the PSSR should document that the information required by the MOC procedure has been completed. The auditor should cross reference the PSSR to the appropriate MOC documentation to ensure the necessary process safety information has been updated and the health and safety review has been completed.\
- The auditor should look for training records dated prior to the completion date of the PSSR. Training topics should include the new operating and maintenance procedures, as well as any chemical-specific training for new processes using new chemicals. The training documentation should include the names of the employees, the training date(s), topic(s) covered, and methods used to verify that employees understood the training.

***Onsite Conditions***

**3. Do observations of new or modified facilities indicate that prior to the introduction of highly hazardous chemicals:**
[.119(l)(2)]

- **Construction and equipment is in accordance with design specifications?** ☐ Yes ☐ No
- **Safety, operating, maintenance, and emergency procedures are in place**

**and adequate?** ☐ Yes ☐ No

Tip: The auditor should look for indications (such as a traced P&ID) that the PSSRs completed for the new or modified processes included verification that he equipment and construction were reviewed prior to startup to ensure they met the design specifications. Also, the employer should look for operating and maintenance procedures with revision histories that reflect the modification dates and process changes.

***Interviews***

**4. Based on interviews with a representative sample of operators, maintenance employees, and engineers, can it be confirmed that the construction and equipment are in accordance with design specifications prior to introducing highly hazardous chemicals to a process?**
[.119(i)(2)(i)]

☐ Yes ☐ No

Tip: The site employees responsible for the design, operation, and maintenance of the process should relate their experience and involvement in completing the PSSR. Were operators involved in revising the operating procedures? Did maintenance employees participate in the revision of maintenance procedures and mechanical integrity program requirements for new systems? Did Engineering ensure that the operators and maintenance employees received the proper training on the modified or new system? How did Engineering ensure that the equipment and construction met the design specs?

**5. Based on interviews with a representative sample of operators, maintenance employees, and engineers, are safety, operating, maintenance, and emergency procedures in place prior to introduction of highly hazardous chemicals into a process?**
[.119(i)(2)(ii)]

☐ Yes ☐ No

**Are these procedures adequate?**

☐ Yes ☐ No

Tip: Ask employees involved in the operation and maintenance of the process to describe the process used to ensure that the necessary procedures were developed and implemented prior to startup. Who was responsible for revising or developing the procedures? How was it verified the procedures were adequate?

**6. Based on interviews with a representative sample of operators, maintenance employees, and engineers, is a PHA performed and are recommendations resolved prior to a startup of a new process that utilizes highly hazardous chemicals?**
[.119(i)(2)(iii)]

☐ Yes ☐ No

Tip: Ask the engineers to explain the process for determining whether or not a PHA is conducted for a

process modification. What is the procedure for ensuring that recommendations are resolved prior to startup?

**7. Based on interviews with a representative sample of operators, maintenance employees, and engineers, do modified facilities utilizing a highly hazardous chemical process meet requirements of paragraph (l), Management of Change prior to introducing a highly hazardous chemical?**
[.119(i)(2)(iii)]

☐ Yes ☐ No

Tip: The auditor should determine how the MOC procedure is implemented and how the MOC and PSSR programs intermix. When changes to the covered process are proposed, how does the site ensure that the PSSR is completed and that all the requirements of the MOC program are met prior to the startup of the process.

**8. Based on interviews with a representative sample of operators, is training completed for each employee involved in the process prior to introduction of a highly hazardous chemical?**
[.119(i)(2)(iv)]

☐ Yes ☐ No

Tip: The auditor should determine how the employer ensures that the affected employees are trained on the modification change prior to startup of the system, the auditor should also determine how the site evaluates the content of the training provided.

**1910.119(j) - MECHANICAL INTEGRITY**

The intent of this paragraph is to assure that equipment used to process store, or handle highly hazardous chemicals is designed, constructed; installed, and maintained to minimize the risk of releases of such chemicals. This requires that a mechanical integrity program be in place to assure the continued integrity of process equipment. The elements of a mechanical integrity program include the identification and categorization of equipment and instrumentation, development of written maintenance procedures, training for process maintenance activities, inspection and testing, correction of deficiencies in equipment that are outside acceptable limits defined by the process safety information, and development of a quality assurance program.

***Records Review***

**1. Does the written mechanical integrity program include:**
[.119(j)(1)]

- **Pressure vessels and storage tanks?** ☐ Yes ☐ No
- **Piping systems and components such as valves?** ☐ Yes ☐ No
- **Relief and vent systems and devices?** ☐ Yes ☐ No
- **Emergency shutdown systems?** ☐ Yes ☐ No
- **Controls (including monitoring devices**

**and sensors, alarms and interlocks)?** ☐ Yes ☐ No

- **Pumps?** ☐ Yes ☐ No

Tip: The site should document that the listed system components are included in the Mechanical Integrity Program for the process. The process safety information, especially the P&IDs, developed for the PHA may be used to compile the list of equipment to be included in the Mechanical Integrity Program.

The auditor should verify that this equipment list for each process includes the items above. The equipment list should then be used to develop the scheduled maintenance plans for the system.

**2. Are there written procedures to maintain the on-going integrity of process equipment?**
[.119(i)(2)]

☐ Yes ☐ No

**Does the documentation indicate the procedures have been implemented?**

☐ Yes ☐ No

Tip: The site is required to have written procedures for conducting preventative maintenance on the system components. Oftentimes, the maintenance procedures are documented on work orders that are provided to maintenance technicians responsible for maintaining the systems. In other instances, the work orders may reference equipment manufacturer's manuals for the proper procedures of the systems.

**3. Has training been provided to each employee and contractor employee involved in maintaining the on-going integrity of process equipment in the following:**
[.119(j)(3)]

- **An overview of the process and it hazards?** ☐ Yes ☐ No
- **Procedures applicable to the employee's job tasks to assure that the employee can perform the job tasks in a safe manner?** ☐ Yes ☐ No

Note: Review certification documents for employees doing non-destructive tests, welding on pressure vessels, etc., where these certifications are required.)

Tip: The site is required to ensure that employees responsible for maintaining the system are trained on the system and its hazards as well as on the individual procedures to complete the maintenance tasks. Training documentation should include the name of the employee, the date of the training, the topics covered, and the method used to verify that the employees understood the training.

**4. Are inspections and tests performed on each item of process equipment included in the program?**
[.119(j)(4)(i)]

☐ Yes ☐ No

Tip: The PSM standard requires that specific components of the coved process system be inspected and tested to prevent system failure that could result in catastrophic incidents. The equipment list identifying the components of the system should be sued in establishing the PM program. The auditor should ensure that each component is included in the program.

**5. Do inspection and testing procedures follow good engineering practices?**
[.119(j)(4)(ii)]

☐ Yes ☐ No

Tip: The site should ensure that good engineering practice is used when developing the inspection and testing procedures. Often, the most straightforward means to develop the procedures is to use information from the equipment manufacturers' maintenance manuals.

The auditor should look for evidence that the procedures follow good practice and should look for references to manufacturers' recommendations or industry standards. The auditor should try to determine if the site has identified the codes or standards relied on to establish good engineering practices (i.e. ASME., ANSI., NFPA, etc.).

**6. Are inspection and test frequencies consistent with the manufacturer's recommendation and good engineering practice?**
[.119(i)(4)(iii)]

☐ Yes ☐ No

**Are inspections and tests performed more frequently if determined necessary by operating experience?**

☐ Yes ☐ No

Tip: In addition to obtaining inspection and test procedures from manufactures' maintenance manuals and industry standards information, these documents also often contain recommended PM intervals. The site should use this information (if available) to establish a baseline for scheduling PM. As operating experience increases, the operator will be able to identify those components that may need to be inspected, tested, or replaced more or less frequently than the manufacturer recommends. In this case the site should document the experience and justification for modifying the intervals.

The site should reference the manufacturer's recommendations or industry standard information to ensure that the intervals represent good practice.

**7. Is there documentation of each inspection and test that has been performed including all of the following:**

[.119(j)(4)(iv)]

- **Date of the inspection or test?** ☐ Yes ☐ No
- **Name of person performing the procedure?** ☐ Yes ☐ No
- **Serial number or other identifier of equipment on which procedure was performed?** ☐ Yes ☐ No
- **Description of inspection or test performed?** ☐ Yes ☐ No
- **Results of inspection or test?** ☐ Yes ☐ No

Tip: The site should ensure that the maintenance documentation includes the identity of the piece of equipment maintained, the name of the person completing the maintenance, the date on which the work was performed, and a description of the test or inspection completed, and the results.

**8. Are deficiencies in equipment that are outside limits (as defined in process safety information) corrected before further use or in a safe and timely manner when necessary means are taken to assure safe operation?**
[.119(j)(5)]

☐ Yes ☐ No

Tip: The site should have a written statement on dealing with equipment deficiencies requiring either a shutdown and subsequent corrective action or a policy to verify that any "work-arounds" of defective process equipment are carefully implanted and their safety validated in a rigorous process.

**9. In the construction of new plants and equipment, does the employer assure that equipment as it is fabricated is suitable for the process for which it will be used?**
[.119(j)(6)(i)]

☐ Yes ☐ No

Tip: The site should document that the equipment is suitable for the process for which it will be used. This is often documented in the PSSR.

**10. Have appropriate checks and inspections been made to assure equipment is installed properly and consistent with design specifications and manufacturer's instructions?**
[.119(j)(6)(ii)]

☐ Yes ☐ No

Note: Include contractor supplied equipment.

Tip: The site should document that the installation has been verified against the design drawings. Also, there should be documentation that the equipment has been calibrated to ensure that it operates within the proper limits.

**11. Does the employer assure that maintenance materials, spare parts, and equipment are suitable for the process application for which they are used?**
[.119(j)(6)(iii)]

☐ Yes ☐ No

Note: Include contractor supplied equipment.

Tip: The site must be sure that maintenance materials, spare parts, and equipment are suitable for the process application. The site should also document which materials are compatible with the process and chemicals in use and ensure that spare parts do not contain materials that are incompatible.

***Onsite Conditions***

**12. Do observations of a representative sample of process equipment indicate deficiencies outside acceptable limits?**
[.119(j)(5)]

☐ Yes ☐ No

Note: Compare process safety information criteria with the conditions of the equipment found in the process.

Tip: The auditor should review the process safety information and compare this documentation with the condition of the equipment. Does the equipment drift beyond the safe operating limits? Has the equipment failed under these circumstances or have alarms been activated as designed.

**13. If new plants or equipment are being constructed, do observations indicate that the equipment as it is fabricated is suitable for the process application?**
[.119(j)(6)(i)]

☐ Yes ☐ No

Tip: For new installations, the auditor should ensure that the equipment is suitable for the process application. This may be accomplished by verifying that the construction materials of the equipment are compatible with the process chemicals in use and that the operating limits for the process are attainable based on the design of the equipment.

**14. Do observations of a representative sample of maintenance materials, spare parts, and equipment indicate that they are suitable for the process application for which they shall be used?**
[.119(j)(6)(iii)]

☐ Yes ☐ No

Tip: The auditor should review the maintenance materials used for the covered process and ensure that they are completed with the process application. The materials used should be verified against the manufacture's recommended spare parts and materials.

***Interviews***

**15. Based on interviews with a representative number of engineers (or other qualified persons), have procedures to maintain the ongoing integrity of the process equipment been implemented for::**
[.119(j)(2)]

- **Pressure vessels and storage tanks?** ☐ Yes ☐ No
- **Piping systems and components such as valves?** ☐ Yes ☐ No
- **Relief and vent systems and devices?** ☐ Yes ☐ No
- **Emergency shutdown systems?** ☐ Yes ☐ No
- **Controls (including monitoring devices and sensors, alarms and interlocks?** ☐ Yes ☐ No
- **Pumps?** ☐ Yes ☐ No

Note: Ask about the possibility of safety critical equipment being inadvertently rendered inoperative. For example, a relief device might be isolated by closing an upstream valve.

Tip: The auditor should ask the engineer to describe the equipment included in the PM program and what types of tests or inspections are performed on the different system components. Ask about the PM performed on safety equipment.

**16. Based on interviews with a representative number of engineers (or other qualified persons), do the inspection and testing procedures follow recognized and generally accepted good engineering practice?**
[.119(j)(4)]

☐ Yes ☐ No

**Has prior operating experience indicated a need for more frequent test and inspection schedule than has been implemented?**

☐ Yes ☐ No

Tip: Ask the engineers about the basis used to develop the PM activities and procedures for conducting those activities. How did they determine the proper inspections or test for the various system components? Are the PM procedures reviewed and updated on a regular schedule? Has prior operating experience (and equipment failure occurrences) been used to adjust the frequency of maintenance activities?

**17. Based on interviews with a representative number of engineers, are equipment deficiencies corrected before use when they are outside the acceptable limits?**

☐ Yes ☐ No

**If not, are the deficiencies corrected in a timely manner and are necessary means taken to assure safe operation?**

[.119(j)(5)]

☐ Yes ☐ No

Tip: Ask the engineers to explain the procedure for dealing with irregularities in the operation of the equipment. What is the procedure for correcting situations when a piece of equipment is found to operating outside of the acceptable safe limits established?

**18. Based on interviews with a representative number of engineers, has the employer assured that, for new plants and equipment, the equipment as it is fabricated is suitable for the process application?**
[.119(j)(6)]

☐ Yes ☐ No

**Are appropriate checks and inspections made to assure equipment is installed properly and consistent with design specifications and manufacturer's instructions?**

☐ Yes ☐ No

**Are maintenance materials, spare parts, and equipment suitable for the process application for which they will be used?**

☐ Yes ☐ No

Note: Ask about contractor supplied items.

**19. Based on interviews with a representative number of maintenance employees (and where applicable, contractor maintenance employees), have the written procedures for maintaining the on-going integrity of process equipment been implemented?**
[.119(j)(2)]

☐ Yes ☐ No

Tip: The maintenance employees should be asked to describe the procedures they use to conduct maintenance on the covered process equipment. Who is responsible for development and review of the procedures? What is the basis used in development of the procedures?

**20. Based on interviews with a representative number of employees and contractor employees involved in maintaining the on-going integrity of the process, have they been trained to assure they can perform their tasks in a safe manner?**
[.119(j)(3)]

☐ Yes ☐ No

**Did the training include an overview of the process, its hazards, and procedures applicable to the job?**

☐ Yes ☐ No

Note: Determine if certification, specialized training, or unique qualifications are required.)

Tip: The maintenance employees should be asked to describe the training they received. The content of the training should include an overview of the process, the hazards associated with the process and the chemicals used therein, and a detailed review of the various procedures applicable to the job. In addition, the site should verify that employees received training on the safe work practices (such as lockout/tagout, confined space entry, and hot work) required to perform specific tasks.

Also, as outlined in the training section of the standard, the site should verify the means used to determine that the employees understood the training.

**21. Based on interviews with a representative number of maintenance employees, do test and inspection procedures follow recognized and generally accepted good engineering practices?**
[.119(j)(4)]

☐ Yes ☐ No

**Is the frequency of inspections and tests consistent with applicable manufacturer's recommendations and good engineering practices?**

☐ Yes ☐ No

**Are more frequent inspections and tests necessary due as indicated by prior operating experience?**

☐ Yes ☐ No

Tip: The maintenance employees should be asked to describe the procedures used for maintenance of process equipment and to relate their experience in developing those procedures. What was the basis for determining the frequency of PM for the equipment?

**22. Based on interviews with a representative number of maintenance employees, are equipment deficiencies that are outside acceptable limits corrected before further use?**
[.119(j)(5)]

☐ Yes ☐ No

**If not, are corrections made in a timely manner and are necessary means taken to assure safe operation?**

☐ Yes ☐ No

Tip: The maintenance employees should describe the procedure they would follow if they discovered that the equipment was operating outside of the safe operating limits. Do they have the authority to shut down the equipment if is found to be operating outside the safe limits? Is emergency shutdown the first course of action, or are there procedures in place to take measures to keep the equipment operating safely by working around the problem or temporarily modifying the operating procedure, and if so, how is this process initiated?

**23. Based on interviews with a representative number of maintenance employees, are maintenance**

**materials, spare parts and equipment suitable for the process application for which they are intended?**
[.119(j)(6)]

☐ Yes ☐ No

Note: Ask about availability and use of substitutes.

Tip: The auditor should get the maintenance employees to describe the procedure used for replacing parts on the covered process equipment. Who determines what equipment is suitable for the process application? What is the procedure for determining whether or not pieces of equipment other than the manufacturer's recommended replacement parts may be used for the process? Who is responsible for making that decision?

**1910.119(k) - HOT WORK PERMITS**

The intent of this paragraph is to require employers to control, in a consistent manner, extraordinary work conducted in process areas. Specifically, this subparagraph is concerned with the permitting of hot work operations associated with welding and cutting in process areas.

Minimum requirements include the following:

- That the employer issue a hot work permit for hot work operations conducted on or near a covered process; and
- That hot work permits shall document compliance with the fire prevention and protection requirements of 29 CFR 1910.252(a).

***Records Review***

**1. Have hot work permits been issued for all hot work operations conducted on or near a process covered by this standard?**
[.119(k)(1)]

☐ Yes ☐ No

Tip: The site should document a plant that states that hot work operations conducted on or near a covered process will require the issuance of a hot work permit to ensure that the necessary safety precautions are taken.

The auditor should review any project files or MOC documentation to ensure permits were issued for those projects for which hot work would likely be required, such as installation of new piping or components.

**2. Do the hot work permits indicate the date(s) authorized for hot work performed?**
[.119(k)(2)]

☐ Yes ☐ No

Tip: The auditor should verify that the permits have a place to identify the date on which the hot work is to be performed and that employees and/or contractors have completed this section on completed permits.

**3. Do the hot work permits describe the object on which the hot work is to be performed?**
[.119(k)(2)]

☐ Yes ☐ No

Tip: The site or contract employee completing a hot work permit is required to describe the object on which the hot work is to be performed. Many permits give a space to list location and work to be done. If this is the case, the description should be vivid enough that a person unfamiliar with the operation can understand the task. For example, a description such as "Location: Pulp Mill" and "Work to be done: Welding" leaves a lot of room for interpretation. A more complete description might be "Location: Bldg. 108-Fiberline, Elevation 175, Northeast corner of building adjacent to Number 1 Digester", and "Work to be Done: Welding to hang Hose Reel from Column H6".

**4. Have the hot work permits been kept on file until the hot work operations were complete?**
[.119(k)(2)]

☐ Yes ☐ No

Tip: A review of ongoing hot work operations can be made during the facility inspection. Andy incomplete work should have permits on file. We suggest that appropriate hot work permits be retained at the facility for about a year.

**5. Have the hot work permits identified openings, cracks and holes where sparks may drop to combustible materials below?**
[.252(a)(2)(i)]

☐ Yes ☐ No

Tip: Many standard hot work permits list common precautions that should be addressed prior to conducting the work and have check boxes to verify that the precautions were reviewed. The employee should ensure that this item is included on the checklist and document that it was addressed prior to conducting the work by checking the appropriate box.

**6. Have the hot work permits described the fire extinguishers required to handle any emergencies?**
[.252(a)(2)(ii)]

☐ Yes ☐ No

Tip: The permit should include a space to document the necessary type of extinguisher to use for the application. The site should ensure that this is completed. If there is a standard type of fire extinguisher to be used for all hot work-related fires, this should be documented in the site's written program for conducting hot work.

**7. Have the hot work permits assigned fire watchers whenever welding is performed in locations where**

**other than a minor fire might develop?**
[.252(a)(2)(iii)]

☐ Yes ☐ No

Tip: Most permits include a space or check box to document that a fire watch was used for the work. A fire watch is required whenever precautions involving removal of combustible items (for example, in the Shipping Departments Roll Storage) cannot be undertaken.

**8. Are the hot work permits being authorized, preferably in writing, by the "individual" responsible for all welding and cutting operations?**
[.252(a)(2)(iv)] [.252(a)(2)(xiii)(A)]

☐ Yes ☐ No

**Is authorization preceded by site inspection and designation of appropriate precautions?**

☐ Yes ☐ No

Tip: The site is responsible for incorporating into the written plan for implementation (program) an outline of the individual(s) responsible for the hot work operations and how they will ensure that the appropriate precautions will be taken and verified. The auditor should verify that this responsible individual has signed off on the completed hot work permits on file.

**9. Have the hot work permits described precautions associated with combustible materials on floors or floors, walls, partitions, ceilings or roofs of combustible construction?**
[.252(a)(2)(v)] [.252(a)(2)(ix)]

☐ Yes ☐ No

Tip: The hot work permit should have a location to mark upon verification that the necessary precautions have been taken to ensure that hot work conducted in an area near combustible materials or on materials of combustible construction will not cause the material to ignite.

**10. Has hot work permitting been successful in prohibiting welding in unauthorized areas, in sprinklered buildings while such protection is impaired, in the presence of explosive atmospheres, and in storage areas for large quantities of readily ignitable materials?**
[.252(a)(2)(vi)]

☐ Yes ☐ No

Tip: Many hot work permits have a space to document that the responsible individual has verified that he sprinkler system in a building where the hot work is to take place are operational, and that there are no explosive atmospheres and no storage of ignitable materials in proximity to the hot work operation. The auditor would check that this verification is documented on the hot work permit.

**11. Have the hot work permits required relocation of combustibles where practicable and covering with flame-proofed covers where not practicable?**

[.252(a)(2)(vii)]

☐ Yes ☐ No

Tip: The responsible individual is required to verify and document on the permit that, prior to starting hot work, the hot work area was checked for combustible materials and, where found, they were moved or covered with flame proof covers.

**12. Have hot work permits identified for shutdown any ducts or conveyors systems that may convey sparks to distant combustibles?**
[.252(a)(2)(viii)]

☐ Yes ☐ No

Tip: In the course of reviewing incident investigations from fires, OSHA recognized that sparks generated through hot work could easily be transported to other areas of the facility through ductwork or through other conveyor systems. For example, sparks from a conveyor might be dropped in an area of wood dust.

**13. Have hot work permits required precautions whenever welding on components (e.g., steel members, pipes, etc.,) that could transmit heat by radiation or conduction to unobserved combustibles?**
[.252(a)(2)(x)] & [.252(a)(2)(xii)]

☐ Yes ☐ No

Tip: The hot work is a tool to be used to ensure that precautions are taken to prevent hazardous conditions from arising that may otherwise be overlooked. The permit should pose this question to force the responsible person to look at the potential for transmitting heat to distant combustible materials and to verify that this possibility does not exist, and if it does, that corrective actions have been taken to prevent it from happening.

**14. Have hot work permits identified hazards associated with welding on walls, partitions, ceilings or roofs with combustible coverings or welding on walls or panels of sandwich-type construction?**
[.252(a)(2)(xi)]

☐ Yes ☐ No

Tip: The responsible person should document that the hot work site has been checked and that the work does not entail welding on parts made with combustible coverings or of sandwich-type construction. If, upon review of the site, the operation does require welding on such materials, the responsible person should document on the permit the precautionary measures to be taken. The auditor should look to ensure that such documentation is included on the applicable permit.

**15. Has management established areas and procedures for safe welding and cutting based on fire potential?**
[.252(a)(2)(xiii)]

☐ Yes ☐ No

Tip: If the site has a designated welding shop or areas within maintenance shops partitioned doff for

conducting welding and other hot work operations, the auditor may want to verify that there is a hot work permit posted, the expiration date of which may extend up to a year from the issue date, authorizing hot work operations in the area.

**16. Has management designated the "individual" responsible for authorizing cutting and welding operations in process areas?**
[.252(a)(2)(xiii)(B)]

☐ Yes ☐ No

Tip: The site's written program should include a statement designating who is responsible for authorizing hot work operations. This designation should be by job title. The auditor should check to ensure that the designated job title matches the person's job title who is signing permits.

**17. Has management ensured that welders, cutters and supervisors are trained in the safe operation of their equipment?**
[.252(a)(2)(xiii)(C)]

☐ Yes ☐ No

Tip: Unlike many OSHA standards, the hot work permit standard does not mandate specific training requirements. Sites need to develop a program to ensure that welders have been trained in the safe use of their equipment.

**18. Has management advised outside contractors working on their site about all hot work permitting programs?**
[.252(a)(2)(xiii)(D)]

☐ Yes ☐ No

Tip: Contractors on the job site must either adhere to the site's hot work permit program or must develop and implement an equivalent program for their employees. The auditor should collect permit information from contract employers and conduct spot inspections of hot work operations being carried out by contract employees.

**19. Has the Supervisor determined if combustibles are being protected from ignition prior to welding by moving the, shielding them, or scheduling welding around their production?**
[.252(a)(2)(xiv)(A)(B) & (C)]

☐ Yes ☐ No

Tip: In signing the hot work permit, the Supervisor of hot work operations indicates that he has determined that combustible materials are being protected from the ignition source. If it is not practical to move combustible materials, a shield (such as a noncombustible tarp or blanket) must be placed around the materials. If materials can be moved away from the hot work, corporate policies and fire protection inspections services (such as FM) commonly set safe distances at greater than 25 feet.

**20. Has the Supervisor, prior to welding, secured authorization from the responsible "individual" designated by management?**
[.252(a)(2)(xiv)(D)]

☐ Yes ☐ No

Tip: The welding supervisor or the welder needs to receive authorization from the hot work permit coordinator prior to beginning work. Such authorization needs to be completed on a daily basis, even if hot work is performed over an extended period of days.

***Onsite Conditions***

**21. Conduct checks of current welding and cutting operations to ensure compliance with the requirements of 1910.119(k) and 1910.252(a). The twenty items listed above (questions 120-139) may serve as an audit checklist. A management representative, the "individual" responsible for welding operations and the supervisor should all be invited to participate in this on-site check.**
[.119(k)&.252(a)]

☐ Yes ☐ No

Tip: The auditor should review hot work in progress, if possible, and ensure that a hot work permit has been properly completed, is posted in the area, and is kept on file with the appropriate person. The auditor should also observe the area to verify that safety precautions have been taken, such as moving combustibles out of the area.

***Interviews***

**22. Based on interviews with a representative number of maintenance and contract employees, has the Supervisor visited welding work operations to verify that:**
[.252(a)(2)(xiv)(E)(F) & (G)]

- **Welders have approval for safe go ahead prior to welding?** ☐ Yes ☐ No
- **Fire protection and extinguishing equipment is properly located at the work site?** ☐ Yes ☐ No
- **Fire watches are functional, where required?** ☐ Yes ☐ No

Tips: The auditor should question employees involved in hot work (even past hot work if none is being performed) to determine if a supervisor inspected the work site prior to the commencement of hot work.

**23. Based on interviews with a representative number of maintenance and contractor employees, have hot work permits been issued for all hot work operations conducted on or near a process covered by this standard?**
[.119(k)(1)]

☐ Yes ☐ No

Tip: The auditor should assess the implementation frequency of hot work permits and determine if all hot

work at the facility is being completed under a hot work permit.

**24. Based on interviews with a representative number of maintenance and contractor employees, have the hot work permits been kept on file until the hot work operations were complete?**
[.119(k)(2)]

☐ Yes ☐ No

Tip: This can also be assessed by a records review as well.

**25. Based on interviews with a representative number of maintenance and contractor employees, have the hot work permits identified openings, cracks and holes where sparks may drop to combustible materials below?**
[.252(a)(2)(i)]

☐ Yes ☐ No

**26. Based on interviews with a representative number of maintenance and contractor employees, have the hot work permits assigned fire watchers whenever welding is performed in locations where other than a minor fire might develop?**
[.252(a)(2)(iii)]

☐ Yes ☐ No

**27. Based on interviews with a representative number of maintenance and contractor employees, are the hot work permits being authorized, preferably in writing, by the "individual" responsible for all welding and cutting operations?**
[.252(a)(2)(iv)] & [.252(a)(2)(xiii)(A)]

☐ Yes ☐ No

**Is authorization preceded by site inspection and designation of appropriate precautions?**

☐ Yes ☐ No

**28. Based on interviews with a representative number of maintenance and contractor employees, have the hot work permits described precautions associated with combustible materials on floors or floors, walls, partitions, ceilings or roofs of combustible construction?**
[.252(a)(2)(v)] & [.252(a)(2)(ix)]

☐ Yes ☐ No

**29. Based on interviews with a representative number of maintenance and contractor employees, has hot work permitting been successful in prohibiting welding in?**
[.252(a)(2)(vi)]

- **Unauthorized areas?** ☐ Yes ☐ No

- **Sprinklered buildings while such protection is impaired?** ☐ Yes ☐ No
- **The presence of explosive atmospheres?** ☐ Yes ☐ No
- **Storage areas for large quantities of readily ignitable materials?** ☐ Yes ☐ No

**30.** **Based on interviews with a representative number of maintenance and contract employees, have the hot work permits required relocation of combustibles where practicable and covering with flame-proofed covers where not practicable?**
[.252(a)(2)(vii)]

☐ Yes ☐ No

**31.** **Based on interviews with a representative number of maintenance and contract employees, have hot work permits identified for shutdown any ducts or conveyors systems that may convey sparks to distant combustibles?**
[.252(a)(2)(viii)]

☐ Yes ☐ No

**32.** **Based on interviews with a representative number of maintenance and contractor employees, have hot work permits required precautions, whenever welding on components (e.g., steel members, pipes, etc.) that could transmit heat by radiation or conduction to unobserved combustibles?**
[.252(a)(2)(x)] & [.252(a)(2)(xii)]

☐ Yes ☐ No

**33.** **Based on interviews with a representative number of maintenance and contractor employees, have hot work permits identified hazards associated with welding on walls, partitions, ceilings or roofs with combustible coverings or welding on walls or panels of sandwich-type construction?**
[.252(a)(2)(xi)]

☐ Yes ☐ No

**34.** **Based on interviews with a representative number of maintenance and contractor employees, has management established areas and procedures for safe welding and cutting based on fire potential?**
[.252(a)(2)(xiii)]

☐ Yes ☐ No

**35.** **Based on interviews with a representative number of maintenance and contractor employees, has management designated the "individual" responsible for authorizing cutting and welding operations in process areas?**
[.252(a)(2)(xiii)(B)]

☐ Yes ☐ No

**36.** **Based on interviews with a representative number of maintenance and contractor employees, has management ensured that welders, cutters and supervisors are trained in the safe operation of their**

**equipment?**
[.252(a)(2)(xiii)(D)]

☐ Yes ☐ No

**37. Based on interviews with a representative number of contractors and contractor employees, has management advised outside contractors working on the site about all hot work permitting programs?**
[.252(a)(2)(xiii)(D)]

☐ Yes ☐ No

**38. Based on interviews with a representative number of maintenance and contractor employees, has the Supervisor determined if combustibles are being protected from ignition prior to welding by moving them, shielding them, or scheduling welding around their production?**
[.252(a)(2)(xvi)(A)(B) & (C)]

☐ Yes ☐ No

**1910.119(l) - MANAGEMENT OF CHANGE**

The intent of this paragraph is to require management of all modifications to equipment, procedures, raw materials, and processing conditions other than "replacement in kind" by identifying and reviewing them prior to implementation of the change. Minimum requirements for management of change include:

- Establishing written procedures to manage change;
- Addressing the technical basis, impact on safety and health, modifications to operating procedures, necessary time period, and authorizations required;
- Informing and training employees;
- Updating process safety information and operating procedures and practices.

***Records Review***

**1. Are the written procedures adequate for managing changes (except for "replacements in kind") to process chemicals, technology, equipment, and procedures and changes to facilities that affect a covered process?** [.119(l)(1)]

☐ Yes ☐ No

Note: Review procedures that address responsibilities, steps for assessing risks and approving changes, requirements for reviewing designs for temporary and permanent changes, steps needed to verify that modifications have been made as designed, variance procedures, time limit authorizations for temporary changes, and steps required to return the process to status quo after temporary changes.

Tip: The intent of the MOC program is to review and approve proposed changes prior to implementation to ensure the change will not introduce safety hazards. The site should document a procedure for managing changes to the covered process. The plan should define the person(s) responsible for

approving changes and requirements for handling temporary changes, as well as changes in emergency situation when the designated person(s) with the authority to approve changes is not available.

**2. Do the procedures assure that the technical basis for the proposed change is addressed prior to any change?**
[.119(l)(2)(i)]

☐ Yes ☐ No

Tip: The site should ensure that the request for change procedure includes the requirement of document the technical basis of the change. The auditor should look for such documentation on a change request form.

**3. Do the procedures assure that the impact of the change on safety and health is addressed prior to any change?**
[.119(l)(2)(ii)]

☐ Yes ☐ No

Tip: One of the reasons behind the developing an MOC program is to ensure that changes made to the system do not introduce unwanted safety and health consequences to employees to the community. The employer should document a plan to evaluate each proposed change in light of the potential safety and health related consequences. The means of accomplishing the review differ widely, from a complete process hazard analysis to a checklist of questions that guide the site though an evaluation of potential safety consequences and recommendations for improvements.

**4. Do the procedures assure that modifications to operating procedures are addressed prior to any change?**
[.119(l)(2)(iii)]

☐ Yes ☐ No

Tip: The site should verify that operating procedures are modified to reflect the change. Often the change requires form has a checklist to verify that the procedures were updated. The auditor should look for revision dates that correspond to the time of the change.

**5. Do the procedures assure that the proposed date of change is addressed prior to any change?**
[.119(l)(2)(iv)]

☐ Yes ☐ No

Tip: The site should ensure that the MOC procedure is designed to handle temporary changes. The procedure should establish time limits for temporary changes as well as a method for ensuring that the process is returned to normal at the end of the time period.

**6. Do the procedures assure that the authorization requirements for the proposed change are addressed prior to any change?**
[.119(l)(2)(v)]

☐ Yes ☐ No

Tip: The MOC procedure should define those persons (by job title) who have the authority to approve a change. The designated approvers may be different based on the area affected by the proposed change.

**7. Are employees involved in operating the process, and maintenance and contract employees whose job tasks will be affected the change, informed of, and trained in, the change prior to start-up of process or affected part of process?**
[.119(l)(2)(i)]

☐ Yes ☐ No

Tip: The site's MOC program should document a means to ensure that affected employees are informed of the change and trained on the new procedures for operation or maintenance activities, as necessary. The means of communication may be oral or written. However, the communication is affected, the employer should be sure to have documented backup.

**8. Is the process safety information required by paragraph (d) (process safety information) updated if changed?**
[.119(l)(4)]

☐ Yes ☐ No

Tip: The MOC program must include the requirement to update the process safety information in the event of a change. The change request form may include a space to verify that the information has been updated.

**9. Are the operating procedures or practices required by paragraph (f) (operating procedures) updated if changed?**
[.119(l)(5)]

☐ Yes ☐ No

Tip: Changes to process operating procedures as well as any specific safe work practices (for example equipment specific lockout/tagout procedures) must be made, if appropriate, prior to implementing the change. The change request forms may have a space to verify that the procedures were updated as necessary. Procedure revision histories should show updates that correspond to the time of the change.

***Onsite Conditions***

**10. Do observations of newly or recently modified process chemicals, technology, equipment, or procedures (except "replacement in kind") indicate that the Management of Change procedures have been implemented?**
[.119(l)(1)]

☐ Yes ☐ No

Note: Determine if records are available to support the procedures for new or revised processes found in the facility.

Tip: The auditor should look for evidence that MOC documentation has been completed for modifications to the covered process. The auditor may research revisions of the process operating procedures and look for the associated MOC documentation describing the exact nature of the change. The auditor should verify that the additional documentation updates are completed.

***Interviews***

**11. Based on interviews with operators, maintenance employees and contractor employees, are procedures implemented to manage changes to existing process chemicals, technology, equipment, facilities, and procedures?**
[.119(l)(1)]

☐ Yes ☐ No

Tip: Site employees responsible for the operation, maintenance and design of the covered process system should explain the procedures developed to control changes to the covered process systems.

Who is authorized to propose changes? What is the means used to propose changes? Who is responsible for critiquing the technical basis for the change? Who determines whether or not a hazard analysis is required, and what is the basis for the determination? Who is responsible for updating the process safety information?

**12. Based on interviews with operators, maintenance employees and contractor employees, is training in process changes provided to employees whose job tasks will be affected by the changes prior to start-up?**
[.119(l)(3)]

☐ Yes ☐ No

Tip: The employees should be asked to describe the procedure used to ensure that the affected employees are notified of the change and rained on the modified procedures.

**1910.119(m) - INCIDENT INVESTIGATION**

The site is required to investigate each incident which resulted in, or could reasonably have resulted in, a catastrophic release of a highly hazardous chemical into the workplace. An investigation shall be initiated no later than 48 hours following the incident. An investigation team shall be established and a report prepared which includes:

- Date of the incident;
- Date the investigation began;
- Description of the incident;
- Factors that contributed to the incident; and,
- Recommendations from the investigation.

The site is required to establish a system to promptly address the incident report findings and recommendations, documenting all resolutions and corrective actions. Incident reports shall be reviewed with all affected personnel whose job tasks are relevant to the investigation and maintained for five years.

***Records Review***

**1. Has each incident that resulted in, or could reasonably have resulted in a catastrophic release of highly hazardous chemicals in the workplace been adequately investigated?**
[.119(m)(1)]

☐ Yes ☐ No

Tip: The site should document an incident investigation report for every incident that resulted in a release.

**2. Have incident investigations been initiated as promptly as possible, but not later than 48 hours following the incident?**
[.119(m)(2)]

☐ Yes ☐ No

Tip: The incident reports should be documented. The site should document the start of the investigation and ensure that it begins within 48 hours of the incident report.

**3. Have incident investigation teams been established?**
[.119(m)(3)]

☐ Yes ☐ No

**Do the teams contain at least one person who was involved in the incident that is knowledgeable in the process, and other members with appropriate knowledge and experience to thoroughly investigate and analyze the incident?**

☐ Yes ☐ No

**Has a contractor employee been included on the team if the incident involved the work of the contractor?**

☐ Yes ☐ No

Tip: Incidents must be investigated by a team of individuals who understand the process and will be able to properly identify contributing factors and deduce the root cause. Appropriate representatives from Operations, Maintenance, Engineering and Safety should be chosen. If contractors are involved in the incident, they must be included on the investigation team.

**4. At the conclusion of the investigation, have incident investigation reports been prepared that include at minimum:**
[.119(m)(4)]

- **Date of the incident?** ☐ Yes ☐ No
- **Date the inspection began?** ☐ Yes ☐ No
- **A description of the incident?** ☐ Yes ☐ No
- **The factors that contributed to the incident?** ☐ Yes ☐ No
- **Any recommendations resulting from the investigation?** ☐ Yes ☐ No

Tip: There should be a format for reporting incidents and investigations which ensures that the information listed above is documented. The investigation team should be sure to document recommended corrective actions to be taken to prevent the incident from recurring.

**5. Has a system been established to promptly address and resolve the incident investigation report findings and recommendations?**
[.119(m)(5)]

☐ Yes ☐ No

Tip: The site should have a plan for ensuring that recommendations from the incident report are addressed and corrective actions taken are documented. The site should assign persons responsible for resolving the recommendations and set target completions dates.

**6. Have resolutions and corrective actions from the incident investigation reports been documented?**
[.119(m)(5)]

☐ Yes ☐ No

Tip: Corrective actions taken to resolve recommendations from the incident investigation must be documented to maintain a complete history of the process. The site should ensure that the incident investigation report is followed through to completion. The list of recommendations may reference other documents, such as change request forms for those findings that required a process modification to reduce the likelihood of a reoccurrence.

**7. Have incident investigation reports been reviewed with all affected personnel whose job tasks are relevant to the incident findings including contract employees, where applicable?**
[.119(m)(6)]

☐ Yes ☐ No

Tip: In an effort to increase the employee's knowledge of the process and its hazards so as to minimize the chance for reoccurrence, they must be aware of the findings of the report so they understand the contributing factors, the root cause, and what could have been done to prevent the incident from occurring. The site should document that this information is disseminated to employees.

This information may be passed on orally, for example in a special safety meeting or in a daily shift pass-down meeting. The site may wish to circulate the incident report for each employee to review. In either case, the site should document that the information was passed along, by documenting the minutes of the meeting or sending a read and initial sheet with the report for employees to sign and turn in to the person in charge of the Incident Team.

**8. Is the site retaining incident investigation reports for a period of five years?**
[.119(m)(7)]

☐ Yes ☐ No

Tip: The site should ensure that the complete incident investigation reports and documented resolution of recommendations should be retained for at least five years. The auditor should review the incident files to ensure the reports are being retained.

***Onsite Conditions***

**9. Do observations of a representative sample of process components involved in incident investigations indicate that recommendations have been resolved?**
[.119(m)(5)]

☐ Yes ☐ No

Note**:** Compare the corrective actions outlined in the investigation documentation with the actual equipment, procedures, material use, etc.

Tip: The auditor should review the recommendations documented on any incident investigation reports and verify that these have been implement5ed. This may include reviewing operating and maintenance procedures to verify that the appropriate revisions have been made and ensuring that the required training has been completed and the appropriate training documentation is in place.

***Interviews***

**10. Based on interviews with a representative number of operators, maintenance employees and contractor employees, have all incidents that resulted in or could reasonably have resulted in a catastrophic release of highly hazardous chemicals in the workplace, been investigated?**
[.119(m)(1)]

☐ Yes ☐ No

Tip: The auditor should ask employees to describe the nature of incidents that have been investigated and the procedure followed to complete the investigations. How are incidents defined? Is there a procedure for investigating near missed (those situations which may have resulted in a release or hazardous consequence, but did not)?

**11. Based on interviews with a representative number of the members of past investigation teams, do the teams contain at least one person who was involved in the incident and is knowledgeable in the process, and other persons with appropriate knowledge and experience to thoroughly investigate and analyze the incident?**
[.119(m)(3]

☐ Yes ☐ No

**Was a contractor employee included in the team if the incident involved work of the contractor?**
☐ Yes ☐ No

Tip: The employees should be asked to describe their involvement in the incident investigation process. Who determines which persons are to be involved in the investigation? Are affected employees (and contractor employees) involved in the investigation process?

**12. Based on interviews with a representative number of employees whose job tasks are relevant to the past incident investigation findings, have the investigation reports been reviewed with the affected personnel?**
[.119(m)(6)]
☐ Yes ☐ No

Tip: The auditor should ask employees to describe the means used to inform affected employees of the results of the incident investigation, including the root cause and supporting causes, the recommended action items to prevent reoccurrence of the incident, and distribution of responsibility for implementing the recommendations.

**1910.119(n) - EMERGENCY PLANNING AND RESPONSE**

The intent of this paragraph is to require the site to address what actions employees are to take when there is an unwanted release of highly hazardous chemicals. The site must establish and implement an emergency action plan in accordance with the provisions of 1910.38(a) and include procedure for handling small releases. Certain provisions of the hazardous wastes and emergency response standard, 1910.120(a), (p) and (q) may also apply.

***Records Review***

**1. Has an emergency action plan been established and implemented for the entire plant in accordance with the requirements of 1910.38?**
[.119(n)] or [.38(a)(2)]

☐ Yes ☐ No

**Does the plan address the following:**
- **Escape procedures and routes?** ☐ Yes ☐ No

Tip: The emergency action plan should include a written description of how the emergency evacuation program will be initiated. The plan should include a summary of notification measures and an explanation of how all employees will be notified of the need for an evacuation. Also included should be

a facility site plan and marked routes for evacuation from the facility and assembly areas.

- **Procedures for post-evacuation employee accounting?** ☐ Yes ☐ No

Tip: The emergency action plan should indicate the locations for employee assembly following an evacuation and should designate the personnel with responsibility for accounting for employees after evacuation.

- **Preferred means to report emergencies?** ☐ Yes ☐ No

Tip: The emergency evacuation plan should include a notification list-indicating the means and method for reporting the emergency, including the Fire Department, the Police, Hospitals, and Corporate Personnel.

- **Duties and procedures of employees who:**
- **Remain to operate critical equipment** ☐ Yes ☐ No

Tip: In emergency situations where continued operation is necessary, personnel who have these responsibilities should have detailed procedures reflecting their responsibilities and the types of safety precaution that should be taken to protect them from exposure to hazards.

- **Perform rescue and medical duties?** ☐ Yes ☐ No

Tip: The emergency action plan should have written procedures for those employees who are responsible for rescue and recovery (see also confined space rescue requirements) and medical duties (such as First Aid or CPR) during emergencies. In particular, an emergency response coordinator or an incident commander should be named in the plan.

- **The names of persons or locations to contact for more action plan information?** ☐ Yes ☐ No

Tip: A central contact person should be appointed with the facility and should be responsible for providing additional information to employees and agencies regarding emergency response.

- **Employee alarm systems?** ☐ Yes ☐ No

Tip: Alarm systems consistent with OSHA 1910.165 should be included in the emergency action plan.

**2. Is the written plan available?**
[.38(a)(1)]

☐ Yes ☐ No

Tip: The plan must be in writing and should have been reviewed and/or updated within the last year.

**3. Are there a sufficient number of persons designated and trained to assist in the safe and orderly emergency evacuation of employees?**
[.38(a)(5)(i)]

☐ Yes ☐ No

Tip: OSHA does not define the number of personnel that it deems sufficient to ensure orderly evacuation. Typically, this is one person per 25 to 30 that will be part of the evacuation.

**4. Is the plan reviewed with each employee covered by the plan; initially when the plan is developed; and whenever the employees' responsibilities or designated action under the plan change; or whenever the plan is changed?**
[.38(a)(5)(ii)]

☐ Yes ☐ No

Tip: Emergency action plans should be reviewed with employees during their initial orientation (documentation should be available) and then reviewed on a regular basis. If employers are reassigned to a different location, different duties or now handle different hazardous materials, they should be retrained on the provisions of the emergency action plan.

The plan should also be exercised on a regular basis and during the different shifts employees work.

**5. Does the emergency action plan cover procedures for handling small releases?**
[.119(n)]

☐ Yes ☐ No

Tip: The written emergency action plan should include requirements for handling small releases of hazardous materials. These procedures include those releases that are covered in the scope of an employee's job responsibilities.

**6. Is an alarm system established and implemented which complies with 1910.165?**
[.165(b-e)]

☐ Yes ☐ No

**Are the alarms:**

- **Distinctive for each purpose of the alarm?**

☐ Yes ☐ No

Tip: OSHA may regard the use of the fire alarm tone for emergency evacuation in the cases of hazardous material releases as deficient.

- **Capable of being perceived above ambient noise and light levels by all employees in the affected portions of the workplace?**

☐ Yes ☐ No

Tip: During the audit, the auditor should review locations in the facility where alarms may not be audible (i.e., high noise or remote locations).

- **Distinctive and recognizable as a signal to evacuate the work area or perform actions designated under the plan?**
  ☐ Yes ☐ No

Tip: Consistent with the question above, there should be distinctive alarms for each material that separate actions are required under the emergency action plan.

- **Maintained in operating condition?** ☐ Yes ☐ No

Tip: The auditor should view the site's records on the alarm system tests.

- **Tested appropriately and restored to normal operating condition as soon as possible after test?**
  ☐ Yes ☐ No

- **Non-supervised systems tested not less than every two months?**
  ☐ Yes ☐ No

- **Supervised systems tested at least annually?**
  ☐ Yes ☐ No

Tip: Routine tests and documentation of such tests should be maintained by the site.

- **Serviced, maintained, and tested by appropriately trained persons?** ☐ Yes ☐ No

Tip: The alarm system should be included in the PM (and mechanical integrity) system for the facility. The auditor should review these records and review the qualifications of the alarm system personnel or contractor.

- **If they are manual alarm systems, are they unobstructed, conspicuous and readily accessible?** ☐ Yes ☐ No

Tip: The auditor should check the placement of alarm pull stations (where applicable) and signage for clarity and location.

**7. Does the written emergency response plan meet the requirements of 1910.120(q)?** [.120(q)]
☐ Yes ☐ No

Tip**:** Applicability of 1910.120(q) will vary depending upon whether there is full evacuation versus employee-based response teams.

**8. If employees are engaged in emergency response (except clean-up operations), does the plan address the following:**
[.120(q)]

Tip: These questions only applies to those facilities where HAZWOPER is applicable)

- **Coordination with outside agencies?** ☐ Yes ☐ No

Tip: The HAZWOPER standard requires that emergency response plans include information regarding the facility's plans to interact with the emergency management system in the surrounding community, in particular, the plan must include information on the following:
- Local emergency planning committee responsibilities;
- Fire Department;
- Police Department;
- Hospital availability and readiness;
- Other EMS personnel;
- Local or state disaster preparedness; and
- Local, state and federal environmental notifications.

- **Personnel roles, lines of authority, training and communication?** ☐ Yes ☐ No

Tip: The HAZWOPER standard requires that facilities establish facility incident commanders and an incident command system. Depending on the scope of the facility HAZMAT team and response, the incident command system may also include a number of additional personnel including: Safety and Public Affairs.

The standard also requires that raining for facility personnel be spelled out and a rationale for such training be developed. The interview questions below reflect the requirements for training personnel to appropriate levels of HAZWOPER response.

Also, the HAZWOPER rule requires facilities to develop a communication program to ensure that emergency responses proceed smoothly. The communication plan should outline radio frequencies to be used by the facility responders and by the local EMS.

- **Emergency recognition and prevention?** ☐ Yes ☐ No

Tip: The emergency response plan should include a detailed assessment of the areas in which hazardous materials are stored and their overall likelihood of release. Best management practices for spill prevention and measures taken to reduce the likelihood of hazardous materials release should be included.

Auditors should be aware that the HAZWOPER standard does not require facilities to develop a new

emergency response plan simply to meet the requirements of the standard. The requirements may be met by compliance with a host of other regulations including the following:

- Spill prevention, control and countermeasures (SPCC) plan;
- Hazardous waste contingency plans as required by RCRA.

- **Safe distances and places of refuge?** ☐ Yes ☐ No

Tip: For facilities covered by the requirements of RMP, offsite consequence analysis will provide significant detail to requirements for safe distance. Facilities should develop plans that indicate where employees will congregate or shelter-in-place in the event of a hazardous materials release.

- **Site security and control?** ☐ Yes ☐ No

Tip: The HAZWOPER emergency response plan should provide a summary of site security measures and their utility during hazardous materials releases.

- **Evacuation routes and procedures?** ☐ Yes ☐ No

Tip: The plan should include the same information and detail as the emergency action plan regarding emergency evacuation plans.

- **Decontamination?** ☐ Yes ☐ No

Tip: The emergency response regulations require that emergency responders understand the requirements for decontamination from hazardous materials to which they may be exposed. Although training requirements reflect only a general education in decontamination, specific requirements for decontamination (including procedures) should be spelled out in the emergency response plan for the facility.

- **Emergency medical treatment and first aid?** ☐ Yes ☐ No

Tip: In-plant provisions for first aid and medical treatment should be outlined in the emergency response plan, as should coordination with local hospitals and other emergency medical providers.

- **Emergency alerting and response procedures?** ☐ Yes ☐ No

Tip: The emergency plan must outline how facility personnel and emergency responders are going to receive notification of the emergency and how that information will be used.

- **Critique of response and follow-up?** ☐ Yes ☐ No

Tip: The emergency response plan must include some method for determining whether the response has been successful and the elements of the response that should be modified or improved in the future. The critique should be accomplished for drills and for actual emergency responses. IN many cases, the

critique will take the form of a checklist or questionnaire.

- **PPE and emergency equipment?** ☐ Yes ☐ No

Tip: The emergency response plan should include an inventory of PPE and other emergency equipment and where necessary, a brief description of when and where the equipment should be used.

***Onsite Conditions***

**9. Do observations of a representative sample of alarm systems indicate that they comply with the requirements in .165(b-e)?**
[.165(b-e)]

☐ Yes ☐ No

**Are the alarms:**

- **Distinctive for each purpose of the alarm?**
☐ Yes ☐ No

Tip: Generally, a fire alarm is not suitable for alarming on the occasion of a hazardous materials release. A fire alarm system that can generate different or multiple tones would be suitable as a hazardous materials alarm.

- **Capable of being perceived above ambient noise and light levels by all employees in the affected portions of the workplace?**
☐ Yes ☐ No

Tip: The auditor should check the alarm function in high noise areas of the facility.

- **Distinctive and recognizable as a signal to evacuate the work area or perform actions designated under the plan?**
☐ Yes ☐ No

Tip: The alarm system is to be called into action for employees how have responsibilities under the plan and a warning to all employees to be aware of potential exposures to hazardous materials. As such, the alarm system must be distinctive for these purposes.

- **Maintained in operating condition?** ☐ Yes ☐ No

Tip: The auditor should check with test records to determine if problems are discovered and fixed promptly.

- **Tested appropriately and restored to normal operating condition as soon as possible after test?**

☐ Yes ☐ No

Note: Be present for an alarm test if possible or review video if available.)

Tip: If at all possible, the auditor should observe the alarm system.

- **Tested no greater than every two months?**

☐ Yes ☐ No

Tip: The auditor should review the test records to determine the frequency of tests.

- **Serviced, maintained, and tested by appropriately trained persons?**

☐ Yes ☐ No

Tip: Review the qualifications of the personnel or the alarm system technicians who perform maintenance on the system.

- **If they are manual alarm systems, are they unobstructed, conspicuous and readily accessible?**

☐ Yes ☐ No

Tip: Review access to the alarms.

**10. Do observations of the evacuation routes indicate that they are not blocked, locked, or barricaded?**
[.36(b)(4)]

☐ Yes ☐ No

Tip: Be sure to walk the routes and look for clutter or other items which might impede egress.

**11. Do observations of the evacuation routes indicate that there are readily visible signs for evacuation routes leading to safe locations?**
[.36(b)(5)]

☐ Yes ☐ No

Tip: Auditors should observe signage and ensure that a reasonable employee or contractor could follow the signs to an exit.

**12. Do observations of a representative sample of the evacuation route signs during dark conditions indicate that they are adequately illuminated?**
[.36(b)(6)]

☐ Yes ☐ No

Tip: Auditors should be aware of areas that are routinely poorly lit that must be used during an evacuation and determine if a person could evacuate in a timely manner with little light.

***Interviews***

**13. Based on interviews with employees who have been identified as being likely to discover releases or are assigned other emergency response duties, are they provided training?**
[.120(q)(6)]

☐ Yes ☐ No

**Is the training based on the duties they are expected to perform?**

☐ Yes ☐ No

Tip: The auditor should review training materials and records prior to performing the audit. Based upon the curriculum provided to the employees, the auditor should tailor questions that will determine whether employees have adequate comprehension of the materials being covered in the training course.

**14. Based on interviews with employees who are likely to discover hazardous substance releases, can they demonstrate competency in the provisions listed in the first responder awareness level:**
[.120(q)(6)(i)]

- **Understanding of what hazardous substances are, and the risks associated with them in an accident?** ☐ Yes ☐ No
- **Understanding of potential outcomes associated with an emergency when hazardous substances are present?** ☐ Yes ☐ No
- **Ability to recognize the presence of hazardous substances in an emergency?** ☐ Yes ☐ No
- **Ability to identify the hazardous substances, if possible?** ☐ Yes ☐ No
- **Understanding the role of the first responder awareness individual in the employer's emergency response plan, including site security and control and the U.S. Dept. of Transportation's Emergency Response Guidebook?** ☐ Yes ☐ No
- **Ability to realize the need for additional resources, outside agencies and make appropriate notifications to the communications center?** ☐ Yes ☐ No

Tip: OSHA has provided a detailed summary of the training requirements for emergency responders. Employees at the first responder awareness level are required to understand three basic concepts: Hazard Recognition, Hazard Identification and Proper Notification.

The auditor should interview employees trained at this level to ensure that they can recognize the

existence of a hazard, identify the hazardous materials in their workplace, and notify the appropriate personnel in the facility to engage the emergency response system.

**15. Based on interviews with employees who will take defensive action in containing and controlling a release as part of the response, can they demonstrate the competencies for the first responder operations level:**
[.120(q)(6)(ii)]

- **Knowledge of the basic hazard and risk assessment techniques?** ☐ Yes ☐ No
- **Knowledge of how to select and use the proper PPE provided to them?** ☐ Yes ☐ No
- **Understanding of basic hazardous materials terms?** ☐ Yes ☐ No
- **Knowledge of how to perform basic containment, confinement, and control operations within the capability of their unit?** ☐ Yes ☐ No
- **Knowledge of how to implement basic decontamination procedures?** ☐ Yes ☐ No
- **Knowledge of relevant standard operating procedures and termination procedures for a response?** ☐ Yes ☐ No

Tip: Employees at the first responders' operation level are assumed to be employees that will only take defensive actions (limit the spread of the spill) during a hazardous materials release. The auditor should review the raining materials provided to employees, OSHA's training requirements, and conduct an interview with employees to verify their knowledge of the material covered during training.

**16. Based on interviews with employees who will take offensive action in containing and controlling a release as part of the response, can they demonstrate the competencies for a hazardous materials (HAZMAT) technician:**
[.120(q)(6)(iii)]

- **Knowledge of how to implement the employer's emergency response plan?** ☐ Yes ☐ No
- **Knowledge of the classification, identification, and verification of known and unknown materials using field survey instruments and equipment?** ☐ Yes ☐ No
- **Ability to function within an assigned role in the Incident Command System?** ☐ Yes ☐ No
- **Knowledge of how to select and use proper specialized chemical PPE**

**provided to them?** ☐ Yes ☐ No

- **Understanding of hazard and risk assessment techniques?** ☐ Yes ☐ No
- **Ability to perform advanced control, containment, and/or confinement operations within the capability of their unit?** ☐ Yes ☐ No
- **Understanding of how to implement decontamination procedures?** ☐ Yes ☐ No
- **Understanding of termination procedures?** ☐ Yes ☐ No
- **Understanding of basic chemical and toxicological terminology and behavior?** ☐ Yes ☐ No

Tip: Hazardous Materials (HazMat) Technicians are employees who have received at least 24 hours of training in hazardous materials handling and offensive spill control and cleanup. As with the training levels above, the auditor should review the training materials provided to the employees, as well as OSHA's training requirements, and then conduct an interview with covered employees to determine their understanding of the materials.

**17. Based on interviews with a representative number of operator and maintenance employees, do they know the emergency action plan to protect themselves in an emergency?**
[.38(a)]

☐ Yes ☐ No

Tip: The auditor should interview personnel to determine if they have reviewed the components of the emergency action plan and know what to do in an emergency action. Those employees with responsibility for accounting for other employees of for specific actions under the plan should also be interviewed. For employees without responsibilities under the plan, the auditor should ensure that they are aware of the assembly points for evacuation.

**1910.119(o) - COMPLIANCE AUDITS**

The intent of this paragraph is to require employers to self-evaluate the effectiveness of their PSM program by identifying deficiencies and assuring corrective actions. Minimum requirements include:

- Audits every three years;
- Maintenance of audit reports for at least the last two audits;
- Audits conducted by at least one person knowledgeable in the process;
- Documentation of an appropriate response to each finding;
- Documentation that the deficiencies found have been corrected.

***Records Review***

**1. Has the employer certified in writing that there has been an audit of compliance with PSM at least every three years?**
[.119(o)(1)]

☐ Yes ☐ No

Tip: Sites should retain a record of the appropriate PSM compliance audits, in addition to the audit report.

**2. Do the audit reports include an evaluation of all the required paragraphs of the PSM standard?**
[.119(o)(1)]

☐ Yes ☐ No

Tip: The audit report should cover all of the paragraphs of the PSM standard. Where paragraphs are not applicable (i.e., Trade Secrets), specific mention of applicability should be made in the audit report.

**3. Was the compliance audit conducted by at least one person who was knowledgeable in the process?**
[.119(o)(2)]

☐ Yes ☐ No

Tip: Although OSHA had originally intended to require a team approach, all that the final rule required is that at least one person be knowledgeable in the process. The standard does not set specific levels or details regarding competency.

**4. Has a report of the findings been developed for each audit?**
[.119(o)(3)]

☐ Yes ☐ No

Tip: OSHA does not specify the format of the report.

**5. Has the employer promptly determined and documented an appropriate response to each of the findings?**
[.119(o)(4)]

☐ Yes ☐ No

Tip: As with PHAs, the site needs to develop a corrective action plan and provide detailed documentation of all responses to the audit items.

**6. Does the employer document that deficiencies have been corrected?**
[.119(o)(4)]

☐ Yes ☐ No

Tip: Any deficiencies discovered during the audit should be corrected and corrections documented along with details discussing the responses to the findings. Where recommendations are made that represent BMP, but are not compliance driven, if the site decides that the recommendation won't be carried through, they must detail their rational for not doing it and the Audit Team Leader must agree.

**7. Has the employer retained the two most recent compliance audit reports?**
[.119(o)(5)]

☐ Yes ☐ No

Tip: Compliance audits should be retained only through two cycles. If audits were done sooner than two in six years, than the third oldest audit reports should be discarded. A recommendation should be included in the findings stating this.

***Interviews***

**8. Based on interviews with auditors, are they knowledgeable in processes?**
[.119(o)(2)]

☐ Yes ☐ No

Tip: Review the names and positions of the last audit team to determine if they were knowledgeable in the process.

**9. Based on interviews with a representative number of employees and their designated representatives, do they have access to compliance audit information?**
[.119(c)(3)]

☐ Yes ☐ No

Tip: OSHA requires that the audit reports be available to employees, as with the other PSM documentation. Employees should at least know where to go to see the report if they so choose.

**1910.119(p) - Trade Secrets**

The intent of this paragraph is to require employer to provide all information necessary to comply with the standard to personnel developing paragraphs (d), (e), (f), (n) and (o) without regard to possible trade secrets. In addition, employees and their designated representatives shall have access to trade secret information contained within documents required to be developed by the standard.

***Records Review***

**1. Has all information necessary been provided to those persons responsible for compiling the PHA information, without regard to possible trade secret status of such information?**
[.119(p)(1)]

- **development of the PHAs?** ☐ Yes ☐ No
- **development the SOPs?** ☐ Yes ☐ No

- **incident investigations?** ☐ Yes ☐ No
- **emergency planning & response?** ☐ Yes ☐ No
- **compliance audits?** ☐ Yes ☐ No

**2. Do employees and their designated representatives have access to trade secret information contained in the PHA and other documents required by the PSM standard?**
[.119(p)(3)]

☐ Yes ☐ No

***Interviews***

**For employees involved in specific duties:**

**1. Based on interviews with a representative number of employees involved in compiling required information, has all information necessary been provided to them without regard to possible trade secret status of such information:**
[.119(p)(1)]

- **developing PHAs** ☐ Yes ☐ No
- **developing SOPs** ☐ Yes ☐ No
- **investigating incidents** ☐ Yes ☐ No
- **emergency response** ☐ Yes ☐ No
- **auditing compliance** ☐ Yes ☐ No

**Employees and Representatives:**

**2. Based on interviews with a representative number of employees and their designated representatives, do they have access to trade secret information contained within the PHA and other documents required to be developed by the standard?**
[.119(p)(3)]

☐ Yes ☐ No

Note: this access is subject to the provisions set forth in 1910.1200(i)(1).

# Appendix B - Clarifications and Interpretations of the PSM Standard

The guidance contained in this appendix is provided for compliance assistance. It shall be followed in interpreting the PSM standard for compliance purposes. Unless otherwise noted, all paragraph citations refer to 29 CFR 1910.119.

This appendix contains clarifications agreed to in a settlement agreement dated April 5, 1993, between OSHA, the United Steelworkers of America, the Oil, Chemical and Atomic Workers International Union, and the Building and Construction Trades Department of the AFL-CIO. The settlement agreement clarifications reflect modifications jointly and cooperatively agreed to by the above parties and by the Chemical Manufacturers Association, the American Petroleum Institute, the Dow Chemical Company, and the National Petroleum Refiners Association.

Where possible, clarifications and interpretations have been presented in a question-and-answer format.

NOTE: MNOSHA plans to include additional clarifications and interpretations in this appendix through future page changes to this instruction. The federal OSHA webpage should be checked for current Clarifications and Interpretations except for the definition of chemicals in "storage" as Minnesota OSHA has not adopted the current Federal Memo to Enforcement on "storage".

**(a) Application**

**(a) Registration**

**Do covered establishments have to register with MNOSHA?**
**No.** There is **no** requirement that establishments covered by the standard register with or otherwise notify MNOSHA.

**(a) Explosives -- fireworks manufacture**

**How does the PSM standard apply to pyrotechnics (fireworks) and explosives?**
The PSM standard amended the scope of 29 CFR 1910.109, Explosives and blasting agents, by revising paragraph (k), which requires that the manufacturer of explosives and pyrotechnics comply with 29 CFR 1910.119. As defined at 1910.109(a)(10), pyrotechnics are commonly referred to as fireworks. Employers who manufacture explosives and fireworks must comply with both 29 CFR 1910.109 and 1910.119.

The applicability of 29 CFR 1910.109 to employers who manufacture fireworks is delineated in OSHA Instruction CPL 2.73, Fireworks Manufacturers: Compliance Policy. In accordance with that directive, a fireworks plant employer can be cited for violation of 29 CFR 1910.109 with reference to certain National Fire Protection Association (NFPA) standards in NFPA 1124, Code for the Manufacture, Transportation and Storage of Fireworks.

**What is the role of the Bureau of Alcohol, Tobacco and Firearms (BATF) vis-à-vis the PSM standard and fireworks manufacture?**
By 27 CFR 55 Subpart K, BATF regulates the storage, including minimum distances, of explosive materials including fireworks in the workplace. As such, BATF limits the amount of special fireworks, pyrotechnic composition, and explosive materials used to assemble fireworks in processing building to no more than 500 pounds. Also, the maximum quantity of flash powder permitted by BATF in any fireworks process building is 10 pounds. These BATF limitations should not be confused with the applicability of the PSM standard to **any** amount of fireworks being manufactured.
**(a) Laboratories**

**Does the PSM standard apply to laboratory and research operations?**
A laboratory or research operation involving at least the threshold quantity of one or more highly hazardous chemicals is subject to the PSM standard.

**(a) Flammable liquids**

**Are processes involving flammable liquids (e.g., ethyl alcohol) covered by the standard?**
Quantities of flammable liquids that are in process in quantities above 10,000 lbs. are covered by the standard with the exception of quantities that are stored in atmospheric storage tanks without the benefit of cooling or refrigeration. When calculating quantities of flammable liquids in the process, the quantity of flammable liquids in atmospheric storage tanks is excluded.

Flammable liquids that are stored on a tank farm (e.g., a wholesale gasoline regional tank farm) where only transferring and storage are done are not covered by the PSM standard. They are, however, covered under 1910.106.

**(a)(1)(i) Hydrogen chloride (HCL)**

**Does the PSM standard apply to muriatic (32% HCL) acid?**
The chemical names: hydrogen chloride (HCL) and anhydrous hydrochloric acid are included in the highly hazardous chemicals listing in Appendix A of the PSM standard. Anhydrous (without water) hydrochloric acid is hydrogen chloride. Both hydrogen chloride and anhydrous hydrochloric acid are identified by the same Chemical Abstract Service (CAS) Number 7647-01-0, as denoted in Appendix A. Hydrochloric acid (muriatic acid) -- i.e., a solution of hydrogen chloride gas in water -- is not listed in Appendix A and therefore is not considered to be a highly hazardous chemical subject to the PSM standard.
**(a)(1)(i) Highly hazardous chemicals (HHCs)**

**What is meant by "Formaldehyde (Formalin)" listed in Appendix A of the PSM standard?**
This highly hazardous chemical should be listed to read:

Formaldehyde (37% by weight or greater). Any amount of mixture of Formaldehyde, less than 37%-by weight, in solution would not be covered by the PSM standard.

**Does the PSM standard apply to solutions of Dimethylamine?**
Anhydrous Dimethylamine, identified by Chemical Abstract Service (CAS) Number 124-40-3, is listed in Appendix

A of the PSM Standard as a highly hazardous chemical. Dimethylamine in aqueous solutions, which is not listed in Appendix A, is not considered to be a highly hazardous chemical covered by the PSM standard except when the solution qualifies as a flammable liquid.

**(a)(1)(i) HHCs -- mixtures**

**Does the threshold quantity listed under Appendix A of the PSM standard apply to the quantity of the whole mixture or just the quantity of the component chemical, or to neither (i.e., does the threshold quantity apply only to quantities of pure chemical unless otherwise specified in the appendix)?**

Except where a concentration is listed (e.g. hydrogen peroxide, 52% by weight or greater) or where Appendix A specifies an anhydrous chemical (e.g. hydrogen chloride, anhydrous), the threshold quantities listed in Appendix A will be based on the one percent test whereby the total weight of the Appendix A chemical in the process at a concentration of one percent or greater will count towards the threshold quantity listed. The employer does not need to include the weight of such chemicals in any portion of the process where the partial pressure of the chemical in the vapor space under handling or storage conditions is less than 10 millimeters of mercury.

**Does the PSM standard apply to an employer who uses cellulose nitrate in a concentration greater than 12.6% nitrogen to which water is added, producing a mixture containing greater than 23% water, which will not burn?**
Appendix A of the standard lists cellulose nitrate in concentrations of greater than 12.6% nitrogen as a chemical which presents a potential for a catastrophic event at or above the threshold quantity of 2500 pounds (1,133.9 kg). The standard does not distinguish between "wet" or "dry" cellulose nitrate.

Therefore, if an employer's process involves cellulose nitrate in a concentration greater than 12.6% nitrogen, with the total quantity of the mixture or solution at or above the threshold quantity -- no matter what percentage of water may be used in treatment -- the process is covered under the requirements of the PSM standard.

**(a)(1)(i) and (b) Covered process -- Hazardous waste operations**

**Does the PSM standard apply to the EPA-regulated and permitted RCRA hazardous waste treatment, storage and disposal (TSD) facilities, when such facilities keep on-site in one location a hazardous waste chemical in a concentration and quantity which exceeds the applicable threshold quantity of Appendix A. If so, why? If not, why not?**
Employers of worksites with TSD facilities which contain covered processes must comply with the PSM standard. The requirements of the PSM standard are intended to eliminate or mitigate workplace catastrophic releases of highly hazardous chemicals and resulting employee exposure to explosion, fire and toxic hazards.

**(a)(1)(i) and (b) Covered process -- dispersal of inventory**

**Can an employer who keeps threshold quantities of highly hazardous chemicals listed in Appendix A to 29 CFR 1910.119, such as ammonia, separated into smaller lots and used and stored in separate systems or locations, be exempt from the requirements of the PSM standard?**

From a storage standpoint, the 1910.119 standard would not apply to an employer who segregates his inventory by dispersing storage of highly hazardous chemicals, such as ammonia, in amounts which do not exceed the threshold quantity so that a release from one storage area would not contribute to or cause a release from others around the workplace. Additionally, an employer could reduce his on-site inventory of highly hazardous chemicals by ordering more frequent, smaller shipments so that they do not exceed the threshold quantities set forth in the PSM Standard.

**The PSM standard's non-mandatory Appendix C suggests that, if reduced inventory of highly hazardous chemicals is not feasible, an employer might consider dispersing inventory to several locations on-site. When are such materials to be considered part of a single process?**
Under the definition of "process" provided at 29 CFR 1910.119(b), any group of vessels which are interconnected and separate vessels which are located such that a highly hazardous chemical could be involved in a potential release shall be considered a single process. Inventories of highly hazardous chemicals would not be considered to be adequately dispersed if the storage vessels are connected with or in proximity to a covered process such that they could be involved in a potential release.

**What evaluation techniques are appropriate to determine adequate separation distances?**
MNOSHA has not developed, nor is it aware of, any standard evaluation technique to determine adequate distances to separate chemical inventories. If an employer chooses to disperse highly hazardous chemicals on-site, the separation distances would have to be determined on a case-by-case basis, considering such factors as the nature of the chemicals and covered processes, total inventories, threshold quantities of pertinent chemicals, and facility layout.

**(a)(1)(ii) Application -- 55-gallon drums**
**Would more than 10,000 pounds (4535.9 kg) of a flammable liquid stored together in 55-gallon (209-liter) drums be covered under the PSM standard?**
For the purposes of the PSM standard, this would be considered exempt as storage in atmospheric tanks (notwithstanding the definitions of "containers" and "tanks" in 29 CFR 1910.106), unless the drums are near a covered process, as described in the Q & A on "flammable liquids" at page 13 of this appendix. For the purposes of 1910.106, 55-gallon (209-liter) drums are covered in the definition of "container."

**(a)(1)(ii) Covered Process -- Flammable gases**
**For processes involving flammable gas mixtures, are the non-flammable components in a flammable gas mixture included when determining the threshold quantity?**
The non-flammable components contribute to the determination of threshold quantity, i.e., 10,000 pounds (4535.9 kg) or greater amounts of a flammable gas, as defined in 29 CFR 1910.1200(c) and noted below:

**Gas, flammable** means:

(a) A gas that at ambient temperatures and pressure forms a flammable mixture with air at a concentration of thirteen (13) percent by volume or less; or

(b) A gas that, at ambient temperature and pressure, forms a range of flammable mixtures with air wider than twelve (12) percent by volume, regardless of the lower limit.

**(a)(1)(ii) Covered process -- Flammable liquids**

**Does the PSM standard apply to processes in a paint manufacturing facility, which includes the mixing and blending of flammable liquids with other raw materials, and which typically involve few or no chemical reactions? Typically, the flammable products are processed below their normal boiling points and that several large batch vessels are located near each other, with an aggregate weight above the threshold quantity of 10,000 pounds (4535.9 kilograms).**
The requirements of the PSM standard would apply to such operations. The exemption provided in the standard at 1910.119(a)(1)(ii)(B) for situations involving flammable liquids applies only when such liquids are being stored in atmospheric tanks (where the tank pressure does not exceed 0.5 pounds per square inch gauge [p.s.i.g.]) or transferred and the liquids are kept below their normal boiling point without benefit of chilling or refrigeration. This exemption does not apply to a mixing and blending operation related to paint manufacturing.

**(a)(1)(ii)(A) Application -- Exceptions -- Hydrocarbon fuels**
**Does the PSM standard apply to ceramic manufacturing facilities utilizing propane in amounts exceeding 10,000 pounds as the fuel for firing ceramic ware in a process which does not involve any other highly hazardous chemicals?**
No. The PSM standard would not apply to such a situation.

**Does gasoline used as a fuel to test run inboard and outboard engines fall within the scope of the PSM standard?**
Gasoline used in such a manner does not fall within the scope of 1910.119, because it is used as a fuel in this situation and thus meets the exception at 1910.119(a)(l)(ii)(A). However, other OSHA standards, such as 1910.106, Flammable and combustible liquids, would apply.

**Does the PSM standard apply to a plant that has more than 10,000 pounds of hydrocarbon fuel on site where the fuel is used solely as a fuel for a furnace used to melt glass?**
The requirements of 1910.119 do not apply to this situation because 1910.119(a)(1)(ii)(A) of the standard specifically excludes from coverage hydrocarbon fuels used solely for workplace consumption as a fuel if the fuel is not part of a process containing another highly hazardous chemical covered by the standard.

**(a)(1)(ii)(A) Tote tanks**
**350-gallon tote tanks containing flammable liquids are used at a facility to refuel vehicles. Are they covered by the standard?**
No. 1910.119(a)(1)(ii)(a) exempts hydrocarbon fuels used solely for workplace consumption as a fuel (e.g., gasoline for vehicle refueling) if such fuels are not part of a process containing another highly hazardous chemical covered by the standard. They are, however, covered under 1910.106.

**(a)(1)(ii)(A) Fuels for heating**
**Are flammable liquids and gases used as fuels for such items as heaters or exchanges contained in (covered) processes also included within the coverage of the standard?**
Furnaces, boilers, heaters, etc., fueled by flammable liquids or gases -- regardless of the quantity of the fuel -- used in processes that are otherwise covered by the PSM standard (i.e., the existence of a threshold quantity of another highly hazardous chemical) are considered part of the process and are covered by the PSM standard. Flammable liquid-or-gas-fueled furnaces, boilers, etc., used in processes not otherwise covered by the PSM standard are exempt from the standard.

**(a)(1)(ii)(B) Tank farms**
**Are flammable liquids stored in a tank farm covered under the standard?**
Atmospheric tanks containing flammable liquids at bulk transfer terminals are not covered when the tanks are solely used for storage, or transfer to or from storage.

**(a)(1)(ii)(B) Flammable liquids**
**Does 1910.119(a)(l)(ii)(B) exempt all flammable liquids stored or transferred which are kept below their normal boiling point without the benefit of chilling or refrigeration, including, but not limited to, flammable liquids in atmospheric tanks?**
The exemption is limited to flammable liquids stored in atmospheric tanks or transferred which are kept below their normal boiling point without benefit of chilling or refrigeration. This exemption is applicable to flammable liquids in tanks, containers and pipes used only for storage and transfer. Similarly, stored flammable liquids in atmospheric containers, including cans, barrels and drums, would be exempt from coverage by the PSM standard. We recommend you carefully consider the definition of "process" to determine further applicability of the PSM standard in situations where flammable liquids are stored in tanks or containers at a worksite.

**(a)(2)(i) Retail facilities**
**What is the definition of "retail facilities" that are exempted from coverage by the PSM standard?**
With respect to enforcement of the PSM standard, a **retail facility** means an establishment that would otherwise be subject to the PSM standard at which more than half of the income is obtained from direct sales to end users.

**If an employer that would otherwise be covered by the PSM standard operates at several locations and the majority of its income comes from sales to end users, is the employer exempt as a "retail facility"?**
The PSM standard defines a retail facility as "an establishment which would otherwise be subject to the PSM standard, at which more than half of the income is obtained from direct sales to end users." If such an employer operates at multiple locations, the questions becomes whether this constitutes a single "establishment" for the purposes of the standard.

The intent of the PSM Standard is to prevent catastrophic releases of highly hazardous chemicals, thereby, providing for safe and healthful workplaces for employees. Consistent with this intent, the term "establishment," when used to define retail facility, means a company name at a specific site (normally with a street address). Thus, if an employer operates at several locations, some might be covered by the standard, and others not affected.

**Are facilities that fill propane tanks for "will call" type customers exempt from the PSM standard? Most of these facilities are under the aggregate quantity of 10,000 pounds (4535.9 kilograms), The majority of the business is transferring propane from the supply tank to small containers for barbecues and "RV" units.**
Such facilities appear to be exempt from coverage by the PSM standard because they are retail facilities or because they do not involve processes with threshold (or greater) quantities of propane. A retail facility is defined as a site-specific establishment which otherwise would be subject to the PSM standard, at which more than half of the income is obtained from direct sales to end users.

**(a)(2)(ii) Oil or gas well operations**
**Are single well processing facilities with equipment including separators, heat-treaters and storage tanks used in gas production (from non-H2S containing petroleum fluids) operations exempt from coverage under**

**1910.119(a)(2)(ii), which excludes oil and gas well drilling and servicing operations?**
The 1910.119(a)(ii) exemption of oil or gas well drilling or servicing operations is intended to cover all drilling operations and any well servicing operation including acidizing. Additionally, water separation facilities adjacent to or near the well (including tanks used primarily for water separation in conjunction with oil or gas well production) are not normally covered by the PSM standard.

The following processes, when they involve at least threshold quantities of oil or gas, are covered by the PSM standard. Oil or gas well production fluids from several wells are processed by heating the fluids and physically separating the water from the gas or oil. The water is returned to the ground via a "down hole well" for disposal return to the strata from which it came. But if these oil or gas well drilling operations take place at "normally unoccupied remote facilities", then according to 1910.119(a)(2)(iii), they are exempt from PSM standard coverage.

**(a)(2)(iii) Meaning of "facility"**
**Can a facility contain more than one process?**
A facility can include multiple processes. If multiple processes are interconnected, they may be considered a single process for purposes of the standard.

**(b) Definitions**

**(b) "Process"**

**What are "aggregate threshold quantities"?**
In accordance with the second sentence of the definition of "process," quantities of a particular hazardous chemical contained in vessels that are interconnected -- and in unconnected vessels that may be adversely affected due to an incident at a nearby process -- must be combined to determine whether the threshold level of a hazardous chemical has been reached. If the threshold level is exceeded by the combination of the amount in separate tanks and interconnected vessels, then all of these may be considered one process.

**Is waste burning of covered solvents considered a process?**
Yes.

**(b) "Hot work"**

**"Spark-producing operations"** include operations which use flame-or spark-producing equipment -- such as grinders, welding, burning, or brazing -- that are capable of igniting flammable vapors or gases.

**(b) "Normally unoccupied remote facility"**

**"Normally unoccupied remote facility"** means that employees are not permanently stationed at the remote location. This includes those sites for which periodic visits by employees may be made on a scheduled basis. Examples could include pump stations located miles from the main establishment. Employees may be assigned to check on the station as needed.

The intent behind "remote" is that, due to the isolation of the process from employees by distance, such employees would not be affected by the consequences of a catastrophic release. Therefore, the remote location must be geographically separated from other facilities and employees such that employees would not be affected by an explosion, vapor cloud of toxic gas, or other consequence of an uncontrolled release at the remote site.

**(c) Employee participation**

**In implementing employee participation as required by 1910.119 (c) of the PSM standard, can an employer mandate that employees e.g., top operators of process units -- provide the company with information such as step-by-step procedures for routine tasks performed on their operating units? Can the employer threaten disciplinary action for employees who do not cooperate?**
The employee participation called for at 1910.119(c) is intended to provide for a cooperative participatory environment and necessary flow of information from management to employees and from employees to management on process safety to eliminate or mitigate the consequences of catastrophic releases of highly hazardous chemicals in the workplace. Paragraph 1910.119(c)(2) contains language taken from the Clean Air Act Amendments (CAAA) of 1990. As prescribed by the CAAA, the standard at 1910.119(c)(3) requires that PSM information developed by the employer be made available to employees and their representatives. Also, MNOSHA requires that an employer carefully consider and structure the plant's approach to employee involvement in the PSM program.

The plan-of-action standard at 1910.119(c)(1) is intended to address this issue to ensure that the employer actively considers the appropriate method of employee participation in the implementation of the PSM program in the workplace.

**(c)(2) Consultation**

**What does consult mean? Can the employer simply inform the employees?**
Consultation refers to a two-way dialogue between the employer and the employees and their representatives (where they exist), in which the employer elicits, and responds to, employees' concerns and suggestions bearing upon the elements of process safety management required under this standard. Consultation is therefore more than a way to inform employees about aspects of process safety; it is a process of seeking advice, criticisms, and suggestions from employees and their representatives.

1. The employer should establish a method for informing all employees and their representatives that their process safety concerns and suggestions are welcome. The employer must also establish a mechanism by which it will respond, orally or in writing, to such concerns and suggestions.

2. In addition, the employer should affirmatively solicit the suggestions and concerns of employees and their representatives, who, by virtue of their job responsibilities, actual knowledge, or representative positions, can reasonably be expected to make substantive contributions to the development and evaluation of specific elements of process safety management.

**The standard requires employers to consult with "employees and their representatives." Is the term broad enough to include a representative of the international union? A consultant designated by the union local or**

**international?**
The standard requires consultation with "**employees and their representatives"**. The term "**employee representative**" is intended to mean **union representative** where a union exists, or an employee designated representative in the absence of a union. The term is to be construed broadly, and may include the local union, the international union, or an individual designated by these parties, such as the safety and health committee representative at the site or a non-employee consultant. In the absence of a union, employees have a right under the standard to designate a representative to participate in the consultation process.

With respect to the PHA team, in all cases it must consist of one or more persons **knowledgeable about** the process. The intent of the consultation requirement at 1910.119(c)(2) is not to compel the inclusion of any person(s) who are not knowledgeable; ideally, the employer and employees/employee representatives should reach a consensus on including the most capable parties.

**(c)(2) Consultation -- contractors**

**Must the employer consult with employees of contractors?**
A host employer must consult with employees of covered contractors and their representatives, to the same extent that it must consult with similarly situated direct hire employees. Therefore, the host employer must establish a method for informing all contractor employees and their representatives that their process safety concerns and suggestions are welcome, and will be responded to. In addition, the following non-exclusive examples illustrate circumstances under which the host employer may be required to solicit the advice and suggestions of specific contractor employees about specific aspects of process safety:

1. Contract employees who function as process operators on covered processes, or perform routine maintenance on covered processes, should be consulted to the same extent as equivalent direct hire operating and maintenance employees, respectively.

2. Contract employees who routinely interface with a host employer's Management of Change program should be consulted on the effectiveness of the program as it relates to their jobs and based upon their interaction with it.

3. Contract employees who routinely participate in activities pursuant to mechanical integrity should be consulted on the effectiveness of the program as it relates to their jobs and based upon their interaction with it; e.g., contract employees should be encouraged to identify any deficiencies they observe in the host employer' s program.

4. Contract employees who have unique experience or knowledge concerning the operation, maintenance, or safe performance of any portion of a covered process should be consulted, as appropriate, on that portion of the process during the PHA.

5. Contract employees who routinely interface with the host employer's safe work practices (such as, for example, the employer's lockout/tagout rules, hot work permit procedures, and confined space entry procedures) should be consulted as to the effectiveness of those practices.

Host employers can consult with contractor employees and their representatives directly, or through the contractor employer. Contractor employers share responsibility for ensuring that there is consultation with their

employees.

**(c)(3) Access**

**What does "access" mean? Does this mean simply make it available at a central location? Does the employer have to make copies for employees if requested?**
The intent of **access** under this standard is for the information to be made available for employees and their representatives in a reasonable manner. Reasonable access may require providing copies or loaning documents. The trade secret provision of the standard permits the employer to require confidentiality agreements before providing the information.

**(c)(3) Equal access to information**
Under (c)(3), the employer is required to provide access to process hazard analyses and all other information to be developed under this standard to employees of covered contractors, to the same extent that it must provide access to direct hire employees, if similarly situated. Contract employers share responsibility for assuring that their employees are provided with the requested information.
**(d) Process safety information**

**(d) Retention of information**

**How long must the employer maintain process safety information?**
In order to demonstrate compliance with this paragraph, and to meet the purpose of the standard, the process safety information is to be kept for the lifetime of the process, and updated whenever changes other than "**replacement in kind**" are made.

**(d)(2)(ii) Original process safety information not present**

**If process safety information on the original technology does not exist, what must the employer do?**
The employer must obtain or generate the missing information. If the information on the original technology does not exist, then the employer may delay the development of this information until the process hazard analysis (PHA) is initiated, but in no case later than the applicable dates specified at 1910.119(e)(1). However, the other information required by this section must be compiled before conducting any PHA. The information on the technology must be gathered as the PHA's are conducted in accordance with the priority schedule developed by the employer.

**(d)(3)(iii) Older codes -- PSM standard deadlines**

**For equipment based on old design codes, the employer must determine and document that the equipment is designed and operated safely. By what date must the employer do this? Specifically:**

*** When must the employer determine adequacy of design based on old codes, and**

*** How much time does the employer have to make corrections?**
Generally speaking, the time frames which apply to implementation of the PHA's also apply to this paragraph.

Such documentation must be completed either before or in conjunction with the development of the PHA, except where a pre-startup safety review is required, in which case the documentation must be completed before startup. For older equipment, this may require verification that the design and construction are safe for the intended application. Where corrective action is required as a result of the PHA, it must be completed as soon as possible pursuant to paragraph (e)(5).

**EXCEPTION:** For actions required by a pre-startup safety review (see (i)(2)), such corrective action must be implemented prior to the startup if the correction is safety critical.

**(e) Process hazard analysis**

**(e)(1) PHA priority**

**What rationale must employers use to determine the priority for conducting the process hazard analyses? May the rationale include age, history, extent of employee exposure, etc.?**
The appropriate priority for conducting PHA's is to be determined by using all of the criteria identified in this paragraph, e.g., extent of the process hazards (catastrophic potential), age of the process, number of potentially exposed employees, and operating history. Other appropriate factors may also be considered in establishing the priority. The documentation required by this paragraph shall demonstrate the underlying rationale for the prioritization.

**(e)(1) PHA priority -- "as soon as possible"**

**(e)(1) PHA completion dates** All PHA's on existing processes should have been completed.

**What is the time frame for completion of the initial PHAs and for updating and revalidating them?**
Initial PHAs must be updated and revalidated at least every 5 years thereafter (see 1910.119(e)(6). When employers update and revalidate a PHA before the 5-year deadline, the subsequent update and revalidation must be completed within the next 5-year period.

**(e)(1) PHAs -- Required site-by-site**?

**If a natural gas company has five sites with facilities performing the same process, does a separate PHA need to be performed for each site, for each facility at these sites, or for each process at each facility?**
The PSM Standard is applicable, on a site-by-site basis, to each worksite which has one or more facilities containing one or more processes involving one or more of the covered highly hazardous chemicals. A worksite may be simply one facility containing a single process. (See the definition of "facility" in Subsection (b) of 1910.119). On the other hand, a worksite may be a complex of facilities, each containing one or more processes.

Under 1910.119(e)(l), employers are required to perform initial PHAs on processes involving highly hazardous chemicals covered by the PSM standard. An employer may use a generic hazard analysis approach for the same (or nearly the same) covered process at an individual worksite. The employer must account for variations (e.g., differences in siting, incident histories, technology, equipment, or operations) for each process covered by this generic approach. Generic process hazard analysis is addressed in section 4. of nonmandatory Appendix C of 1910.119, Compliance Guidelines and Recommendation for Process Safety Management.

**(e)(2) Process hazard analysis -- "appropriate methodology**"

**What type of methodology must employers use in the PHA in order to be sure it is "appropriate"?**
Employers are expected to use sound judgment, on a case-by-case basis, to determine an appropriate methodology for the process hazard analysis for each covered process. It is not the intent of the standard to require a PHA methodology that is excessively burdensome, but rather one that is appropriate, and which will have the capability to elicit all hazards, defects, failure possibilities, etc., for the process being analyzed, and also have the capability to address all the factors at 1910.119(e)(3).

**(e)(3) Meaning of "control"**

**The regulation requires that the PHA address the "control" of the hazards. What is meant by: "identification, evaluation, and control of process hazards" -- ?**
The PHA is intended to identify and evaluate acceptable controls for process hazards. The evaluation of the hazards must include all the steps set out in section (e)(3)(i) -vii), using a methodology consistent with section (e)(2). Through the timely resolution of the PHA findings and recommendations, the PHA is intended to control process hazards.

**(e)(3)(iv) Quantitative determination**?

**Must the employer make a quantitative determination to determine the consequences of failure of the controls?**
The intent of this paragraph is to require the employer to at least identify each type of control as well as identify the possible effects of the failure of the listed control. MNOSHA believes employers can determine the consequences of a failure of these controls, and establish a reasonable estimate of the safety and health effects on employees without conducting a specialized quantitative evaluation.

# Appendix C - PSM Screening Tool

The table listed below notes how different chemicals are addressed based on the quantity of the chemical, when this quantity is covered by the standard, common exemptions, and common locations for the chemical.

| Selected HHC* | Threshold Quantity | Coverage | Common exemptions | Common locations |
|---|---|---|---|---|
| Ammonia (anhydrous) | 10,000 lb. | ≥ TQ in one process, including storage only | Retail | Refrigeration systems, Water treatment |
| Ammonia solutions (aqueous; >44%) | 15,000 lb. | ≥ TQ in one process, including storage only | | Ethanol plants, Circuit board manufacturing |
| Chlorine | 1500 lb. | ≥ TQ in one process, including storage only | | Water treatment, Wastewater treatment |
| Ethanol/water mix - at ethanol plants (as flammable liquid) | 10,000 lb. > 20% ethanol (reference NFPA 325, 1994) | ≥ TQ in one process | | Often ≥ TQ in distillation alone |
| Flammable liquids | 10,000 lb. | ≥ TQ in one process, not including storage connected to a process | Storage and Transfer to/from storage Used solely as heating fuel | Paint blending, Oilseed extraction |
| Flammable gases | 10,000 lb. | ≥ TQ in one process, including storage only | Used solely as heating fuel | Blowing agent (gas) |
| Sulfur dioxide | 1000 lb. | ≥ TQ in one process, including storage only | | Wet corn processing, Sugar beet processing |
| Explosives | any quantity | manufacture of explosives and pyrotechnics, as defined in 1910.109(a)(3) & (a)(10) (see 1910.109(k)) | | |

* HHC = highly hazardous chemical listed in 1910.119 Appendix A, and flammable liquids or flammable gases.

**Hints:**

**ALL HIGHLY HAZARDOUS CHEMICALS (HHC)**

- Temporary connections, such as flexible hoses, are no different from hard piping for purpose of deciding if tanks/vessels are connected/interconnected.
- Lots of piping

**AMMONIA REFRIGERATION**

- For refrigeration systems - if employer indicates just under 10,000 lb. question unless specific calculations were done that included quantities in all piping and vessels.
- If there is more than one refrigeration system, ask if they have a common header (which means they are interconnected.)

**FLAMMABLE LIQUIDS & GASES**

- Large tanks (may be in separate rooms or outside)
- 10,000 lb is only about 1500 gallons for many common flammable liquids

**ETHANOL PLANTS**

- At some point during distillation, the liquid becomes flammable (about 25% ethanol in water)

**Definition of a covered process:**

**APPENDIX A CHEMICALS**

A process containing a Highly Hazardous Chemical (HHC) above the Threshold Quantity listed in Appendix A of 29 CFR 1910.119.

- A process includes any use, storage, manufacturing, handling, or the on-site movement of such chemicals, or combination of these activities.

- A single process includes any group of vessels which are interconnected (even temporarily) and separate vessels which are located such that a HHC could be involved in a potential release.

- Separate containers stored in one fire area generally would be considered a single process.

**FLAMMABLE LIQUIDS & GASES**

A process containing flammable liquid or flammable gas not listed in Appendix A) ≥ 10,000 lb

Exceptions:

- Fuel used only as fuel. Hydrocarbon fuels used solely for workplace consumption as a fuel (propane used solely for comfort heating, gasoline for vehicle refueling);

- Atmospheric storage and/or transfer. Flammable liquids stored in atmospheric tanks (operated at pressures between 0 psig and 0.5 psig) or transferred which are kept below their normal boiling point without benefit of chilling or refrigeration.

- Flammable liquids – “process” does not include storage and transfer

- Note that for flammable gases – “process” includes storage and/or transfer.

**Retail facility**

A facility where > 50% of income is from sale to end users (end users include farmers applying anhydrous ammonia to fields).

**References**

- 29 CFR 1910.119 Process Safety Management of Highly Hazardous Chemicals
- 29 CFR 1926.64 Process Safety Management of Highly Hazardous Chemicals
- 29 CFR 1910.109 Explosives and Blasting Agents
- CPL 2-2.45A PSM - Compliance Guidelines and Enforcement Procedures

# Appendix D - References for Compliance with the PSM Standard

The table below notes publications available in the MN OSHA library that are references for the PSM standard, as well as the publication author or source, year of publication, and the publication number.

| **Publications Available in MNOSHA Library** | | | |
|---|---|---|---|
| **Title** | **Author/Source** | **Year** | **Pub. No.** |
| Emergency Relief System Design Using DIERS Technology | AIChE - CCPS | 1992 | |
| Guidelines for Auditing Process Safety Management Systems | AIChE - CCPS | 1993 | |
| Guidelines for Chemical Reactivity Evaluation & Application to Process Design | AIChE - CCPS | 1995 | G-13 |
| Guidelines for Evaluating the Characteristics of Vapor Cloud Explosions, Flash Fires, & BLEVEs | AIChE - CCPS | 1994 | G-9 |
| Guidelines for Hazard Evaluation Procedures, 2nd Ed. | AIChE - CCPS | 1992 | |
| Guidelines for Investigating Chemical Process Incidents | AIChE - CCPS | 1992 | |
| Guidelines for Safe Storage & Handling of Reactive Materials | AIChE - CCPS | 1995 | G-30 |
| Guidelines for Safe Storage of High Toxic Hazard Materials | AlChE - CCPS | 1988 | |
| Guidelines for Technical Management of Chemical Process Industries | AIChE - CCPS | 1992 | |
| Guidelines for Technical Mgmt. of Chemical Process Safety | AlChE - CCPS | 1989 | |
| Guidelines for Writing Effective Operating & Maintenance Operations | AIChE - CCPS | 1996 | G-32 |
| Inherently Safer Chemical Processes | AIChE - CCPS | 1996 | G-41 |
| Cathodic Protection of Aboveground Petroleum Storage Tanks, 2nd Ed. | API | 1997 | 651 |
| Design & Construction of Large, Welded, Low Pressure Storage Tanks, 9th Ed. | API | 1996 | 620A |
| Design & Construction of Large, Welded, Low Pressure Storage Tanks, 9th Ed. | API | 1996 | 620 |
| Overfill Protection for Storage Tanks in Petroleum Facilities, 2nd Ed. | API | 1996 | 2350 |
| Pressure Vessel Inspection Code: Maintenance Inspection, Rating, Repair & Alteration, 8th Ed. | API | 1997 | 510 |
| Specification for Field Welded Tanks for Storage of Production Liquids | API | 1994 | 12D |
| Specification for Shop Welded Tanks for Storage of Production Liquids | API | 1994 | 12F |
| Tank Inspection, Repair, Alteration, & Reconstruction, 2nd Ed. | API | 1995 | 653 |
| Atmospheric Monitoring Equipment for Chlorine, 6th Ed. | Chlorine Institute | 1997 | Pamphlet 73 |
| Chlorine Manual, 6$^{th}$ Ed. | Chlorine Institute | 1997 | |
| Chlorine Scrubbing Systems, 2nd Ed. | Chlorine Institute | 1998 | Pamphlet 89 |
| Chlorine Vaporizing Systems, 5th Ed. | Chlorine Institute | 1997 | |
| Cylinder & Ton Container Procedure for Chlorine Packaging, 2nd Ed., Rev. 1 | Chlorine Institute | 1994 | |
| Emergency Response Plans for Chlorine Facilities, 4th Ed. | Chlorine Institute | 1995 | Pamphlet 64 |
| Estimating the Area Affected by a Chlorine Release, 3rd Ed. | Chlorine Institute | 1998 | Pamphlet 74 |
| First Aid and Medical Management of Chlorine Exposures, 6th Ed. | Chlorine Institute | 1998 | Pamphlet 63 |

| **Publications Available in MNOSHA Library** | | | |
|---|---|---|---|
| **Title** | **Author/Source** | **Year** | **Pub. No.** |
| Generic Risk Management Plan for Chlorine Packaging Plants and Sodium Hypochlorite Production Facilities, 1st Ed. | Chlorine Institute | 1998 | |
| Personal Protective Equipment for Chlorine and Sodium Hydroxide, 3rd Ed. | Chlorine Institute | 1995 | |
| Piping Systems for Dry Chlorine, 14th Ed. | Chlorine Institute | 1998 | Pamphlet |
| Recommendations to Chlor-alkali Mfg Facilities for Prevention of Chlorine Releases, 3rd Ed. | Chlorine Institute | 1994 | |
| The Chlorine Manual, 6th Ed. | Chlorine Institute | 1997 | Pamphlet 1 |
| Water and Wastewater Operators Chlorine Handbook, 1st Ed. | Chlorine Institute | 1999 | Pamphlet 155 |
| Chlorine Safety Manual | NY state Emergency Response Commission | 1994 | |
| Chlorine Safety Manual for Water/Wastewater Treatment Facilities | NY State Emergency Response Commission | 1994 | |
| A Guide to Good Practices for the Operation of an Ammonia Refrigeration System | IIAR | 1983 | R1 |
| Ammonia Data Book | IIAR | 1993 | |
| Ammonia Machinery Room Ventilation | IIAR | 1991 | 111 |
| Avoiding Component Failure in Industrial Refrigeration Systems Caused by Abnormal Pressure or Shock | IIAR | 1992 | 116 |
| Guidelines for Minimum Safety Criteria for a Safe Ammonia Refrigeration System | IIAR | 1997 | 109 |
| Guidelines for Start-up, Inspection & Maintenance of Ammonia Mechanical Refrigerating Systems | IIAR | 1993 | 110 |
| Minimum Protective Equipment for Mechanical Refrigerating Systems Poster | IIAR | | |
| Suggested Safety and Operating Procedures When Making Ammonia Refrigeration Plant Tie-ins | IIAR | 1997 | 107 |
| Water Contamination in Ammonia Refrigeration Systems | IIAR | 1986 | 108 |
| Dispelling Chemical Engineering Myths, 3rd Ed. | Kletz, Trevor | 1996 | |
| Learning From Accidents, 2nd Ed. | Kletz, Trevor | 1994 | |
| Process Plants: A Handbook for Inherently Safer Design | Kletz, Trevor | 1998 | |
| What Went Wrong? Case Histories of Process Plant Disasters, 4th ed | Kletz, Trevor | 1998 | |
| The Phillips 66 Company Houston Chemical Complex Explosion and Fire | US Dept of Labor | 1990 | |
| Avoiding Static Ignition Hazards in Chemical Operations | Britton, Laurence G. | 1999 | |
| Chemical Process Safety: Fundamentals with Applications | Crowl, Daniel & Louvar, Joseph | 1990 | |
| Dust Explosions in the Process Industries, 3rd ed. | Eckhoff, Rolf K. | 2003 | |
| Guiding Principles for Chemical Accident Prevention, Preparedness & Response | EPA | 1993 | |

| **Publications Available in MNOSHA Library** | | | |
|---|---|---|---|
| **Title** | **Author/Source** | **Year** | **Pub. No.** |
| Safety & Accident Prevention in Chemical Operations, 2nd Ed. | Fawcett, Howard & Wood, William | 1982 | |
| Handbook of Chemical Hazard Analysis Procedures | FEMA/DOT/EPA | 1989 | |

Other References:

| **Title** | **Author/Source** | **Year** | **Pub. No.** |
|---|---|---|---|
| Safety and Health Guide for the Chemical Industry (available on OSHA website) | OSHA | 1986 | |
| Voluntary Safety and Health Program Management Guidelines (available on OSHA website) | OSHA | 1989 | |
| Chlorine Institute Pamphlets<br>To get free publications, see: CI Bookstore Pricing Changes Effective June 1, 2022 - The Chlorine Institute | Chlorine Institute | | |
| Dow's Chemical Exposure Index | AICHE-CCPS | 1994 | |
| Guidelines for Vapor Release Mitigation | AICHE-CCPS | 1988 | |
| Plant Guidelines for Technical Management of Chemical Process Safety (out of print – new ed. due by 2007) | AICHE-CCPS | 1992 | |
| Pressure Vessels, Section VIII | ASME | | |
| B31.3 Chemical Plant and Petroleum Refinery Piping | ASME | | |
| RP 520 Sizing, Selection, and Installation of Pressure Relieving Devices –Part 1 | API | | 520 |
| RP 521 Guide for Pressure Relieving and Depressuring Systems | API | | 521 |
| RP 574 Inspection of Piping, Tubing, Valves, and Fittings | API | | 574 |
| RP 750 Management of Process Hazards | API | | 750 |
| RP 920 Prevention of Brittle Fracture of Pressure Vessels | API | | 920 |
| RP 945 Avoiding Environmental Cracking in Amine Units | API | | 945 |
| RP 2220 Improving Owner and Contractor Safety Performance | API | | 2220 |
| RP No. SNT-TC-1A Personnel Qualification and Certification in Nondestructive Testing | American Society of Nondestructive Testing | | SNT-TC-1A |
| A Manager's Guide to Reducing Human Errors Improving Human Performance in the Chemical Industry | CMA | | |
| Evaluating Process Safety in the Chemical Industry | CMA | | |
| Process Safety Management (Control of Acute Hazards) | CMA | | |
| Safe Warehousing of Chemicals | CMA | | |
| DOD 5154.45 Ammunition & Explosives Safety Standards | Dept of Defense | | |
| DOD 4145.26M Contractor's Safety Manual for Ammunition, Explosives and Related Dangerous Material | Dept of Defense | | |

| Title | Author/Source | Year | Pub. No. |
|---|---|---|---|
| Fire & Explosion Index Hazard Classification Guide, 6th Ed. | Dow Chemical | 1987 | |
| Guiding Principles for Chemical Accident Prevention Preparedness & Response | EPA | 1993 | |
| Review of Emergency Systems | EPA | 1988 | |
| Loss Prevention Data Sheet 7-44 Spacing of Facilities in Outdoor Chemical Plants | Factory Mutual | | |
| Loss Prevention Data Sheet 7-45 Chemical Process Control and Control Rooms | Factory Mutual | | |
| No. 1 Construction Guide for Storage Magazines<br>No. 2 The American Table of Distances<br>No. 3 Suggested Code of Regulations for the Manufacture, Transportation, Storage, Sale, Possession, and Use of Explosive Materials<br>No. 4 "Do's and Don'ts" Instructions and Warnings<br>No. 12 Glossary of Industry Terms<br>No. 17 Safety in the Transportation, Storage, Handling and Use of Explosives<br>No. 20 Safety Guide for the Prevention of Radio Frequency Radiation Hazards in the Use of Electrical Blasting Caps<br>No. 22 IME Standard for the Safe Transportation of Class C Detonators (Blasting Caps) in a Vehicle with Certain Other Explosives | Institute of Makers of Explosives Safety Library Publications | | |
| National Board Inspection Code, A Manual for Boiler and Pressure Vessel Inspectors | National Board of Boiler and Pressure Vessel Inspectors | 1992 | |
| NFPA 77 Static Electricity | NFPA | | 77 |
| NFPA 78 Lightning Protection Code | NFPA | | 78 |
| NFPA 85C Prevention of Furnace Explosions/Implosions in Multiple Burner Boiler Furnaces | NFPA | | 85C |
| NFPA 495 Code for the Manufacture, Transportation, Storage and Use of Explosive Materials | NFPA | | 495 |
| NFPA 496 Purged and Pressurized Enclosures for Electrical Equipment | NFPA | | 496 |
| Accident Investigation***A New Approach | National Safety Council | 1988 | |

# Appendix E - Recommended Guidelines for PQV Inspection Preparation

The following guidelines are suggested as background and preparation for a PQV inspection. These are suggested actions only, and shall in no case take precedence over the guidance presented elsewhere in this instruction.

**AREA OFFICE COORDINATION**

Coordination within the Area Office is absolutely essential in the orderly conduct of a PQV inspection. The Area Supervisor and all those involved in a PQV inspection must commit the resources with the understanding that the project is long-term, possibly several weeks or months. It is imperative that team members complete all outstanding assignments prior to the PQV inspection. Equally important, team participants should not be directed or "asked" to do assignments while they are engaged in the PQV inspection. An obvious exception would be court hearings, over which the Area Office has little control.

The Area Supervisor should designate a contact person in the Area Office to coordinate and oversee all aspects of the inspection. The contact person should be a Principal Investigator (4) or IH 3 who is familiar with the PQV concept. In addition to providing Area Office coordination, the contact person would review the entire case file/report. The contact person would communicate at least weekly with the Area Supervisor.

**INSPECTION TEAM COMPOSITION**

By design, a PQV inspection is a large and complex undertaking, to be accomplished by a select, well-trained team. All members of the team must be experienced journey or senior level compliance officers who are familiar with the chemical industry and have taken the appropriate OSHA training. Newer compliance officers can be utilized in the inspections, but not as a substitute for regular team members.

The team should consist of two safety compliance officers/engineers, one of whom should be a construction specialist, two industrial hygiene compliance officers/engineers. The team leader could be from either discipline in the team, but preferably a safety specialist, due to the fact that most of the critical PSM and construction related hazards reside in the area of safety.

The team leader should be a Safety Investigator (2) or IH (2) or higher, with experience in large team inspections. He or she should have excellent organizational and communication skills, both oral and written. It would also be of benefit that the team leader be knowledgeable in word processing and data base management computer operations. Since the team leader will be the focal point during the conduct of the inspection, that person should also have demonstrated leadership abilities. The entire team, the company, employees/unions and other MNOSHA personnel will look to the team leader for direction and answers to the many questions that will arise during the course of the inspection.

The team leader is responsible for the overall conduct of the inspection including planning, onsite activities and report preparation. The leader would assign the various inspection areas to team members in accordance with their expertise and abilities, and determine what, if any, special expertise is needed. Additional responsibilities include:

1. Keeping the Area Office contact apprised of activities;

2. Providing and tracking requests for documents;

3. Resolving problems with the company

Safety and IH team members are responsible for carrying out the PQV inspection activities under the direction of the team leader. They must keep the team leader apprised of their activities and potential problems when they arise. The construction specialist would work for the most part independently of the rest of the team, under the general direction of the team leader. Some crossover of inspection areas is to be expected, as many of the contractors and company responsibilities overlap.

**PRE-INSPECTION PREPARATION**

Effective planning and preparation is essential to the efficient implementation and successful completion of any large inspection, especially a PQV. **Exhibit 1** provides an outline that can be used as a guide to plan and prepare for a PQV inspection. Establishment histories can be obtained and reviewed well in advance of the target date for the inspection. The inspection strategy and scheduling should be done after the team has been selected. A pre-inspection meeting with all members and the Area Office contact person should be held prior to entry.

The case file begins in the planning and preparation stage. Any documents received, such as micro to host reports, citations and PSM-related findings (including PetroSEP) in other regions must be logged and identified to allow for easy retrieval. An activity log/diary should be started to record all pertinent actions taken. A computer data base management program is recommended to keep track of the document requests and to provide a ready index of the documents that have been obtained. With this type of system it would be easy to search for pertinent documents by using the OSHA identification number, topic of document, company identification number, date of request, etc., and to ensure that various members of the team do not duplicate requests for documents.

The team should develop a weekly schedule of activities, taking into account travel days, holidays, start time, stop time, company briefings and internal briefings. Time should be allotted during the inspection week to complete necessary paperwork and documentation and tie up loose ends.

**DOCUMENTS**

PQV inspections will require compliance officers to review numerous company documents. Many of these documents will become part of the case file as documentation for potential citations or for documentation of the required PSM elements. It is imperative that these documents be organized and identified so that they may be readily referenced and reviewed. It is highly recommended that all requests for copies of company documents be in writing. A standard document request format should be established and should contain at least the following information:

1. Name of the requester
2. To whom the request is made
3. Identity of the document (in company terms if possible)

4. Company document number
5. Date of request
6. Priority for response
7. Internal I.D. number or docket number (for filing)
8. Date request fulfilled
9. Comment section (did the response fulfill request).

It should be noted that there is no universal language used to identify documents. Different companies have different names for the same type of document. It is therefore essential to clearly communicate what information is needed and desired prior to writing the request. The document requests should be in duplicate: one copy for the company and the other to be retained in the case file. To avoid long discussions and legal department involvement, all documents obtained should be considered proprietary information.

Prior to the documents actually being received, a filing system should be developed. The system should be secure, accessible to all team members and ensure that individual documents are easily retrievable.

NOTE: Only appropriate documents should be maintained in the filing system; field notes, document "clips", and document review/evaluation notes should remain with the corresponding 1B's.

**Exhibit 2** contains a list of those documents most commonly requested. It is divided into two sections: Pre-Unit Selection and Unit-Specific Documents.

**INSPECTION FACILITIES**

The PQV team needs a suitable work area/command center from which the inspection can be conducted and coordinated. Except in the most unusual of circumstances, the company will provide the requisite on-site space. Almost any room will suffice, providing it meets some basic requirements. The work area must be secure 24 hours a day with access limited to the inspection team and those company officials who would respond in an emergency. This is important so as to preclude taking boxes of documents and equipment in and out each day. The room should have sufficient desks and/or tables for reviewing documents and writing the report. Provisions should be made for communications – one phone line as a minimum. Outgoing calls should be charged on the Area Office calling card. Where phone service is not provided, the team should have a portable cellular phone. Sufficient power outlets should be available for charging pumps, batteries and other inspection equipment.

The inspection team will need copies of a number of documents. It is hoped that the company would provide copying services or the use of a copy machine. Should the company not provide these services, the inspection team will need to have a copy machine.

The team leader must determine as soon as possible, what – if any – of the necessary facilities the company will provide. If the company does not provide all of the necessary facilities voluntarily, or puts disruptive restrictions on their use, a manager/supervisor should be contacted as soon as possible so that alternate facilities can be arranged. This may result in the use of a rented copier(s) and office space.

**INSPECTION EQUIPMENT**

Upon entry to the site, the inspection team should be fully prepared with all necessary inspection equipment and personal protective equipment. **Exhibit 3** contains a list of equipment that may be useful to prepare for the inspection. In addition, an inspection "kit" is outlined which can be used to set up the command center. Some of the items in the "kit" may appear to be trivial; however, all of these items will be needed at some time during the inspection. It may not be practical to go back and forth to the office or a store to get these items, particularly if the inspection site is in a remote location.

**CRITICAL INSPECTION AREAS**

It is essential that team members have specific subjects and areas to investigate. The team leader, with input from the team members, should assign the inspection areas prior to entry. This will help to avoid confusion and duplication of effort. In addition, the team members will be able to be better prepared for their individual tasks.

As inspection subjects are completed, the information should be reviewed with the team leader before going on to the next assignment. The state of compliance or noncompliance within any given area may require the team leader to modify the assignment list so as to make the most of the resources available.

**CONTRACTORS**

Contractors are an integral part of any PSM inspection. There may be only a few contractors or dozens, with several hundred contract employees, depending on whether the facility is undergoing a shutdown or turnaround.

It is imperative that, upon entry, the scope of the contractor activity be determined. The construction specialist on the team will have to formulate an inspection plan and set appropriate priorities. It is not the intent of the PQV inspection to inspect all outside contractors that are on-site, rather to inspect only those contractors who may be exposed to, or could cause or be affected by a catastrophic incident. Food service workers, certain janitorial employees and similar activities would not normally be inspected. Remote construction projects not associated with catastrophic potential would not necessarily be inspected.

The term "contractor" is not limited to construction type activities. Many chemical facilities use contract maintenance workers, vessel and piping inspectors, vessel heat treating, cleaning, engineering and similar non-construction contractors who remain at the facility year-round or are called in at regular intervals. They are used to supplement existing plant personnel for regular duties and for special projects.

A shared responsibility for both contractors and company is quality assurance. It is essential that all materials and workmanship meet engineering standards. There should be sufficient checks to ensure that materials, such as the proper alloy or carbon steel pipe is used, and that the studs and/or bolts are of the proper size and grade. This is especially important in contractor supplied materials.

**CRITICAL EXPERTISE**

Situations may arise in a PQV inspection that are beyond the technical expertise of the team members. A list should be developed identifying OSHA personnel and/or private sector experts and how they may be contacted. Areas where this expertise may be needed are:

1. Pressure equipment
2. Fire protection (fire brigades)
3. Facility siting
4. Emergency medical services
5. Hazardous waste operations
6. Dispersion modeling & incident command centers
7. Process hazard analysis/HAZOPS
8. Process chemistry
9. Industry practice

By no means is this list all-inclusive. It should be modified as needed to reflect current technology and hazards.

**DOCUMENTATION**

In order to withstand the probable legal challenges, all items must be thoroughly documented. Since the team will be made up of journey-and senior-level compliance officers, good documentation is to be expected. All OSHA-1B forms must be complete and legible. Shortcuts for employer knowledge such as "should have known" or "reasonable diligence" are not acceptable. Appropriate company documents, logs, procedures, permits, etc., should be referenced on the 1B for the particular violation.

Photographic documentation, either still camera or videotape, should be reviewed as soon as practicable to ensure that the condition or violation is appropriately depicted. Retake any photos or videos that are not good quality.

**CASE FILE AND REPORT PREPARATION**

A PQV inspection will take weeks or months of onsite activity and will generate a large amount of paper, both in field notes and documents. It is essential that the paper flow be organized and well maintained. This will result not only in a more efficient on-site survey, but will greatly reduce the write-up time.

A daily log, either manual or computer generated, should be maintained indicating the team members onsite, daily activities, meetings, problems, or other details, as necessary. All supporting information documenting a violation should be recorded as the violation is observed, or shortly thereafter, documenting the employees exposed, the date, time, location and management representative who accompanied the compliance officer. Alleged violation descriptions should be written as soon as practicable, while the hazard is fresh in the mind of the compliance officer. Multi-employer policy citations must be coordinated with respect to exposing, controlling, correcting and creating employers' files.

Case file structure and organization must begin prior to entry into the facility. All documents must be logged into an index (computer preferred) generated, indicating the subject matter, document identification number, file number and the location of the document (box number). This is essential, as these documents may have to be referenced or retrieved many times during the course of the inspection and the review process. A data base management program for the PCs would be extremely beneficial. Computer disks should be backed up daily, or more often as necessary. The photos and videotape taken during the inspection should be properly identified with photographer, date, roll or tape number and subject. They should be kept in a separate file.

## EXHIBIT 1: PRE-INSPECTION PREPARATION

A. Previous OSHA history - nationwide search
    1. All citations and/or reports
    2. Litigation results
    3. Outstanding issues, items in contest
    4. Health response team reports
    5. NIOSH evaluations if any
B. EPA history
    1. Reportable releases
    2. Reports of any kind
    3. Complaints and pending actions
C. Other Agency histories - local/State/Federal
    1. Dept. of Transportation
    2. Coast Guard
    3. ESDA/FEMA
    4. State Fire Marshal
    5. State Boiler and Pressure Vessel
D. Previous PetroSEP/PSM inspection results
    1. Citations
    2. Team members & expertise
    3. Settlement agreements or litigation results
E. Identify contact people -- other jurisdictions
    - EPA, DOT, Coast Guard, etc.
F. Acquire necessary codes or standards
    - ASME, API, ANSI, NFPA, etc.

## INSPECTION STRATEGY

A. Identify critical needs and expertise
B. Select team members
C. Identify expertise within the team
D. Identify critical inspection areas
E. Assign areas according to expertise
F. Identify areas lacking expertise
    1. Provide training
    2. Bring in additional resources
G. Develop a tracking system for documents
H. Develop a daily log of on-site activities
I. Identify known scheduling conflicts with team members and/or employer
J. Develop weekly schedule of activities
    1. Travel, write up, start/stop times
    2. Employer/employee and Area Office updates

## PLANNING AND SCHEDULING

A. Create a Projected Timeline
    1. Projected records and program review time
    2. Projected walk around time
    3. Projected write-up time
B. Resource Scheduling
    1. Team leader and construction specialist enter first for program and records review; present document request list.
    2 Full team enters following acquisition of requested documents for program/record review & walk around
    3. Expert assistance enters as needed
C. Equipment Acquisition
    1. Required PPE
    2. Technical equipment

## EXHIBIT 2: DOCUMENT REQUEST LIST

### I. PRE-UNIT-SELECTION

A. OSHA 300 logs for past 3 years
    1. Employer
    2. Contractors
B. Incident reports
    1. Near miss
    2. Fires
    3. All releases (cross check with EPA documents)
C. Site plan/Facility overview
D. Simplified flow diagrams
E. All permit procedures
    1. Confined space
    2. Hot work
    3. Others
F. Hazard communication
G. Overall emergency response plan (emergency action plan, evacuation plan)
H. Lockout/Tagout
I. PPE plan/Requirements
J. Audits
    1. Internal
    2. Corporate
    3. Contracted
    4. Insurance/Consultant
K. Fire brigade records
    1. Organizational statement
    2. Training records

3. Callouts/Responses
4. Roster
5. Equipment inspection

L. Respirator program and inspections (emergency use)
M. Infection/Exposure control program (bloodborne)
N. Safety and health outline
1. Minutes of safety and health committee meetings and walk-around reports
2. Committee roster
O. Disaster preparedness program
P. Facility description
1. Size, capacity, age (units)
2. History
Q. Turnaround/Shutdown schedule (not turnaround plan)
R. Safety and health complaints
S. Accident investigation logs
T. Industry hazard alerts (fire and explosion information from other facilities) ("Lessons Learned" by API)
U. Process hazard analysis scheduling procedure

II. **UNIT-SPECIFIC DOCUMENTS**
A. Written operating procedures
1. All current procedures
a. Normal
b. Abnormal
c. Emergency
2. Startup procedures
a. Partial (swoop down procedures)
b. Full (cold)
3. Shutdown procedures
a. Normal
b. Emergency
4. Upset conditions (beyond normal operating parameters)
B. Process safety information
1. Process chemistry
2. Capacity (volume)
3. Operating temperatures and pressures
- Alarm settings (high, high-high, low, low-low, etc.)
4. Operating parameters
5. Consequences of deviations
6. Flow rates
C. Operating logs (past 6 months)
1. Foreman
2. Operator
3. Manual and Computer
D. Piping and instrumentation diagrams (P&IDS)
1. Working (unit level) **NOTE: Must be current**.
2. Archival

3. Simplified (detailed, at a later date)
4. Product
5. Utility
6. Fire protection

E. Training records
1. Operator and supervisory
2. Training records (summary) for all safety and health programs
a. Hazard communication
b. Emergency response
c. Bloodborne
d. Respirators and PPE
e. SCBA
f. Fire
g. Others

F. Permits for the units
- Hot work, confined space, etc.

G. Pressure vessel records
1. For at least 20 different vessels, selection based on age, pressure, temperature, toxic chemical involved (corrosive nature, i.e. sulfuric acid), repair history, environmental stress cracking, etc.
2. Inspection records
a. All previous records
b. Analysis of defects
c. Nondestructive testing records
d. Inspection schedule and frequency
e. Internal
f. External
g. On-stream
h. Special
i. U-1 and U-2 records
3. Inspector qualifications
a. ASNT or equivalent levels (1, 2, or 3)
b. Roster of inspectors
c. Training history and documentation
4. Pressure relief valve (PRV) inspection records
5. Selection criteria for PRV's, vessels, etc.

H. Unit plot plan – detailed

I. Instrumentation calibration records

J. Unit emergency response / Action plan

K. Control room blueprint and schematic

L. Work orders
1. Outstanding
2. Obtain a sample of completed work order
3. Written work order procedure
4. All safety work orders

M. Environmental sampling records
1. Noise

2. Air contaminants/Toxins
3. Asbestos

N. Product sampling procedures
O. Calibration records for IH sampling equipment
P. Pre-startup review
Q. Rotating equipment inspection records
1. Schedule
2. Repair records

R. Operator certification
S. Flare system diagram (P&ID)
T. Process hazard analysis (Haz-Op, What-If, etc.)
U. Piping inspection program
1. Records/Results
2. Schedule
3. Inspector qualifications

## EXHIBIT 3: INSPECTION EQUIPMENT

### I. PERSONAL PROTECTIVE EQUIPMENT

A. Standard PPE per directive
1. Safety shoes
2. Safety glasses with side shields
3. Hard hat

B. Site specific PPE
1. Hearing protection
2. Respirators with proper filters/cartridges

C. Flame retardant clothing/coveralls
D. Emergency escape packs, where necessary
E. Supplied-air respirators (only trained CSHOs)
F. Oxygen and combustible meters

### II. SAMPLING EQUIPMENT

A. Hydrogen sulfide dataloggers/dosimeters
B. Noise dosimeters
C. Benzene equipment/media
D. Sulfuric acid/hydrogen fluoride equipment/media
E. Asbestos media
F. Other air contaminants
G. Charging facilities (area and equipment)
H. TSD sites - specific requirements

### III. TECHNICAL EQUIPMENT

A. Cameras and video cameras
1. Company policy regarding use
2. Each CSHO/inspection team equipped with a camera
3. Careful log of each frame (who, when, where, what)

B. FILM
1. Each roll should be identified with CSHO, date, and time prior to developing
2. Each picture identified with CSHO, date, and time
3. Film must be developed as soon as possible, and identified (who, what, where, when)
4. Film log must be maintained with roll number, CSHO, date in for developing, date returned
5. Photos should be mounted on worksheets and identified sequentially for each team member
6. Negatives must be identified and secured (preferably stored separately from developed photographs)

C. Videotapes
1. Identified with CSHO, date, and subject
2. Original tapes must be maintained
3. Videotape log maintained with CSHO, camera number (serial number), and date

D. Audiotapes
1. Primarily for interviews and/or field notes
2. Company policy
3. Permit requirements
4. Original tapes must be retained in file
5. Transcription (as needed)
6. Tapes must be identified with date, team member, and subject matter
7. Tapes must be logged

**INSPECTION KIT**

## I. Office Supplies

A. Folders (file folders and expandable)
B. Paper clips
C. Hole punch
D. Stapler and staples
E. Staple puller
F. White out/correction tape
G. Colored pencils/markers
H. Scissors
I. Post-its
J. Tape
K. Labels
L. Pens/pencils
M. Calculator
N. Ruler/graph paper
O. Filing Boxes
P. Envelopes

## II. Inspection Supplies

A. OSHA forms (1b, photo mounting, 5(a)(1) letters, willful and 5(a)(1) worksheets)
B. Film, audio and video tapes
C. Batteries and battery packs for camcorders
D. Film processing envelopes
E. Sampling media

1. smoke tubes
2. scintillation vials
3. filters/charcoal tubes

F. OSHA 31's & travel vouchers

## III. Command Center Equipment

A. Computers (two or more)
1. database management program
2. word processor
3. spreadsheet
4. floppy disks

B. Printer with paper and spare ribbon
C. Disk storage boxes
D. Fax with extra paper
E. Cellular phone and pagers if needed
F. Chargers for all equipment
G. Answering machine
H. Telephone directory (OSHA contacts)

## IV. Library/Reference Material

A. API 510, 750, and others
B. PUB 8-1.5, CPL2 PETROSEP (March 9, 1992)
C. 1910.119 Process Safety Management
D. OTI-PSM (Courses 330/340) manuals
E. 2 sets General Industry and Construction Standards
F. SAVEs manual
G. Field Operations Manual
H. Other references as needed; e.g., NFPA, ANSI, ASNT

# Appendix F - PQV Inspection Procedures

A. **Scope of PQV Inspection**. Comprehensive inspections under the PSM standard shall evaluate the procedures used by the employer and the process-related contract employers to manage the hazards associated with processes using highly hazardous chemicals. Normally, these inspections will embody a three-fold approach, which for reference is termed **Program-Quality-Verification** (PQV).

1. First, the employer's and the contract employers' **Program** for complying with each of the listed elements of the PSM standard shall be evaluated in accordance with the PSM Audit Guidelines contained in Appendix A of this instruction. (See also B. of this instruction.)

2. Second, the **Quality** of the employer's and the contract employers' procedures shall be compared to acceptable industry practices as described in the standard to determine compliance.

3. Third, **Verification** of the employer's and the contract employers' effective implementation of the program can be made through review of written programs and records of activity, interviews with employees at different levels, and observation of site conditions. The team leader shall select one or more processes as described at B.7. of this instruction to perform the verification portion of the inspection.

B. **PQV Inspection Procedures**. The procedures given in the FOM, Chapter III, shall be followed except as modified in the following sections:

1. **Opening Conference**. Where appropriate, the facility safety and health director, Process Safety Manager, or other person capable of explaining the company's Process Safety Management Program shall be included in the opening conference.

   a. During the opening conference, compliance officers shall familiarize themselves with the establishment's emergency response procedures and emergency alarms.

   b. Compliance officers shall also request that the management representative(s) provide them with a reasonably detailed overview of the chemical (and, where applicable, explosives) process and/or manufacturing operations at the facility, including block flow and/or process flow diagrams indicating chemicals and processes involved.

2. **PSM Overview.** Prior to beginning the walk around inspection, the compliance officers shall request an explanation of the company's Process Safety Management Program including, at a minimum:

   a. How the elements of the standard are implemented;

   b. Personnel designated as responsible for implementation of the various elements of the standard; and

c. A description of company records used to verify compliance with the standard.

3. **Initial Walk around**. After this familiarization, the inspection may begin with a brief walk around inspection of those portions of the facility within the scope of the standard. Additional walk around activity may be necessary after selection of the process unit(s). The purpose of the initial walk around is to:

   a. Give compliance officers a basic overview of the facility operations;

   b. Allow compliance officers to observe potential hazards such as pipe work in risk of impact, corroded or leaking equipment, unit or control room siting, and location of relief devices; and

   c. Solicit input from the employee representative concerning potential PSM program deficiencies.

4. **Personal Protective Equipment (PPE)**. In addition to normal inspection protective equipment, compliance officers conducting these inspections shall be provided with flame retardant coveralls for protection from flash fires and with NIOSH-approved emergency escape respirators for use during any emergency conditions. PPE shall be appropriate to the environment at the workplace. Special equipment will be necessary in environments containing explosive materials.

   a. Compliance officers shall wear flame-retardant coveralls in all areas of the plant where there is potential for flash fires and as may be required by company policy.

      NOTE: Clothing made of hazardous synthetic fabrics should not be worn underneath flame-retardant coveralls.

   b. Compliance officers shall carry emergency escape respirators, when necessary, during the walk around portion(s) of the inspection. Compliance officers conducting these inspections shall have received proper training in the use of emergency escape respirators.

   c. Compliance officers shall be provided with appropriate alert monitors approved for the environment where they will be used (e.g. combustible gas, $H_2S$, $Cl_2$) where such devices are necessary.

   d. Compliance officers shall ensure that any still cameras and/or video cameras are intrinsically safe for use in the process areas being inspected.

      NOTE: Compliance officers may use video cameras equipped with a telephoto lens from outside classified areas and/or still cameras without batteries.

5. **Documentation to be Requested--General and Process Related**. At the conclusion of the opening conference, the COMPLIANCE OFFICER shall request access to or copies of the documents listed at B.5.a. through B.5.m. below. Initially, to expedite the inspection process,

only access to documents should be requested. During the inspection, as potential violations of the standard are observed, copies of the written documentation described below shall be requested to substantiate citations.

a. OSHA 300 Logs for the past 3 years for both the employer and all process-related contractor employer(s).

b. Employer's written plan of action regarding the implementation of employee participation.

c. Written process safety information for the unit(s) selected (see B.7.), if available, such as flow diagrams, piping and instrumentation diagrams (P&ID's), and process narrative descriptions.

   NOTE: The employer is required to compile process safety information on a schedule consistent with the employer's schedule for conducting the process hazard analyses (PHA).

d. Documented priority order and rationale for conducting process hazard analyses; copies of any process hazard analyses performed after May 25, 1987; team members; actions to promptly address findings; written schedules for actions to be completed; documentation of resolution of findings; documentation verifying communication to appropriate personnel; and 5-year revalidation of original PHA required by standard.

e. Written operating procedures for safely conducting activities in each selected unit; annual certification that operating procedures are current and accurate; written procedures describing safe work practices for potentially hazardous operations, including (but not limited to) lockout/tagout, confined space entry, lifting equipment over process lines, capping over ended valves, opening process equipment or piping, excavation, and control over entrance into a facility of maintenance, laboratory, or other support personnel.

f. Training records for initial and refresher training for all employees in the selected unit(s) whose duties involve operating a process; methods for determining the content of the training; methods for determining frequency of refresher training; certification of required knowledge, skills, and abilities to safely perform job for employees already involved in operating a process on May 26, 1992, who have not received initial training; and training material.

g. Pre-startup safety review for new facilities and for modified facilities when the modification is significant enough to require a change in the process safety information; documentation of employee training.

h. Written procedures and schedules to maintain the ongoing integrity of process equipment; the relevant portions of applicable manufacturers' instructions, codes, and standards; and inspection and tests performed on process equipment in the unit(s)

selected.

i. Hot work permit program and active permits issued for the unit(s) selected.

j. Written procedures to manage change to process chemicals, technology, equipment and procedures; and changes to facilities that affect a covered process.

k. Incident investigation reports for the unit(s) selected, resolutions and corrective actions.

l. Written emergency action plan including procedures for handling small releases and evidence of compliance with 1910.120(a), (p), and (q), where applicable.

m. The two most recent compliance audit reports, appropriate responses to each of the findings, and verifications that deficiencies have been corrected.

6. **Documentation to be Requested--Contractor-Related**. The following information relating to contractor compliance shall be requested:

a. **Documentation from Employer**:

1. Information relating to contract employers' safety performance and programs;

2. Methods of informing contract employers of known potential hazards related to contractor's work and the process and applicable provisions of the emergency action plan;

3. Safe work practices to control the entrance, presence and exit of contract employers and contract employees in covered process areas;

4. Evaluation of contractor employer performance in fulfilling responsibilities required by the standard;

5. Contract employee injury and illness logs related to work in process areas; and

6. A list of unique hazards presented by contractors' work or hazards found in the workplace that have been reported to the employer.

b. **Documentation from Contract Employer**:

1. Records showing employees receive training in and understand safe work practices related to the process on or near which they will be working to perform their jobs safely;

2. Known potential fire, explosion or toxic release hazards related to job, and applicable provisions of emergency action plan; and

3. A list of unique hazards presented by contractors' work or hazards found in the workplace that have been reported to the employer.

   NOTE: The documentation described at B.5. and B.6.a. may also be required of the contract employer, depending on the scope of the contract employer's activities.

7. **Selection of Process(es)**. The team leader shall select one or more processes within which to evaluate compliance with the standard. This selection shall be based on the factors listed below, and shall be documented in the case file:

   a. Factors observed during the walkthrough;.

   b. Incident reports and other history;

   c. Company priorities for or completed process hazard analyses (PHA);

   d. Age of the process unit;

   e. Nature and quantity of chemicals involved;

   f. Employee representative input;

   g. Current hot work, equipment replacement, or other maintenance activities; and

   h. Number of employees present.

C. **Compliance Guidelines for Specific Provisions of 29 CFR 1910.119**. Guidelines for assessing compliance with the provisions of the PSM standard are provided in Appendix A of this directive.

1. Compliance officers shall use the guidance contained in Appendix A during all enforcement activities related to the PSM standard.

2. Clarifications and interpretations are provided in Appendix B of this instruction. Appendix B (or a subsequent revision) shall normally be the first point of reference in interpreting 29 CFR 1910.119.

   NOTE: Appendix B will be updated on an ongoing basis through page changes to this instruction, as more interpretations are developed. Compliance officers must therefore take care to ensure that their reference copies are up to date.

D. **Citations**. Citations for violations of the PSM standard shall be issued in accordance with the FOM, Chapters IV and V, with the following additional directions:

1. **Classification**. The requirements of the PSM standard are intended to eliminate or mitigate the

consequences of releases of highly hazardous chemicals. The provisions of the standard present closely interrelated requirements, emphasizing the application of management controls when addressing the risks associated with handling or working near hazardous chemicals.

a. Any violation of the PSM standard, therefore, is a condition which could result in death or serious physical harm to employees.

b. Accordingly, violations of the PSM standard shall normally not be classified as "other-than- serious."

2. **Use of Appendix A**. Appendix A, PSM Audit Guidelines, is constructed as a series of questions relating to each of the pertinent provisions of the standard.

a. The questions are designed to elicit a determination of "Yes" or "No" by the compliance officer as to whether compliance with the provision has been met.

b. A determination of "No" for any provision indicates noncompliance; thus, any "No" shall normally result in a citation for a violation of that provision.

c. The compliance officer shall thoroughly document each such determination in the case file.

Source: Federal OSHA CPL 02-02-045A (REVISED) - CPL 2-2.45A CH-1 September 13, 1994 (REVISED) - Process Safety Management of Highly Hazardous Chemicals -- Compliance Guidelines and Enforcement Procedures; Sections K-N.