Applicable OSHA Standards: 29 CFR 1910.119

1. Purpose & Scope

1.1. This example Process Safety Management (PSM) Program complies with OSHA standard 29 CFR 1910.119, Process Safety Management of Highly Hazardous Chemicals; Explosives and Blasting Agents.

1.2. Because Cleveland Integrity Services Inc. may be a contractor working inside of a PSM facility, it will abide with all such PSM contractor requirements. Under this program, Company employees will be trained in the concepts and requirements of PSM.

1.3. This program is included here for informational purposes only, and as a typical example of PSM development and implementation in client facilities.

1.4. Actual client PSM Program requirements apply to all employees and contractors working within the client controlled work locations.

2. Contractor Safety Responsibilities Under a PSM Program

2.1. The contract employer will assure that each contract employee is trained in the work practices necessary to safely perform his/her job.

2.2. The contract employer will assure that each contract employee is instructed in the known potential fire, explosion, or toxic release hazards related to his/her job and the process, and the applicable provisions of the host employer's emergency action plan.

2.3. The contract employer will document that each contract employee has received and understood the training required by this paragraph. The contract employer will prepare a record which contains the identity of the contract employee, the date of training, and the means used to verify that the employee understood the training.

2.4. The contract employer will assure that each contract employee follows the safety rules of the host facility, including safe work practices required by the contractor's company safety and health programs, and in accordance with OSHA requirements. This includes procedures for lockout/tagout, confined space entry, opening process equipment or piping and controls over entrance to facility.

2.5. The contract employer will advise the employer of any unique hazards presented by the contract employer's work, or of any hazards found by the contract employer's work.

2.6. Contractor supervisors and personnel will immediately report all incidents, injuries and near misses in accordance with the host employer's PSM program requirements and procedures.

2.7. Contractor employees will immediately report any incident, injury or near miss to his or her employer's on-site supervisor.

2.8. The example program follows.

3. Preface of Example PSM Program

3.1. Safety, health, and environmental responsibilities must be managed by line management as they manage their other responsibilities including production, quality, cost, and personnel relations. The same basic management techniques are used to manage safety, health, and environmental requirements as for production and quality management.

3.2. These include planning, organizing, leading and controlling assigned responsibilities.

3.3. Responsibility for protecting people, property, and the environment begins with the ranking facility manager and extends through all levels of the line management organization including employees. Each person in the line organization from the ranking manager to the employees has specific safety, health, and environmental responsibilities that they cannot delegate to others. They must effectively discharge their personal responsibility for protecting people, property, and the environment to achieve a safe and healthful working environment.

3.4. One important part of the overall safety and health program involves the prevention of unwanted releases of hazardous chemicals into locations which could expose employees and others to serious hazards as well as the environment and people in the surrounding community.

3.5. This Process Safety Management (PSM) Program describes the management system for protecting people, property, and the environment from catastrophic releases of highly hazardous chemicals in the workplace. This is accomplished by systematically evaluating the process(es) using approaches to assess the effectiveness of the process design, technology, operations, maintenance, non-routine activities, procedures, emergency preparedness, training, and other process elements. These are described in more detail throughout this PSM program.

3.6. This PSM Program complies with OSHA standard 29 CFR 1910.119, Process Safety Management of Highly Hazardous Chemicals; Explosives and Blasting Agents issued on

3.7. February 24, 1992, and which became effective on May 26, 1992.

4. Introduction

4.1. The major objective of this Process Safety Management (PSM) program is to prevent unwanted releases of hazardous chemicals into locations which could expose employees and others to serious hazards including those in the surrounding community.

4.2. The PSM program involves a systematic approach to evaluating the entire process, including the design, technology, operation, maintenance, procedures; emergency plans, training programs, and other pertinent process elements. A proactive identification, evaluation and mitigation or prevention of chemical releases is utilized.

4.3. The necessary expertise, experience, judgment, and proactive initiative is provided within the line organization or obtained from outside resources as needed to assure an effective PSM program. There are continuing efforts to strengthen and improve the process safety knowledge and expertise within the line organization.

4.4. Alternative avenues of decreasing the risks associated with highly hazardous chemicals in the workplace are considered, including the reduction in the inventory of the highly hazardous chemicals and dispersing hazardous chemical storage locations where one location will not cause a release in another location.

4.5. The PSM program describes how employees are involved in the programs, how process hazard analyses are conducted, and preparation of operating procedures and practices, training, contractors, pre-startup safety, mechanical integrity, managing change, incident investigation, emergency preparedness, and compliance audits.

5. Process Safety Management System

5.1. The facility's process safety management system is a part of the facility's safety, health, and environmental program. The Central Safety and Health Committee (CSHC), chaired by the ranking manager, serve as the decision-making and policy-setting body. All department heads reporting to the ranking manager serve on the CSHC as members and chair safety and health task groups. There are usually eight task groups including:

5.1.1. Safety Activities

5.1.2. Rules and Procedures

5.1.3. Education and Training

5.1.4. Health and Environment Inspections and Audits

5.1.5. Fire and Emergency

5.1.6. Accident Investigation

5.1.7. Housekeeping

5.2. A brief description of the CSHC and each task group and how they are involved in the PSM program follows.

6. Central Safety and Health Committee

6.1. The CSHC meets monthly for about an hour to manage the overall safety, health, and environmental program. Group chairmen will report on his or her task group reviews, audits, findings, conclusions, and recommendations at each meeting.

6.2. CSHC task group meeting minutes are maintained. When recommendations are accepted, they are assigned to specific individuals for follow-up, for completion, and for resolving by specified time periods.

6.2.1. Task Groups

6.2.1.1. Each task group is composed of supervisory and employee members who represent their assigned departments. Usually there are an equal number of supervisors and employees on each task group. In some cases, task group members chair safety and health teams, such as one Inspections and Audits task group member chairing a Process Hazards Analysis (PHA) team. This team conducts and/or manages the PHAs.

6.2.2. Safety Activities

6.2.2.1. Task groups promote the overall safety, health, and environmental program to ensure that it effectively protects people, property, and the environment. Task groups help communicate the importance of the PSM program to employees and the surrounding community and solicit employee participation.

6.2.3. Rules and Procedures

6.2.3.1. The Rules and Procedures task group coordinates all facility safety rules and procedures to ensure that the rules and procedures are known, understood, and followed. They manage the preparation and maintenance of the rules and procedures including the PSM procedures and program information. Also, one member of the group serves on the process safety management compliance audit team.

6.2.4. Education and Training

6.2.4.1. This task group coordinates all facility safety, health, and environmental training programs to ensure high quality training and good comprehension. The PSM training programs are coordinated by this group, including management, supervisors, employees, and contractors.

6.2.5. Health and Environment

6.2.5.1. All facility health and environmental program activities are coordinated by this task group, including the hazard communication program, respiratory protection program, hearing conservation program, and bloodborne pathogens program. One member chairs an ergonomics team and another, an environmental team. The task group cooperates with the process hazards analysis team in conducting process analyses.

6.2.6. Inspections and Audits

6.2.6.1. This task group manages all facility safety, health, and environmental inspections, including OSHA required inspections and audits. They determine what should be inspected, when the inspections should be conducted, who should inspect, and how the inspections should be performed. One member of the task group chairs the Process Hazards Analysis (PHA) team. Details concerning the PHA team are provided following this section.

6.2.7. Fire and Emergency

6.2.7.1. The fire and emergency task group coordinates all facility emergency plans, including the Employee Emergency Action Plan, the Fire Prevention Plan, and emergency response. This group also manages the Emergency Preparedness requirements of the process safety management program.

6.2.8. Accident Investigation

6.2.8.1. All facility accident and incident investigations are managed by this task group. This group appoints a process incident investigative team. They also review all accident and incident reports, including process incident investigations.

6.2.9. Housekeeping

6.2.9.1. This task group coordinates all facility housekeeping activities, including routine audits. Recommendations for improving housekeeping and orderliness are made as needed.

6.2.10. Process Hazards Analysis (PHA) Team

6.2.10.1. The PHA team of the facility's Inspection and Audits task group conducts the required process hazard analyses per the OSHA Process Safety Management standard. The PHA team leader is a member of the Inspections and Audits task group and meets each month with the task group. When PHA team reports are completed, the team leader accompanies the Inspections and Audits task group.

6.3. Chairman to the CSHC meeting and presents a verbal report of the PHA findings, conclusions, and recommendations.

6.4. The PHA team leader is fully knowledgeable in the proper implementation of the PHA methodology used and is impartial in the evaluation. Other full and part-time team members provide the team with expertise in areas such as process technology, process design, operating procedures and practices, including how the work is performed, alarms, emergency procedures, instrumentation, maintenance procedures, both routine and non-routine tasks, including how tasks are authorized, procurement of parts and supplies, safety and health, and other relevant subjects as needed. One team member must be familiar with the process being analyzed.

6.5. The PHA team has an intimate knowledge of the standards, codes, specifications and regulations applicable to the process being analyzed.

6.6. See the Process Hazards Analysis section of the Process Safety Management program for more details concerning PHA methodology.

6.7. Employee Participation

6.7.1. Employees participate in process safety management by serving on task groups and teams. Also, employees are consulted concerning the various aspects of the process safety management program.

7. Process Safety Information

7.1. A compilation of written process safety information is provided for each facility process to enable managers, supervisors, and employees to identify and understand the process hazards. This pertinent process safety information is also provided the process hazards analysis (PHA) Team. This information includes, but is not limited to:

7.1.1. Hazards of highly hazardous chemicals used and processed,

7.1.2. Process technology, and

7.1.3. Process equipment

7.2. Highly Hazardous Chemicals Information

7.2.1. Information pertaining to highly hazardous chemicals provided managers, supervisors, employees, and the PHA team includes, but not limited to:

7.2.1.1. Toxicity,

7.2.1.2. Permissible exposure limits,

7.2.1.3. Physical data,

7.2.1.4. Reactivity,

7.2.1.5. Thermal and chemical stability, and

7.2.1.6. Hazardous effects of inadvertent mixing of different materials.

7.2.2. Most of the above information is provided by Material Safety Data Sheets.

7.3. Process Technology Information

7.3.1. The process technology information provided to enable managers, supervisors, employees, and the PHA team to identify and understand the process hazards includes, but is not limited to:

7.3.1.1. Block flow diagrams or process flow diagrams,

7.3.1.2. Process chemistry, maximum intended inventory, safe upper and lower limits of temperature, pressure, flows, compositions, and

7.3.1.3. Evaluations of consequences of deviations, including those affecting employee safety and health.

7.3.2. In those cases where the original process technical data no longer exists, the data is developed during the initial PHA.

7.4. Process Equipment Information

7.4.1. Some of the process equipment information available to managers, supervision, employees, and the PHA team include, but is not limited to:

7.4.1.1. Materials of construction,

7.4.1.2. Piping and instrument diagrams,

7.4.1.3. Electrical classification,

7.4.1.4. Relief system design and design basis,

7.4.1.5. Ventilation system design, design codes and standards employed, material and energy balances for processes built after may 26, 1992, and

7.4.1.6. Safety systems (i.e., interlocks, detection or suppression systems).

7.4.2. Documents are maintained showing that the process equipment complies with recognized and generally accepted good engineering practices. Also, documents are provided that show existing equipment designed and constructed in accordance with codes, standards, or practices that are no longer in general use, is designed, maintained, inspected, tested, and is operating in a safe manner.

7.4.3. Where process technology requires a design which departs from applicable codes and standards, documents are provided which show that the design and construction is suitable for the intended purpose.

8. Process Hazards Analysis (PHA)

8.1. Process Hazards Analysis (PHA) is one of the most important elements of the Process Safety Management (PSM) program. It is an organized and systematic effort to identify and analyze the significance of potential hazards associated with the processing or handling of highly hazardous chemicals.

8.2. The PHA provides information to assist management and employees in making decisions for improving safety and reducing the consequences of unwanted and unplanned releases of hazardous chemicals. A PHA analyzes potential causes and consequences of fires, explosions, releases of toxic or flammable chemicals and major spills of hazardous chemicals.

8.3. Each PHA focuses attention on equipment, instrumentation, utilities, human actions (routine and non-routine), external factors that might impact the process. These considerations assist in determining the hazards and potential failure points or failure modes in processes.

8.4. PHAs are conducted initially and updated at least every 5 years. Each PHA is conducted appropriately for the complexity of the process being evaluated, and to properly identify, evaluate, and control the hazards involved.

8.5. The priority for conducting PHAs is determined and documented based on the:

8.5.1. Extent of process hazards,

8.5.2. Numbers of potentially affected employees,

8.5.3. Age of the process, and

8.5.4. Operating history of the process.

8.6. PHAs completed after May 26, 1987, which meet the requirements of OSHA standard 29 CFR 1910.119, will updated and revalidated 5 years after the last analysis.

8.7. The PHA methodology utilized depends on many factors, including the existing process knowledge, operating experience, process changes, process size and complexity. One or more of the following methodologies may be used.

8.7.1. “What-if?” Method,

8.7.2. Checklist method,

8.7.3. A combination of “what-if?” And checklist methods,

8.7.4. Hazard and operability study (hazop),

8.7.5. Failure mode and effects analysis (fmea),

8.7.6. Fault tree analysis (fta), or

8.7.7. An appropriate equivalent methodology.

8.8. The application of a PHA to a particular process may involve the use of different methodologies for various parts of the process. For example, a process involving a series of unit operations of varying sizes, complexities, and ages may use different methodologies and PHA team members for each operation. When this is done, the PHA findings and conclusions are integrated into one final study and evaluation.

8.9. In some cases, a PHA checklist is used to perform PHA, such as for standard boiler or heat exchanger evaluations.

8.10. Generic PHAs are also used for batch type processes where there are only small changes of monomer or other ingredient ratios and the chemistry is documented for the full range and ration of batch ingredients. Also, for large continuous processes having several different operations, some PHAs are conducted on each segment of the process and then integrated into one final report.

8.11. Each PHA addresses the following items:

8.11.1. Hazards of the process,

8.11.2. Previous incident(s) with catastrophic consequences,

8.11.3. Engineering and administrative controls including detection methodologies for early warning of releases such as process monitoring and control instrumentation with alarms, detection hardware, etc.

8.11.4. Consequences of failure of engineering and administrative controls,

8.11.5. Facility siting,

8.11.6. Human factors, and

8.11.7. Qualitative evaluation of a range of possible safety and health effects of failure of controls on employees' safety and health.

8.12. PHAs are performed by a PHA team with expertise in engineering and process operations, including at least one employee having experience and knowledge specific to the process being evaluated. Also, one team member must be knowledgeable in the specific process hazard analysis methodology used.

8.13. As previously addressed, the PHA team leader is a member of the Central Safety and Health Committee's Inspections and Audits task group. The team leader meets monthly with the Inspections and Audits task group and reports on the team's plans and progress.

8.14. The PHA team has the major responsibility for coordinating the overall facility Process Safety Management Program.

8.15. PHA Report Follow-up

8.15.1. All PHA reports are prepared by the PHA team, the ranking line manager of the process analyzed, the Inspections and Audits task group, and the Central Safety and Health Committee. The Central Safety and Health Committee (CSHC) chairman (ranking manager of the facility) assigns specific individuals to be responsible for completing and/or resolving all PHA report recommendations. The PHA team leader maintains a log of all recommendations and reports to the CSHC chairman monthly concerning the status of all unresolved recommendations.

8.15.2. The actions to be taken as the result of PHA report recommendations, including a schedule for completion, are communicated by the PHA team leader to the process managers involved, maintenance, and other employees whose work assignments are in the process and who may be affected by the recommendations or actions.

8.16. The PHAs are updated and revalidated by the PHA team at least every 5 years after completion of the initial PHA to assure that the PHA is consistent with the current process.

8.17. All PHAs and updates or re-validations are retained for the life of the process.

9. **Operating Procedures**

9.1. Operating procedures have been developed and implemented which describe tasks to be performed, dates to be recorded, operating conditions to be maintained, samples to be collected, and safety and health precautions to be taken.

9.2. The procedures are thoroughly reviewed and approved to ensure they are technically accurate. Employees assist in the preparation of the procedures and verify that they are understandable to employees. All operating procedures are routinely reviewed and revised as necessary to ensure they reflect current operations.

9.3. Process safety information compiled to assist in conducting process hazards analyses is also used as a resource for assuring the process operating procedures and practices are consistent with the known hazards and operating parameters are accurate.

9.4. The operating procedures are reviewed by the engineering staff and operating personnel to ensure they are accurate and provide practical instructions on how to perform jobs safely. Specific instructions and details are included in the operating procedures describing what steps are to be taken or followed, including applicable safety precautions and implications, pressure limits, temperature ranges, flow rates and what to do when the operating limits, ranges and rates are abnormal. Also, the actions needed to correct and/or control upset conditions are included in the procedures.

9.5. The training program ensures that operating personnel have a full understanding of the operating procedures including verification that workers not fluent in English understand the procedures.

9.6. All process and equipment changes are included as necessary in operating procedures and personnel trained to ensure they are properly informed of all pertinent changes. The operating procedures also include controls for maintenance personnel and contractors to enter the process area and to verify they have completed their authorized jobs.

10. **Employee Training**

10.1. All employees, including maintenance and contractor employees, involved with highly hazardous chemicals are trained to ensure they fully understand the safety and health hazards of the chemicals and processes they work with to protect themselves, and citizens living near the facility.

10.2. The training employees receive in compliance with OSHA's hazard communication standard 29 CFR 1910.1200 helps them become more knowledgeable about the chemicals they work with as well as familiarize them with reading and understanding MSDSs. However, additional training is provided concerning operating procedures; safe work practices; emergency procedures including alarms, special assignments, evacuation, and emergency response; safety rules and

procedures; routine and non-routine work authorization; and other pertinent process safety information.

10.3. The employees to be trained and the subjects to be covered have been defined and documented. Also, the training goals and objectives have been established and written in clear measurable terms. These training goals and objectives are tailored to each specific training module or segment. The important actions and conditions under which employees demonstrate competence and knowledge as well as acceptable performance have been described and documented.

10.4. Hands-on training is provided employees to enhance their senses beyond listening, including dry runs and simulated operations to help employees feel the full reality of the situation under controlled conditions.

10.5. Along with the hands-on training, employees receive traditional classroom instruction including lectures, videos, programmed instruction, and on-the-job instruction. Employees are encouraged to actively participate in all training activities and practice their skills and knowledge.

10.6. The training programs are periodically evaluated to see if the necessary skills, knowledge, and routines are being properly understood and implemented by the trained employees. The means/methods for evaluating the training programs has been developed and implemented including assigned responsibility and reports.

10.7. Any training program deficiencies detected during the evaluation are documented and recommendations made to correct them. Retraining or more frequent refresher training is provided as needed to ensure an effective training program. Each employee trained is requested to complete a training critique to obtain information on how to improve the training process. Also, trainees are consulted as to how to improve the training programs.

10.8. Maintenance and contract employees receive current and updated process safety training, including training about process changes which may affect their jobs. Responsibility is assigned for maintenance and contractor employee training and records maintained. They are also consulted about the effectiveness of their training programs.

11. **Contractors**

11.1. A screening process has been established for hiring contractors to perform work in and around processes that involve highly hazardous chemicals. The screening process is designed to ensure that the contractors hired or used can accomplish their assigned tasks without compromising the safety and health of employees at the facility. The screening program involves obtaining information on the contractor's safety performance, including injury and illness rates and experience. Also, contractor references are contracted concerning the contractor's safety performance.

11.2. In addition to reviewing the contractor's safety performance, the contractor's job skills, knowledge, and certifications (such as pressure vessel welders) are also reviewed.

11.3. A site injury and illness log is maintained for contractors working on or adjacent to processes to provide full knowledge of process injury and illness experience. This information is used by those auditing the process safety management program compliance and those investigating process incidents.

11.4. Workplace controls have been established to ensure that contractors perform their work safely. These controls specify that work permits are required for all contractor work on or adjacent to a process. The permit keeps all operating personnel and affected personnel informed concerning contractor work activities.

11.5. Contract employees will not perform hot work until a hot work permit is obtained from the host employer.

12. Pre-Startup Safety

12.1. Process hazard analyses (PHAs) are used for new processes to improve the design and construction of the process from a reliability and quality standpoint. The PHA recommendations are implemented before final installations are complete. Other items completed prior to initial process startup include piping and instrument diagrams, operating procedures, and operating personnel trained.

12.2. The initial startup and normal operating procedures are fully evaluated as part of the pre-startup review to assure a safe transfer into the normal operating mode for meeting the process parameters.

12.3. Management of change procedures are required for changes to existing processes that have been shut down for turnaround or modifications. Also, all changes other than "replacement in kind" made to the process during shutdown go through the management of change procedures. Piping and instrument diagrams and operating procedures are updated as necessary following changes. Significant changes impacting the process result in refresher and/or additional employee training.

12.4. Incident investigations, compliance, audits, and PHA reports are evaluated to determine their impacts they may have prior to startup of new processes.

13. Mechanical Integrity

13.1. An on-going mechanical integrity program is used to ensure safe process operation. Reviews of maintenance programs and schedules are periodically conducted to see if only "breakdown" maintenance is being used. Where such is the case, corrections will be made. Equipment used to process, store, or handle highly hazardous chemicals are designed, constructed, installed, and maintained to minimize releases. To accomplish this, an effective mechanical integrity program has been established to ensure the continued integrity of process equipment.

13.2. The elements of the mechanical integrity program include the identification and categorization of equipment and instrumentation, inspections and tests, testing and inspection frequencies, development of maintenance procedures, training of maintenance personnel, criteria for acceptable test results, documentation of test and inspection results, and documentation of manufacturer's recommendations as to the meantime for failure of equipment and instrumentation.

13.3. The priority for safe process equipment operation is:

13.3.1. Primary Lines of Defense

13.3.1.1. Operate and maintain the process as designed and keep chemicals contained.

13.3.1.2. Controlled release of chemicals through venting to scrubbers or flares, or to surge or overflow tanks which are designed to receive such chemicals, etc.

13.3.2. Secondary Lines of Defense

13.3.2.1. Fixed fire protection systems like sprinklers, water spray, or deluge systems, monitor guns, etc.; dikes, designed drainage systems, and other systems which would control or mitigate hazardous chemicals once an unwanted release occurs.

13.3.2.2. The mechanical integrity program protects the above lines of defense and ensures effective highly hazardous chemical control.

13.3.2.3. The mechanical integrity program includes the following stages:

13.3.2.3.1. A list of all process equipment and instrumentation has been compiled and categorized including:

13.3.2.3.1.1. Pressure vessels,

13.3.2.3.1.2. Storage tanks,

13.3.2.3.1.3. Process piping,

13.3.2.3.1.4. Relief and vent systems,

13.3.2.3.1.5. Fire protection systems components,

13.3.2.3.1.6. Emergency shutdown systems and alarms and interlocks, and

13.3.2.3.1.7. Pumps.

13.4. The equipment and instrumentation is categorized on a priority basis for items requiring closer scrutiny than other items. This priority and the manufacturer's data or operating experience determines the inspection and testing frequency and associated procedures.

13.5. Applicable codes and standards which provide information for the inspection and testing frequency and appropriate methodologies include:

13.5.1. National Boiler Inspection Code, or

13.5.2. American Society for Testing and Material,

13.5.3. American Petroleum Institute,

13.5.4. National Fire Protection Association,

13.5.5. American National Standards Institute,

13.5.6. American Society of Mechanical Engineers, and

13.5.7. Other groups.

13.6. Inspections

13.6.1. The applicable codes and standards are used to provide criteria for external inspections for such items as foundation supports, anchor bolts, concrete or steel supports, guy wires, nozzles and sprinklers, pipe hangers, grounding connections, protective coatings and insulation, and external metal surfaces of piping and vessels, etc.

13.6.2. These codes and standards also provide information on methodologies for internal inspection, and a frequency formula based on the corrosion rate of the materials of construction. The erosion of internal and external surfaces is considered along with corrosion effects of pipes and values. When the corrosion rate is not known, a maximum inspection frequency is followed until the specific corrosion rate has been determined.

13.6.3. The internal inspection covers items such as vessel shell, bottom and head; metallic linings; nonmetallic linings; thickness measurements for vessels piping; inspection for erosion; corrosion, cracking and bulges; internal equipment like trays, baffles, sensors and screens for erosion, corrosion or cracking and other deficiencies.

13.6.4. Although some inspections may be performed by state and local government inspectors under state and local statutes, procedures have been established to ensure that tests and inspections are conducted properly and consistency is maintained even when different employees may be involved.

13.7. Appropriate training is provided maintenance personnel to ensure they understand the preventative maintenance program procedures, safe practices, and the proper use and application of special equipment or unique tools that may be required.

13.8. A quality assurance system is provided to help ensure that the proper materials of construction are used, that fabrication and inspection procedures are proper, and that installation procedures recognize field installation concerns.

13.9. The quality assurance program is an essential part of the overall mechanical integrity program and helps maintain the primary and secondary lines of defense for preventing unwanted chemical releases or those which control or mitigate a release.

13.10. "As built" drawings, together with certifications of coded vessels and other equipment, and materials of construction are verified and retained in quality assurance documentation. Equipment installation jobs are inspected in the field for use of proper materials and procedures and to assure that qualified craftsmen are used. Also, the use of proper gaskets, packing, bolts, valves, lubricants, and welding rods are verified in field inspections. The procedures for installation of safety devices are verified in the field, such as the torque on the bolts for rupture discs, uniform torque on flange bolts, proper installation of pump seals, etc.

13.11. Where the quality of parts is a problem, audits of equipment supplier's facilities are conducted to ensure the equipment is suitable for its intended service.

13.12. All necessary changes in process equipment go through the management of change procedures.

14. Non-Routine Work Authorizations

14.1. Non-routine work performed in process areas is controlled in a consistent manner. The hazards identified involving the work to be accomplished is communicated to those performing the work and to operating personnel whose work could affect the safety of the process.

14.2. A work permit procedure describes the steps the maintenance supervisor, contractor representative or other person needs to follow to obtain the necessary clearance to get the job started.

14.3. The procedure references and coordinates applicable are:

14.3.1. Lockout/tagout procedures,

14.3.2. Line breaking procedures,

14.3.3. Confined space entry procedures, and

14.3.4. Hot work authorizations.

15. **Managing Change**

15.1. Temporary and permanent changes to process chemicals, technology, equipment and facilities are managed to ensure effective process safety management. This process safety management program describes the overall management system used to assure a safe and healthful workplace from process hazards. Management of change is part of the process safety management system. Both technical and mechanical changes must be authorized.

15.2. Process changes include all modifications to equipment, procedures, raw materials and processing conditions other than "replacement in kind." The changes are identified, reviewed, and authorized prior to implementing the change. A Process Change Authorization is required for all changes to ensure the operating procedures contain the

15.3. Operating parameters (pressure limits, temperature ranges, flow rates, etc.) and the importance of operating within the limits. See the following process change authorization form.

15.4. Management of change covers changes such as process technology changes, and changes to equipment and instrumentation. Changes in process technology requiring authorization include, but are not limited to, changes in production rates, raw materials, experimentation, equipment unavailability, new equipment, new product development, and change in catalyst and changes in operating conditions to improve yield or quality.

15.5. Equipment changes requiring authorization include, but are not limited to, changes in materials of construction, equipment specifications, piping pre-arrangements, experimental equipment, computer program revisions, and changes in alarms and interlocks.

15.6. The process change authorization is not only used to assure that temporary and permanent changes can be accomplished safely, but to ensure that following the change that processes are returned to the normal operating state and original designed state. Also, the process change authorization assures that the pertinent safety and health considerations are incorporated into the operating procedures and the process.

15.7. All process change authorizations are filed for reference by PHA teams and others reviewing, evaluating, and/or inspecting processes.

16. **Incident Investigations**

16.1. Employees and contractor personnel will immediately report all incidents, injuries and near misses in accordance with the host employer's PSM program requirements and procedures.

16.2. Process incidents which result in, or could reasonably have resulted in, a catastrophic release of highly hazardous chemicals are investigated immediately, or no later than within 48 hours of the incident. This includes "near miss" incidents.

16.3. The purpose of these incident investigations is to identify the underlying causes of the incident and to implement corrective action to prevent similar incidents and avoid repeating past mistakes.

16.4. Following the investigation, a written report will be made. The report will contain at least the following components:

16.4.1. Incident date, time and specific location;

16.4.2. The date when the investigation is initiated;

16.4.3. A description of the incident;

16.4.4. A list and description of factors that caused or contributed to the incident; and

16.4.5. Findings and recommendations for corrective and other actions identified by the investigation.

16.5. The Company will assist the host employer as required to promptly address incident report findings and recommendations. This includes resolving needs and recommendations. Resolutions, corrective and any other actions will be documented.

16.6. All Company personnel whose work tasks are affected by investigation findings will review the written incident investigation report.

16.7. The Company will maintain its copy of the incident investigation report for a minimum of five years.

16.8. Investigation Team

16.8.1. An incident investigation team will be established and consist of at least one person knowledgeable in the process involved, including a contract employee if the incident involved work of the contractor, and other persons with appropriate knowledge and experience to thoroughly investigate and analyze the incident.

16.8.2. Process incidents are investigated by a process incident investigation team under the Accident Investigation task group. One task group member

chairs the team and reports through the task group chairman to the ranking facility manager who chairs the Central Safety and Health Committee.

16.8.3. The process incident investigation team has received special training in process incident investigation, including how to conduct interviews and report preparation. Both management and employees are included as team members and is multidisciplinary.

16.8.4. One supervisor and one employee knowledgeable of the process is added to process incident investigation teams to ensure effective investigations. The team gathers the facts of the incident, analyzes them and develops plausible scenarios as to what happened, and why.

16.8.5. Employees and supervisors in the process area where the incident occurred are consulted and interviewed to obtain incident facts. The focus of the investigation is to obtain facts and not to place blame. The team and the investigation process deals with all involved individuals in a fair, open and consistent manner. An incident report is prepared following the investigation which includes the findings, conclusions, and recommendations. The written report which is to the ranking manager of the process involved is verbally reviewed with him or her prior to distribution.

16.8.6. Copies of the report are distributed to the ranking manager of the entire facility, the accident investigation task group, and other affected groups and individuals.

16.8.7. The process incident investigation team is responsible for assuring that all report recommendations are completed or resolved by those responsible for the follow-up. Monthly status reports are presented on incident recommendations at each Central Safety and Health Committee meeting by the chairman of the Accident Investigations task group.

17. **Emergency Preparedness**

17.1. The Fire and Emergency Task Group is responsible for assuring proper emergency preparedness and response, including what actions employees are to take when there is an unwanted release of highly hazardous chemicals.

17.2. Emergency Action and Fire Prevention Plans have been established that comply with OSHA standard 29 CFR 1910.38. These plans describe the actions employees must take in the event of an emergency. These actions may involve special emergency duties or evacuation. Refer to the Emergency Action and Fire Prevention plans for specific details.

17.3. The emergency action plan includes the prompt evacuation of employees due to an unwanted release of highly hazardous chemicals. This plan involves emergency

alarms to alert employees when to evacuate. Prompt evacuation is essential, including physically impaired employees who are provided the necessary support and assistance. Also, the use of process control centers in process areas as safe areas is prohibited since they may have not been designed for safe refuge.

17.4. When unwanted releases of highly hazardous chemicals may occur outdoors, wind direction indicators have been placed at the highest point that can be seen throughout the process area. These indicators allow employees to move cross wind to upwind to gain safe access to refuge areas.

17.5. Minor emergency or incidental releases of unwanted highly hazardous chemicals in the process area are handled by highly trained, designated employees wearing appropriate personal protective equipment and following specific procedures. Preplanning for handling incidental releases for minor emergencies in the process area has been accomplished, including hazard communication training per OSHA standard 29 CFR 1910.1200, emergency action and fire prevention plans per OSHA standard 29 CFR 1910.38, and emergency response per OSHA standard 29 CFR 1910.120.

17.6. The specific employee actions which must taken for incidental and major unwanted releases of highly hazardous chemicals have been designated in the emergency action plan. Also, the required actions to obtain outside assistance from mutual aid groups or local government emergency response organizations have been defined in the emergency action plan.

17.7. The emergency action plan and fire prevention plan describes the emergency organization and command system, including an on-scene incident commander and staff. This fully trained organization has been properly equipped to carry out their assigned duties.

17.8. Drills, training exercises, and simulations with local community emergency response planners and responsible organizations have been conducted and are conducted on a periodic basis. This cooperation with local emergency agencies also assists in complying with EPA's Risk Management Plan Criteria.

17.9. An emergency control center has been established at the facility in a safe area away from the process area. This center serves as the major communication link between the on-scene incident commander and plant or corporate management as well as with local emergency organizations and officials. Communication equipment in the center includes a network for receiving and transmitting information by telephone, radio or other means. A back-up communications network is provided in case of power failure or one communication system fails.

17.10. The emergency control center is equipped with plant layout and community maps, utility drawings including firefighting water sources, emergency lighting, appropriate reference materials such as government agency notification lists, Company telephone lists, SARA Title III reports, material safety data sheets, emergency plans and procedures manual, listing of local emergency response equipment,

mutual aid information, and access to meteorological or weather condition data and dispersion modeling data.

18. **Compliance Audits**

18.1. The PHA team is responsible for assembling a compliance audit team to audit compliance with OSHA's process safety management standard 29 CFR 1910.119 at least every three years. Normally, the entire process hazards team plus a member of the rules and procedures task group not on the PHA team and the facility safety/health manager are assigned to the team. The chairman of the PHA team is the compliance audit team chairman unless he or she is responsible for the process(es) being audited to ensure compliance.

18.2. In that case, a person knowledgeable in audit techniques and who is impartial towards the facility area being audited is appointed chairman of the Inspection and Audits task group.

18.3. The audit includes an evaluation of the design and effectiveness of the process safety management system and a field inspection of the safety and health conditions and practices to ensure compliance. The essential elements of the audit program include:

18.3.1. Planning,

18.3.2. Staffing,

18.3.3. Conducting the audit,

18.3.4. Evaluation,

18.3.5. Recommendations,

18.3.6. Corrective action,

18.3.7. Follow-up, and

18.3.8. Documentation.

18.4. An OSHA standard 29 CFR 1910.119 process safety management checksheet is used by the audit team to conduct the audit. Also, a standardized form is used to document each audit step and ensure an effective audit is conducted and proper follow-up is accomplished. All team members and their expertise are listed. If the needed expertise is not available, it is obtained prior to conducting the audit. The standardized audit form includes:

18.4.1. Process description and documentation,

18.4.2. Process safety information,

18.4.3. Training,

18.4.4. Procedures,

18.4.5. Physical inspection of the facility,

18.4.6. Work authorizations,

18.4.7. Interviews with all levels of facility personnel,

18.4.8. Findings,

18.4.9. Conclusions,

18.4.10. Recommendations, and

18.4.11. Follow-up.

18.5. The compliance audit team issues the final audit report to the chairman of the PHA team with copies to the Inspections and Audits task group chairman and the chairman of the Central Safety and Health Committee who is the ranking facility manager. The audit team is responsible for ensuring that all report recommendations are completed or resolved. Written monthly progress reports are issued to the Inspections and Audits task group chairman who gives monthly status reports to the Central Safety and Health Committee until all items are resolved.

18.6. All affected persons and groups are informed of the audit findings, conclusions, and recommendations. The Central Safety and Health Committee chairman assigns specific responsibility for follow-up including revision of the process safety management program, revised operating procedures, improved training, etc. The PHA team has the overall responsibility to ensure that the necessary actions are taken to maintain an effective process safety management program.

19. **Safety and Health Hazard Control Team**

19.1. Effective safety and health programs prevent accidents, injuries and illnesses through proper recognition, evaluation and control of safety and health hazards. Emphasis is placed on prevention, not after-the-fact accident investigation. Thus, products, processes, workplaces and environments must be made safe through design. To ensure proper safety and health engineering controls, each organization and facility should establish and maintain effective safety and health hazard control teams.

19.2. Accidents are costly for organizations and individuals. Correcting safety and health problems after an accident occurs is expensive. A proactive approach must be taken to eliminate and/or control safety and health hazards before accidents, injuries and/or illnesses occur. The Safety and Health Hazard Control Team can help accomplish this objective.

19.3. The purpose of the team is to recognize, evaluate and control safety and health hazards before they cause accidents, damage, injuries and/or illnesses.

19.3.1. The following priority is utilized to control recognized safety and health hazards.

19.3.1.1. Eliminate hazards by substitution or engineering controls

19.3.1.2. Reduce the risks when hazards cannot be eliminated by substitution, employee rotation, or limited exposure

19.3.1.3. Provide safety devices (guards, interlocks, etc.)

19.3.1.4. Provide warning signs, placards or tags

19.3.1.5. Provide procedures, education and training, and protective equipment

19.3.1.6. Assure that procedures are feasible, that they can be followed and the job can still be done

19.3.1.7. Enforce safety rules and procedures

19.4. The Safety and Health Hazard Control (SHHC) Team is chaired by a facility manager or supervisor with strong engineering knowledge and experience. He or she is a member of the Inspections and Audits Task Group of the Central Safety and Health Committee.

19.5. Members of the SHHC Team include at lease one representative from each major department within the facility including staff, supervisors and employees.

19.6. The SHHC Team meets monthly for about 45 minutes to plan their activities and report on their findings, conclusions and recommendations. Minutes are kept and provided to the Inspections and Audits Task Group Chairman.

19.7. The following activities are some of the many things the team considers:

19.7.1. New Facilities, Processes and Equipment -- The team develops implements and maintains effective procedures for performing safety and health evaluations of new facilities, processes and equipment.

19.7.2. Modified Facilities, Processes and Equipment -- The team develops implements and maintains effective procedures for reviewing potential safety and health hazards associated with modified or revised facilities, processes and equipment.

19.7.3. Accident/Incident Analysis -- The team develops implements and maintains effective procedures for analyzing accidents and/or incidents

which involve basic design (engineering) defects. These procedures are developed in cooperation with the Accident Investigation Task Group.

19.7.4. Process Hazard Analyses -- The team develops implements and maintains effective procedures and systems for performing periodic (usually annual) process hazard analyses of all major facility processes. Written process hazard analysis reports are presented to the Inspections and Audits Task Group Chairman and to the Central Safety and Health Committee.

19.8. Responsibilities

19.8.1. Each SHHC Team member is given a specific assignment (activity) to coordinate. He or she obtains assistance from other facility supervisors and employees in effectively coordinating the assignment.

19.9. Staff Assistance

19.9.1. The facility staff safety and health manager, supervisor and/or coordinator meets with the Team and provides assistance as needed to ensure the Team has the necessary resources.

19.10. Trade Secrets

19.10.1. From the applicable OSHA regulations on Process Safety management, FYI:

19.10.1.1. “Employers will make all information necessary to comply with the section available to those persons responsible for compiling the process safety information (required by paragraph (d) of this section), those assisting in the development of the process hazard analysis (required by paragraph (e) of this section), those responsible for developing the operating procedures (required by paragraph (f) of this section), and those involved in incident investigations (required by paragraph (m) of this section), emergency planning and response (paragraph (n) of this section) and compliance audits (paragraph (o) of this section) without regard to possible trade secret status of such information.”

19.10.1.2. Nothing in this paragraph will preclude the employer from requiring the persons to whom the information is made available under paragraph (p)(1) of this section to enter into confidentiality agreements not to disclose the information as set forth in 29 CFR 1910.1200.

19.10.1.3. Subject to the rules and procedures set forth in 29 CFR 1910.1200(i)(1) through 1910.1200(i)(12), employees and

their designated representatives will have access to trade secret information contained within the process hazard analysis and other documents required to be developed by this standard.