

## PROCESS SAFETY (OSHA 1910.119)

### GUIDELINES

#### **I. Site Process Safety Plan**

- A. Each site should have a "site plan" that explains how that site manages Process Safety, and contains, or references, all documentation associated with Process Safety.
- B. An index that organizes the Plan by each element of 1910.119 is appropriate; beginning with "Employee Participation" and containing all additional elements;
  - Process Safety Information
  - Process Hazard Analysis
  - Operating Procedures
  - Training
  - Contractors
  - Pre-startups Safety Review
  - Mechanical Integrity
  - Hot Work Permit
  - Management of Change
  - Incident Investigation
  - Emergency Planning and Response
  - Compliance Audits
  - Trade Secrets
- C. If the site would like to utilize an "introduction" section that provides background information on the site, and other data that is common to all elements, this can be done.
- D. An appendix section can be used to locate all schedules or forms, rather than having them located under each element.
- E. An "Action Plan Section" could be part of your introduction, included under each element, or be a separate item. This section covers specifically what outstanding issues are being upgraded in the Site Plan. Target dates and individual assignments are included for any element being upgraded, or not considered "in place".

## II. Guidelines That Are Common To All Elements In Site Plan

- A. A written description of how the element is managed at the site.
- B. Identify the individual/or individuals responsible for managing this element.
- C. Include or reference (if referencing, provide physical location also) all related procedures, policies, schedules, etc. that relate to this element. Use flow charts when appropriate.

## III. Updated Guidelines for Individual Elements In Site Plan

- A. Employee Participation
  - 1.) Perhaps the most important of all the elements!
  - 2.) Employees should be involved in preparing and managing this element, and all other elements.
  - 3.) Plan should be in enough detail to show how the site insures broad participation.
- B. Process Safety Information:
  - 1.) Three basic types of information required.
    - a) Pertaining to the hazards of the highly hazardous chemicals
    - b) Technology of the process
    - c) Equipment in the process
  - 2.) If the above data is not recreated in the site plan, the person responsible for this element should verify that each type of information listed in the regulation is covered in the referenced material.
  - 3.) Documentation needs to be kept up to date. Drawings have been are biggest concern. See Attachment No. I for additional comments.
- C. Process Hazard Analysis
  - 1.) Each site should have a five year (5/26/92 - 5/26/97) schedule for their Process Hazard Review. (See Attachment No. II).
  - 2.) Each site should report quarterly on recommendations from Process Hazard Reviews. (See Attachment No. III).

- 3.) Each site should define their "covered processes". Include or reference written technical analysis documents.
- 4.) Recent OSHA recommendations indicate that any storage area directly connected to a "covered process" should also be treated as a "covered process".
- 5.) When defining concentration levels of chemicals, the "commercial grade" mixture will be the lower limit of covered materials.
- 6.) Employees specifically need to be involved in developing your PHR schedule.

D. Operation Procedures

- 1.) This element has four primary parts:
  - a) Clear written procedures required
  - b) Shall be readily accessible
  - c) Shall be reviewed and kept current
  - d) Shall have other safe work practices (such as lock out, confined entry, and work order control procedures).
- 2.) Each site that is still working on the above, needs to have a detailed schedule for accomplishing these items.

E. Training

- 1.) The person responsible for this element needs to have access to all "grandfather" clauses, and/or initial training records for all operators and their supervisors.
- 2.) Each site needs to involve employees in determining the maximum time between refresher training periods. this shall be documented.
- 3.) A means to verify that the employee understood the training shall be a part of the program.
- 4.) If an operator "tests-out" in order to not sit through refresher training, the test needs to completely cover the procedures necessary to operate the unit.
- 5.) This is one of the two most sited elements by OSHA.

## F. Contractors

- 1.) There are six items each site should cover:
  - a) When selecting a contractor, obtain and evaluate safety performance and programs.
  - b) Inform contract employees of the known potential fire, explosion, or toxic release hazards related to their work.
  - c) Communicates the provisions of emergency response plan.
  - d) Communicate plant's safe work practices.
  - e) Evaluate contractor's performance on their areas of responsibility.
  - f) Maintain injury and illness log on contractor's work in process areas covered.
- 2.) The contractor is responsible for the following:
  - a) Assure each employee is trained on work practices.
  - b) Assure each employee is instructed on potential hazards.
  - c) Document each employee receives and understands (a) & (b).
  - d) Assure that each employee follows safety rules and work practices.
  - e) Advise employer of any unique hazards.
- 3.) Items 1) a,b,c,d, & f have been covered by most plants in their "Contractor Quality Guidelines" and Contractor Orientation procedures. Item 1) e may require further review.

## G. Pre-Start Up Safety Review -

- 1.) Each site needs to establish what size or type of modification is "significant" enough to require a change to the process safety information.
- 2.) A review should contain these features:
  - a) Verification the facility was built or modified in accordance with design specifications.
  - b) Safety, Operating and Maintenance procedures are in place.
  - c) A Process Hazard Analysis has been done and recommendations all resolved before startup.
  - d) Training of each employee involved completed before start-up.

- 3.) Most sites have built this element into their Management of Change Procedure.

#### H. Mechanical Integrity -

- 1.) Over the past eight months several "position papers" have been published, and talks held. Attachment No. IV contains the latest versions.
- 2.) There are six basic parts to this element:
  - a) Identify equipment covered.
  - b) Use a written work order procedure to control the safety, quality, and timeliness of maintenance work.
  - c) Grandfather or document existing skills, and develop refresher training that covers skills, safety, and process overview. All procedures (work-order system, Work practices, inspection, etc.) need to have been formally communicated to employees at least once.
  - d) Inspection and testing should be done in a manner and on a frequency that is constant with good engineering practices. (Document basis used.)
  - e) The work order system and the inspection program should provide for timely corrections to deficiencies found.
  - f) Quality assurance has three parts.
    - 1) Purchasing and/or inspection procedures should cover the inspection of new equipment.
    - 2) A design check that should be part of the pre-startup safety review.
    - 3) Inventory control procedures and work order systems should control the use of spare parts, materials, and equipment. (Procedures should identify QC elements.)

#### I. Hot Work Permit-

- 1) The only unique item here is the need to use permits not only in covered processes, but also "near" a covered process.
- 2) Permits do not have to be retained after work is complete.

**J. Management of Change**

- 1) Written procedure should contain the following:
  - a) Technical Basis
  - b) Change on Safety or health.
  - c) Operating procedure changes
  - d) Time period for change
  - e) Authorizations required
- 2) Employees to be trained prior to start-up
- 3) Update "Process Safety Information" if required
- 4) Update operation procedure manual
- 5) MOC's come from three different areas (engineering, operations, and maintenance), and all should be captured.

**K. Incident Investigation -**

- 1) Catastrophic releases or an incident that could have resulted in a catastrophic release (near miss) must be investigated within 48 hours.
- 2) The site shall establish a system to promptly address and resolve findings and recommendations.
- 3) The report should be reviewed with all affected employees.
- 4) Reports shall be retained for five years.
- 5) Be sure safety and emergency response reporting systems are consistent.

**L. Emergency Planning & Response -**

- 1) The only new concept that may need to be included in current procedures is a system for handling small releases.

**M. Compliance Audits -**

- 1) Although original intent was to have a corporate audit every three years, each site should audit their system.
- 2) Each site should retain the two most recent audit reports.
- 3) First audits must be completed no later than 5/95.

## N. Trade Secrets -

- 1) Attachment No. V contains a suggested statement to provide for this element.
- 2) When providing process overview orientations for contractors, consider requiring confidentiality agreements to be signed.

**ATTACHMENT NO. I****(ONE PAGE)****UP-TO-DATE P&ID'S**

Our critical drawings need to be kept up-to-date. At a minimum, this would include our Process & Instrumentation Diagrams (P&ID's). Many plants also include electrical one-line drawings, instrumentation loop drawings, underground drawings and process flow sheets in their lists of "critical" drawings. The time taken to update these documents has become an issue in light of new federal laws.

One thing is for certain, any critical drawings for a covered process (per OSHA 1910.119) that are available to employees for reference in operating or maintaining the plant, must be current, up-to-date documents. However, this does not necessarily mean you have to update every drawing instantaneously and distribute copies. You could consider keeping one set of "red-lined" drawings at a central location for all to use.

Normally your management of change procedure will require training/communication with employees after the drawings are made and before the change becomes effective in the field. It is during this time that corrected drawings are distributed or old drawings collected and employees referred to a certain location for updated drawings.

**ATTACHMENT NO. II****(TWO PAGES)****PHR SCHEDULES**

Most sites are ahead of the OSHA 1910.119 schedule for accomplishing process hazard reviews on covered processes. However, most sites are also building a backlog of engineering work required to resolve recommendations generated during the PHR reviews.

We need to take extra care and not "over schedule" PHR reviews, particularly for non-covered processes. We have until May 26, 1997, to complete our first round of PHR reviews. We also need to be able to apply the appropriate resources to "promptly address" and resolve "in a timely manner" the recommendations generated.

To assist in viewing the overall effort required, each site should produce their PHR schedule through 5/26/97. Information should include a listing of all areas to be reviewed and, if completed, in what year. The attached chart is an example of a schedule before the reviews were pushed out into 1995 and 1996.

Thursday, July 01, 1993

Page 3

| Plant Site | Unit/Area | Date of Recom. | Recom. No. | R | Title of Recommendation                                                                                                                                                                                                            | Target Comp. Date | Person Responsible | Status                                                                                                    | Actual Comp. Date |
|------------|-----------|----------------|------------|---|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|--------------------|-----------------------------------------------------------------------------------------------------------|-------------------|
| LKCH       | Furnaces  | 7/93           | 4-16       | 2 | Consider review and repairs as needed to make F-1/2 flue gas dampers fail open on loss of signal, fail last on loss of air.                                                                                                        |                   |                    |                                                                                                           |                   |
| LKCH       | Furnaces  | 7/93           | 4-17       | 2 | Consider moving F-1 O2 analyzer sample points to match F-2 location.                                                                                                                                                               | 2/94              |                    | Furnaces A, C, & E complete B, D, & E remain. F-201 to be upgraded.                                       |                   |
| LKCH       | Furnaces  | 7/93           | 4-18       | 2 | Consider adding 825 F/325 F (F-1/2/F-201) furnace convection section TAHs, using TI-5018, -5038, -5058, -5078, -5098, -50118, -50138, and -8093.                                                                                   |                   |                    |                                                                                                           |                   |
| LKCH       | Furnaces  | 7/93           | 4-19       | 2 | Consider adding 875 F/350 F (F-1/2/F-201) furnace convection section high temp trips, using TI-5018, -5038, -5058, -5078, -5098, -50118, -50138, and -8093. Trip action is to shut off feed and fuel and open decoke steam valves. | 10/94             |                    | AFE written for furnace interlock upgrade. Project to be installed during furnace outages in 1993 & 1994. |                   |
| LKCH       | Furnaces  | 7/93           | 4-20       | 2 | Consider adding equipment and instrumentation associated with furnace fuel trip on high convection section temp to PM schedule.                                                                                                    |                   |                    |                                                                                                           |                   |
| LKCH       | Furnaces  | 7/93           | 4-21       | 2 | Consider review of F-201 minimum fire capability with modifications and repairs as needed to provide full functionality. Minimum fire trip to be caused by high superheater temp or C-202 low speed.                               | 10/94             |                    | AFE written for furnace interlock upgrade. Project to be installed during furnace outages in 1993 & 1994. |                   |
| LKCH       | Furnaces  | 7/93           | 4-22       | 2 | Consider adding equipment and instrumentation associated with F-201 minimum fire trip capability to PM schedule.                                                                                                                   |                   |                    |                                                                                                           |                   |
| LKCH       | Furnaces  | 7/93           | 4-23       | 2 | Consider changing existing F-201 feed/fuel trip on high convection section pressure to PAH (using PC-8108) with -0.5" H2O setpoint.                                                                                                |                   |                    |                                                                                                           |                   |

ATTACHMENT NO. IV. (b)(3 PAGES)**MECHANICAL INTEGRITY****APPLICATION DEFINITION (j) (1)**

BUT IS IT ALL PRESSURE VESSELS, STORAGE TANKS, PIPING,.....???

1910.119 STATES : YES. APPLIES TO HHC PROCESSES.

***THE DEFINITION OF A PROCESS IS ANY ACTIVITY INVOLVING A HHC INCLUDING THE USE, STORAGE, MANUFACTURING, HANDLING , OR ONSITE MOVEMENT OF SUCH CHEMICALS. FOR PURPOSES OF THIS DEFINITION, ANY GROUP OF VESSELS WHICH ARE INTERCONNECTED AND SEPARATE VESSELS WHICH ARE LOCATED SUCH THAT A HAZARDOUS CHEMICAL COULD BE INVOLVED IN A POTENTIAL RELEASE SHALL BE CONSIDERED A SINGLE PROCESS.***

**OXY ANSWER:**

**WRITTEN TECHNICAL CONSEQUENCE ANALYSIS WHICH DEVELOPS REASONABLE "BOUNDARIES" FOR MECHANICAL INTEGRITY**

**NOTE:        RESULT OF POTTSTOWN DEBATES, THE CONCEPT OF A WRITTEN ANALYSIS WITH CERTAIN INTERPRETATIONS WAS "AGREED" UPON AS BEING REASONABLE.**

## TECHNICAL PSM ANALYSIS GUIDELINES

1. **IDENTIFY HHC CHEMICALS**  
 -Processes that contain HHC chemicals are included in PSM  
 -per OSHA list and definitions
  
2. **APPLICATION OF PSM BY PROCESS AREA (PLOT PLAN)**  
 -establish typical physical boundaries that plant personnel relate to  
 -identify areas that are known "hazardous areas"
  
3. **SAFEGUARD EQUIPMENT COVERED - INCLUDE**  
 -firewater systems, gas monitors, flares, etc..  
 pressurized control room compressors, breathing air systems
  
4. **REVIEW PROCESS OUTSIDE PSM AREAS THAT MAY AFFECT A COVERED AREA**  
 -utilities, non-HHC raw materials, waste treatment, etc..  
 -identify effects of functional and mechanical failures  
 -include processes that have potential for catastrophic consequences

**OSHA :** says system failures that result in enactment of emergency procedures on HHC processes is a test for inclusion  
 ...increased state of the potential for a catastrophic release

failures that result in going to the last lines of defense, result in those systems being included in PSM

-exclude systems/equipment that have no effect on the HHC process

-exclude systems/equipment that catastrophic consequences for failures are mitigated by highly reliable redundant design and are proven to not cause an emergency state..

## TECHNICAL PSM ANALYSIS GUIDELINES

5. **REVIEW PROCESSES WITHIN A PSM PROCESS AREA FOR POSSIBLE EXCLUSIONS**
  - identify effects of functional and mechanical failures
  - exclude systems/equipment that have no effect on the HHC process
  - exclude systems/equipment that catastrophic consequences for failures are mitigated by highly reliable redundant design
  - exclude systems of the HHC process that upon failure are mitigated by highly reliable redundant design, and are not the last lines of defense
  
6. **REVIEW PLANT FOR NON HHC PROCESSES THAT UPON FAILURE MAY WITHIN THEMSELVES, LEAD TO A CATASTROPHIC EVENT...for inclusion**
  - within mechanical integrity for PSM.
  - based on incident investigations
  - input from employees
  
7. **DOCUMENT ANALYSIS, DEVELOP PSM LISTS OF THE PLANT'S COVERED EQUIPMENT AND PROCESSES**
  - ...marked up PID's
  - Passport equipment lists
  - charter of accounts
  - equipment file designations
  - etc..

### VERY IMPORTANT TO REMEMBER THE NEXT STEP HERE!!!

8. **ONCE A SYSTEM IS INCLUDED THE NEXT STEPS ARE TO PREPARE THE APPROPRIATE PSM MECHANICAL INTEGRITY PROGRAMS THAT ARE NECESSARY TO MITIGATE THE IDENTIFIED SYSTEM FAILURES.**
  - programs can vary based on risk, probability, existing historical data, but above all.....sound engineering judgement...that is documented!
  - e.g. A hydrocarbon containing pressure vessel will be inspected per API 510.
  - A cooling water system that is necessary for hhc process control shall be inspected to mitigate a total failure, not minor leaks...thus visual inspection program that initiates action based on small leaks may be appropriate..
  - A chlorine line will be inspected per Chlorine pamphlet 60

**(10 PAGES)**

Corporate Safety

**DATE:** 3/2/93  
**TO:** Distribution  
**FROM:**  
**SUBJECT:** Process Safety Management Standard - 1910.119

**Mechanical Integrity Position Paper  
Corporate Safety**

OSHA's Process Safety Management standard includes an element titled mechanical integrity (1910.119 (j)). The section is intended to identify performance standards for maintaining the integrity of highly hazardous chemical (HHC) process equipment.

This memo states OxyChem's regulatory position (\*) on what facilities should have in place in 1993 for effectively dealing with these requirements.

1910.119 (j) Mechanical integrity includes six sections:

- (1) Application
- (2) Written Procedures
- (3) Training for Process Maintenance Activities
- (4) Inspection and Testing
- (5) Equipment Deficiencies
- (6) Quality Assurance

OxyChem's Operations Strategic Plan identifies the goal of having implemented a mechanical integrity program at our facilities by 12/93.

Please review this document against your site's current mechanical integrity programs.<sup>2,3</sup>

Each site should address all these sections listed above and develop a WRITTEN guidance document which identifies all the site components of a comprehensive mechanical integrity program.

Please call if any additional information, clarification is needed.

(\*) as OSHA begins to enforce this performance standard, any additional requirements that become necessary will be communicated.



## MECHANICAL INTEGRITY

### APPLICATION

1910.119 (j) (1) Paragraphs (j)(2) through (j)(6) of this section apply to the following process equipment: (i) pressure vessels and storage tanks, (ii) piping systems (including piping components such as valves, (iii) relief and vent systems and devices, (iv) Emergency shutdowns systems, (v) controls (including monitoring devices and sensors, alarms, and interlocks, (vi) pumps.

OSHA is defining in the above application, the categories of process equipment that affect the handling of highly hazardous chemicals. The intent is to include all possible mechanical devices that could impact the control of these chemicals, and all sites should make their own analysis of what process equipment at their site is to be covered by a written mechanical integrity program.

In the development of specific Inspection and Testing guidelines (See section (4)), some additional clarification of equipment definition is being provided.

## MECHANICAL INTEGRITY

### WRITTEN PROCEDURES

1910.119 (j) (2) The employer shall establish and implement written procedures to maintain the on-going integrity of process equipment.

Each facility should have written management systems in place to address the following:

1. Full compliance and implementation of OxyChem Key Safety Procedures: Line Breaking, Lock Tag, and Try, Hot Works, and Confined Space Entry.

**Incorporation of these safe work procedures into a formal plant work order system are the most critical elements in establishing "written maintenance procedures" to safely perform work in our highly hazardous chemical process areas.**

2. A written work order system that controls work to be done (routine, emergency, or preventative) in a HHC process unit must be in place. Features of the system should include:

- a. Work Order numbering system (ability to track and document)
- b. Approval process
- c. Written Job Plan/ Work Orders that include:
  1. List of basic steps to be taken (\*)
  2. List of special tools and equipment required
  3. PPE required (\*)
  4. Permits required, Key Procedures to be followed (\*)
  5. Special Skills needed (assure properly trained personnel assigned)

(\*) Special or site specific procedures may be developed or referenced, such as permanent job plans, manufacturer's repair procedures, plant safety procedures, existing maintenance procedures, existing industry practices such as a Chlorine Institute pamphlet with recommended repair practices, etc....

In all cases for any of these specific procedures, once defined, should be followed and the written documentation be available to all maintenance personnel for use and reference.

- d. Method to control maintenance personnel access to HHC process areas
- e. Method to plan work so that all work is safe to start by maintenance
- f. Method to verify completion of work, and release to operations
- g. Method to record actual findings, and any unique information that would be beneficial when doing similar job in the future (provide documentation of steps/procedures followed on a HHC process area repair)

## **MECHANICAL INTEGRITY**

### **WRITTEN PROCEDURES(cont.).**

Having in place a comprehensive work order management system, in combination with the execution of our OxyChem Key Safety Procedures, insures that all maintenance repairs will have a basic set of written instructions that are designed to allow a maintenance person to safely perform any repair or task in a way that maintains the mechanical integrity of the process.

Other considerations that should be reviewed to support the above maintenance procedures are:

1. Supporting documentation (Factory Repair Manuals, Parts Lists, permanent job plans, etc....) must be maintained and accessible to all maintenance personnel.
2. Employees should be encouraged to participate in any improvements in your site maintenance procedures. Using employees as a resource to assure that all written instructions and procedures are indeed adequate for the task is recommended.  
(Employee involvement element of OSHA 1910.119)
3. Documentation that all affected personnel have been trained on your maintenance procedures.

**ACTION:** Each site is expected to have the above systems fully in place now.

## MECHANICAL INTEGRITY

### TRAINING FOR PROCESS MAINTENANCE ACTIVITIES

1910.119 (j) (3) The employer shall train each employee involved in maintaining the on-going integrity of process equipment in an overview of that process and its hazards and in the procedures applicable to the employee's job tasks to assure that the employee can perform the job tasks in a safe manner.

A Corporate Task Group is currently assigned to develop more detailed guidelines to address these maintenance training requirements. A corporate position on the content of the above two training elements (process overview and procedural) is set to be issued by April, 1993.

**ACTION :** When the corporate position is issued, each site is to review their existing maintenance training efforts against the corporate requirements. Any action plans developed to upgrade an existing program should be assigned, and be part of the plant's comprehensive Process Safety Management Plan.

### INSPECTION AND TESTING

1910.119 (j) 4(i) Inspection and tests shall be performed on process equipment. (ii) Inspection and testing procedures shall follow recognized and generally accepted good engineering practices. (iii) The frequency of inspections and tests of process equipment shall be consistent with applicable manufacturer's recommendations and good engineering practices, and more frequently if determined to be necessary by prior operating experience. (iv) The employee shall document each inspection and test that has been performed on process equipment. The documentation shall identify the date of the inspection or test, the name of the person who performed the inspection or test, the serial number or other identifier of the equipment on which the inspection or test was performed, a description of the inspection or test performed, and the results of the inspection or test.

The Operations Committee is adopting Maintenance Guidelines which set corporate guidelines for addressing the inspection and testing of equipment covered under 1910.119 (pressure vessels, storage tanks, piping systems, relief and vent systems and devices, emergency shutdown systems, controls and pumps). A subcommittee of the Corporate Maintenance Taskforce is developing these guidelines.

The first guideline (pressure vessels) was issued on January 21, 1993. The remaining guidelines necessary for review of 1910.119 equipment are expected to be issued by April, 1993.

**ACTION:** Each facility will review their site inspection programs against these guidelines and put in place a written, formal system which addresses these requirements. Any action plans developed to upgrade an existing program should be assigned, and become a part of the plant's comprehensive Process Safety Management Plan.

## **MECHANICAL INTEGRITY**

### **EQUIPMENT DEFICIENCIES**

1910.119 (j) (5): The employer shall correct deficiencies in equipment that are outside acceptable limits (defined by the process safety information) before further use or in a safe and timely manner when necessary means are taken to assure safe operation.

This paragraph in the standard makes it clear that all mechanical integrity programs in place are intended to assure that equipment is maintained in such a way that the process equipment remains in a safe operating mode.

The intent of the standard is not to have HHC process equipment fail in service.

Sites should have correct process safety/equipment information on all covered process equipment and be able to define acceptance limits for inspection programs. Maintenance files/engineering files should be properly kept up to date.

Sites should establish and maintain repair history files and use this information in the development of their preventative and predictive maintenance programs.

Sites should repair and/or replace HHC process equipment before further use, or in a safe and timely manner when necessary means are taken to assure safe operation.

**ACTION:** The site's written, mechanical integrity guidance document should address the requirement that site systems (work order system, PM program, inspection and testing programs, quality assurance systems) are in place to prevent and/or repair deficiencies in equipment outside of acceptable limits.

Each site should review their maintenance files to assure that acceptance criteria for equipment operation is defined against the equipment's process safety information (vendor's recommended operating conditions, supplier specifications, etc.).

Repair history files should be established and maintained to be used in the development of inspection and testing programs.

Any action plans developed to upgrade programs in these areas should be assigned, and become a part of the plant's comprehensive Process Safety Management Plan.

## **MECHANICAL INTEGRITY**

### **QUALITY ASSURANCE**

1910.119 (j) (6) (i) Quality assurance In the construction of new plants and equipment, the employer shall assure that equipment as it is fabricated is suitable for the process application for which they will be used. (ii) Appropriate check and inspections shall be performed to assure that equipment is installed properly and consistent with design specifications and the manufacturer's instructions. (iii) The employer shall assure that maintenance materials, spare parts, and equipment are suitable for the process application for which they will be used.

The standard requires that systems be in place to assure the correct equipment is designed, installed and is kept in the original design condition with proper maintenance materials and spare parts.

Appropriate administrative controls to address the above requirements are likely to be found within existing site systems including:

- a) Project procedures for the procurement and design of new equipment
- b) Installation procedures required per vendor or supplier instructions
- c) Pre-Startup Safety Review/Management of Change procedures which include physical verification of newly installed equipment against design specifications and manufacturer's instructions
- d) Store room/tool room procedures for receiving and distributing the correct materials and parts
- e) Purchasing policies to assure qualified personnel procure proper materials
- f) Engineering design and material specifications

**ACTION:** Each site should define and document what systems that they have in place to address the above quality assurance requirements. Any action plans required to upgrade or develop these written procedures should be assigned, tracked and become a part of the site's comprehensive Process Safety Management Plan.

**ATTACHMENT NO. IV. (c)****(7 PAGES)****MAINTENANCE TRAINING  
1910.119 POSITION PAPER**

1910.119 (j) (3) Training for process maintenance activities. The employer shall train each employee involved in maintaining the on-going integrity of process equipment in an overview of that process and its hazards and in the procedures applicable to the employee's job tasks to assure that the employee can perform the job tasks in a safe manner.

In addition to the rule's standard statement, OSHA identifies in the preamble, Appendix C, and in its compliance directive additional language to define the intention of maintenance training. OSHA believes that any employee that will do maintenance on specified HHC(Highly Hazardous Chemical) process equipment should have the proper training to assure that the employee can perform the job tasks in a safe manner. The overall section on mechanical integrity ties together under the statement in the preamble that mechanical integrity is to "require a written program that would assure that process equipment receives, careful, appropriate, regularly scheduled maintenance to assure its continued safe operation".

**OXYCHEM MAINTENANCE TRAINING REQUIREMENTS**

Maintenance Training is required for all OxyChem employees assigned maintenance tasks in covered HHC process area equipment as defined by OSHA 1910.119 (j) (1). The training needed falls into five categories :

- I. PROCESS OVERVIEW / HAZARDS
- II. SAFE WORK PROCEDURES
- III. MAINTENANCE PROCEDURES
- IV. CRAFT SKILLS AND KNOWLEDGE
- V. MANAGEMENT OF CHANGE INITIATED TRAINING

Attachment 1 defines the basic components of the training necessary for each category.

Maintenance training for each category is divided into different types of training. **Initial training** consisting of basic plant training, process specific training, and job specific training is provided at the inception of coming into the maintenance work group (1). **Refresher/Supplemental training** occurs throughout the maintenance employee's work service to assure that the employee maintains a thorough understanding of the requirements to safely perform assigned tasks.

(1) The content of initial training for a given individual can be adjusted based on their previous experience, training, education, etc..

## IMPLEMENTATION GUIDELINES

### OVERALL

- ▣ Each site shall develop and maintain **written site specific requirements for each maintenance training category.** This sets your site's performance standard.
- ▣ Documentation requirements of an employee's training should be established and maintained. Employees are not considered trained unless documentation exists which can verify the type and content of training given.
- ▣ For **CONTRACT MAINTENANCE EMPLOYEES** doing work in OxyChem facilities, training requirements are specified within OxyChem's Contractor Quality Guidelines which addresses OSHA 1910.119 training requirements and obligations for both the Contractor and OxyChem(owner).
- ▣ Maintenance supervisors and engineers require training appropriate to the job tasks they are assigned and manage. Their training should include (I), (II), appropriate maintenance procedures in (III), and MOC (V) training. Skills training (IV) is not required if the supervisor or engineer is not to be assigned physical work.

### I. PROCESS OVERVIEW

**Initial** training should be given to all new employees as part of their orientation, and to current employees who are reassigned to maintenance from a different department.

**Refresher/Supplemental** training should occur when new processes are introduced or modified. A frequency should be established for refresher training to assure employees maintain their process overview knowledge.

*(the opportunity exists here to invite employee participation in development of the scope and frequency of refresher training)*

### II. SAFE WORK PROCEDURES

**Initial** training occurs on plantwide key safety procedures (Line Breaking, Lock Tag and Try, Hot Work, and Confined Space) as part of a new employee's basic plant training. For any additional departmental safety procedures/practices, training should be given as part of maintenance job specific training.

**Refresher/Supplemental** training for key safety procedures occurs annually as part of a site's compliance training. For any safety work practices/procedures not covered by an established compliance schedule, the maintenance department should develop a refresher training frequency to assure employees maintain an understanding of these requirements.

### III. MAINTENANCE PROCEDURES

**Initial** training on all appropriate maintenance procedures should occur as part of the employee's job specific training.

**Refresher/Supplemental** training occurs throughout the maintenance employee's career as new procedures are introduced and to sustain job performance and knowledge at an acceptable level to perform tasks in a safe manner.

(e.g. an apprentice electrician may not be trained on high voltage equipment until well into his career..accurate records on what procedures each employee is trained on are essential in making sure employees are only assigned tasks for which they have had the appropriate training )

Maintenance procedures (per previous position paper) can include the work order system, equipment repair manuals, inspection checklists, generic procedures, as well as specific task procedures. Training should be appropriate to the type of procedure.

Training on procedures such as the work order system, checklists, and equipment repair may be an "awareness/communication meeting" training, where all employees are informed of how to use these type procedures as part of their daily work.

Other more detailed and critical procedures(i.e. a step by step interlock testing procedure), should require a skills verification portion to the training, such as task demonstration or written testing.

**It is important that each site establish their specific training requirements found to be necessary to assure employees are trained to perform the assigned tasks in a safe manner.**

*Note: Employee participation to establish the detailed requirements of training may be an excellent way to meet the intent of the process safety standard, which is to set site performance standards, with the input of direct workers.*

#### IV. CRAFT SKILLS AND KNOWLEDGE

For employees having craft skills and knowledge prior to becoming an OxyChem maintenance person, documentation on what training the employee has received should be maintained in the file.

**Initial** training completed by OxyChem should occur as part of the employee's job specific training or apprentice program.

**Refresher/Supplemental** training for skills and craft knowledge occurs throughout the maintenance employee's career. Site specific programs should establish these requirements, including any refresher training frequency to assure the employee maintains the skills and knowledge to perform assigned tasks in a safe manner.

Note: for apprenticeship training, the site programs should include appropriate documentation for verification that an employee is developing the skills necessary to complete assigned tasks...i.e skills demonstrations, testing at various stages of the training.

Note: skills training documentation should address the issue on how verification that the employee understood the training was accomplished. (i.e. testing, skills demonstrations..)

##### **Documentation note: (OxyChem position)**

- a) For incumbent maintenance employees as of 8/24/92 and continuously since, skills training must be documented, including the methods relied on to verify understanding of the training received; however, if documentation is not available, a knowledgeable plant maintenance manager may certify as to a maintenance employee's possession of the skills necessary to safely perform his/her job tasks. (See Attachment 2).
- b) For maintenance employees new or transferred after 8/24/92, skills training must be documented, including the methods relied upon to verify understanding of the training received.

#### V. MANAGEMENT OF CHANGE

**Initial** training should include training on the use and scope of a site's Management of Change procedure.

**Refresher/Supplemental** training occurs when the Management of Change procedure initiates the requirements that employees affected by a change be trained on these changes.

## **ATTACHMENT 1 MAINTENANCE TRAINING COMPONENTS**

### **A. PROCESS OVERVIEW/HAZARDS TRAINING**

- ▣ Basic plant flow diagrams - identifies major chemical process equipment and fundamental chemistry
- ▣ Process Inputs and Outputs - raw materials, products, utilities, catalysts used in the process. The physical properties (Temperature, pressure, volume) of these elements should be understood and their impact as a potential hazard.
- ▣ Hazards associated with the chemical process - flammability, reactivity, explosivity, toxicity, acute hazards, etc..(may be your HAZCOM program ) AND appropriate process safety information as provided to operations as necessary for maintenance personnel to perform tasks in a safe manner.
- ▣ Basic plant design/systems to control these hazards - fixed fire protection systems, monitors, redundant alarm devices, isolation systems, safe havens, etc..
- ▣ Physical orientation to the process - plant layout, basic understanding of who/how/where the process is controlled.
- ▣ Major types of equipment used in the process - furnaces, reactors, distillation columns, CTW/cooling systems, boiler/steam systems, conveying equipment, storage tanks and vessels, etc...
- ▣ Basic Personal Protective Equipment (PPE) requirements for various chemicals/process - fire retardant clothing required, goggles, gas masks (if exposed), etc...
- ▣ Emergency Response Procedures

### **B. SAFE WORK PRACTICE TRAINING**

- ▣ Key Safety Procedures (Lock, Tag and Try, Confined Space, Line Breaking, Hot Work)  
-likely part of an existing annual safety refresher training program
- ▣ Site Safety Procedures/Work Rules
- ▣ Personal Protective Equipment training (Respirators, Line Breaking suits, etc..)

**ATTACHMENT 1  
MAINTENANCE TRAINING COMPONENTS**

**C. MAINTENANCE PROCEDURE TRAINING**

- ▣ Formal maintenance work order/planning system
- ▣ Mechanical integrity quality assurance programs
  - spare parts program, materials receiving, parts purchasing procedures
- ▣ Use and location of equipment repair manuals, vendor equipment manuals, specification sheets
- ▣ Site specific maintenance repair procedures  
(note: specific repair procedures only exist as deemed necessary by the site, but if they are written, then they become part of the procedures that employee training must cover)
  - i.e. welding procedure
  - preparation as defined for a specific process tank cleanout
- ▣ Special maintenance equipment procedures
  - sandblasting procedure when in a operating area
  - hot tap equipment procedures

**D. MAINTENANCE SKILLS TRAINING**

- ▣ Acceptable external craft training certifications
  - union cards, external training programs, trade schools, etc..
- ▣ Internal craft training program
  - apprenticeship program; identify method, timing, review/verification, etc..
  - self paced training plans -(i.e ICS courses)

**E. MANAGEMENT OF CHANGE (MOC) TRAINING**

- ▣ Training initiated to satisfy the site's MOC procedure
- ▣ Changes, additions to HHC process equipment
- ▣ New, or revised procedures affecting HHC equipment, that maintenance employees should be aware of to be able to perform maintenance tasks in a safe manner
- ▣ Changes in hazards in a covered area; new HHC chemicals, new information on the hazards associated with an existing covered chemical/process

## ATTACHMENT 2

## SAMPLE GRANDFATHER LETTER FOR SKILLS TRAINING

Name of Employee:

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Maintenance position: (i.e. electrician, instrument tech, millwright, etc.)

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Date employee started in position

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Upon review of the employee's continued work performance as a qualified maintenance employee prior to 8/24/92, this letter acknowledges that \_\_\_\_\_ has demonstrated the necessary skills and/or craft knowledge to perform assigned tasks in a safe manner.

Employee Supervisor:

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Review Date:

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**Note:** The grandfathered employee should participate in this review as part of employee participation. A signature by the employee is not necessarily required, nor prohibited.

Each site should consider using the same methodology that was taken for operator grandfathering that was completed per 1910.119 (g).

**Note:** This grandfather letter applies to training as described in section IV Craft Skills and Knowledge of this position paper. Training necessary to meet sections I, II, III, and section V are not included in this grandfathering method.