

## **DOSH Process Safety Management (PSM) Rulemaking - Preliminary Draft Statement**

The Process Safety Management rulemaking is in the early stages, and the draft being sent to stakeholders is meant to serve as a discussion draft. In no way is this draft reflect a final version, but on the contrary gives an opportunity for all stakeholders to share their ideas and concerns on draft language. This gives stakeholders an understanding of what the department is considering based on current information and feedback that we have received up to this point. The primary intent of this revised rule is to achieve the best minimum requirements to fully prevent catastrophic releases of highly hazardous chemicals in order to prevent worker fatalities, injuries and illnesses.

The department encourages stakeholders to review this draft and share ideas that they may have to assist this project in moving forward. We welcome your responses and encourage any input you wish to share. The department understands that there may be a difference between ideas from various stakeholders, and we intend on using stakeholder meetings to work through this process.

**(NEW) Chapter 296-XX WAC Process Safety Requirements for  
Petroleum Refineries  
(1.9.18)**

*Note: We used X's as place marks for WAC section numbers since this is a new chapter, and WAC section numbers have not been chosen yet. We will update all references in red font accordingly as well.*

**WAC 296-XX-XXX Purpose/Scope.**

- (1) Purpose. This chapter contains requirements for preventing and minimizing the consequences of releases of toxic, reactive, flammable, or explosive chemicals or materials in the petroleum refining industry.
- (2) Scope. This part applies to processes within petroleum refineries.

**WAC 296-XX-XXX Definitions.**

**Acute toxicity.** See definition of *Acute Toxicity* in WAC 296-901-140, Appendix A.

**Affected employee.** Workers who operate a process or job task in areas that may be impacted by maintenance or operation of a process area. Affected employees include, but are not limited to:

- (a) Maintenance personnel;
- (b) Operations personnel;
- (c) Contractors;
- (d) Staff members; and
- (e) Vendors providing process-related equipment, or chemicals.

**Best Practice.** A method or technique that has been generally accepted as superior to alternative methodologies.

**Boiling Point.** See the definition of *Boiling Point* in WAC 296-901-14024, Appendix B.

**Change.** Any alteration in chemistry, technology, procedures, equipment, facilities or organization that could affect a process. A change does not include replacement-in-kind.

**Collaboration.** The action of working with someone to produce or create something.

**Damage Mechanism.** The mechanical, chemical, physical, microbiological, or other process that results in equipment or material degradation.

**Damage Mechanism Hazard Review (DMR).** An assessment of potential damage mechanisms that can affect processing equipment, including corrosion, stress cracking, and other material degradation.

**Employee Representative.** Union representative, where a union exists, or an employee-designated representative in the absence of a union that is on-site and qualified for the task. The term is to be construed broadly, and may include the local union, the international union, or a refinery or contract employee designated by these parties, such as the safety and health committee representative at the site.

**Feasible.** Capable of being accomplished in a successful manner within a reasonable period of time, taking into account health, safety, environmental, legal, social and technological factors.

**Flammable gas.** See the definition of *Flammable gas* in WAC 296-901-14024, Appendix B.

**Flammable liquid.** See the definition of *Flammable liquid* in WAC 296-901-14024, Appendix B.

**Hierarchy of Hazard Controls Analysis (HCA).** Assessing hazard prevention and control measures, in priority order, to eliminate or minimize a hazard. Hazard prevention and control measures ranked from most effective to least effective are: First Order Inherent Safety, Second Order Inherent Safety, and passive, active and procedural protection layers.

**Highly hazardous chemical (or material).** A substance possessing toxic, reactive, flammable, or explosive properties.

**Hot work.** Work involving electric or gas welding, cutting, brazing, or any extreme heat, flame, or spark-producing procedures, operations, or the use of non-intrinsically-safe equipment.

**Human Factors.** The design of machines, operations and work environments such that they closely match human capabilities, limitations and needs. Human factors include environmental, organizational and job factors, as well as human and individual characteristics, such as fatigue, that can affect job performance, process safety, and health and safety.

**Independent Protection Layers (IPL).** Safeguards that reduce the likelihood or consequences of a major incident through the application of devices, systems or actions. IPLs are independent of an initiating cause

and independent of other IPLs. Independence ensures that an initiating cause does not affect the function of an IPL and that failure in any one layer does not affect the function of any other layer.

**Inherent Safety.** An approach to safety that focuses on eliminating or reducing the hazards associated with a set of conditions. A process is inherently safer if it eliminates or reduces the hazards associated with materials or operations used in the process, and this elimination or reduction is permanent and inseparable from the material or operation. A process with eliminated or reduced hazards is described as inherently safer compared to a process with only passive, active and procedural safeguards. The process of identifying and implementing inherent safety in a specific context is known as inherently safer design:

- (a) **First Order Inherent Safety Measure.** A measure that eliminates a hazard. Changes in the chemistry of a process that eliminate the hazards of a chemical are usually considered first order inherent safety measures; for example, by substituting a toxic chemical with an alternative chemical that can serve the same function but is less toxic.
- (b) **Second Order Inherent Safety Measure.** A measure that effectively reduces the severity of a hazard or the likelihood of a release. Changes in process variables to minimize, moderate and simplify a process are usually considered second order inherent safety measures; for example, by redesigning a high-pressure, high-temperature system to operate at ambient temperatures and pressures.

**Initiating Cause.** An operational error, mechanical failure or other internal or external event that is the first event in an incident sequence, which also may mark the transition from a normal situation to an abnormal situation.

**Integrity Operating Windows (IOWs).** Sets of limits used to determine the different variables that could affect the integrity and reliability of equipment within the process.

**Isolate.** To cause equipment to be removed from service and completely protected against the inadvertent release or introduction of material or energy by such means as blanking or blinding; misaligning or removing sections of lines, pipes, or ducts; implementing a double block and bleed system; or blocking or disconnecting all mechanical linkages.

**Leading Indicators.** Predictive metrics of equipment, operating procedures, training, employee involvement, or other best practices used to identify potential and recurring deficiencies.

**Lagging Indicators.** Retrospective metrics of equipment, operating procedures, training, employee involvement, or other practices identified as requiring corrective action.

**Major Change.** Any of the following:

- (a) Introduction of a new process, new process equipment, or new highly hazardous material;
- (b) Any operational change outside of established safe operating limits; or
- (c) Any alteration that introduces a new process safety hazard or worsens an existing process safety hazard.

**Major Incident.** An event within or affecting a process that causes a fire, explosion or release of a highly hazardous material and which has the potential to result in death or serious physical harm.

**Management of Organizational Change (MOOC).** An assessment that takes place prior to the reduction of staffing levels, the reduction of classification levels of employees during shift changes, or the increase of employee responsibilities or classification levels.

**Outage.** Occasions during which a process or part of a process is taken off stream, or in which pressure, heat, or other factor(s) in the process are decreased or removed for purposes of maintenance or other necessary action. An outage does not include a turnaround, which typically involves concerted planning well in advance of process shutdown and maintenance.

**Process.** Any activity involving a highly hazardous chemical, including:

- (a) Any use;
- (b) Storage;
- (c) Manufacturing;
- (d) Handling;
- (e) Piping;
- (f) Release mitigation; or
- (g) The on-site movement of such chemicals, or combination of these activities.

For purposes of this definition, any equipment that is interconnected, including separate vessels, which are located such that a highly hazardous chemical or utility could be involved in a potential release, must be considered a single process. This definition excludes ancillary administrative and support functions, including office buildings, labs, warehouses, maintenance shops, and change rooms.

**Process equipment.** Equipment that is part of a process.

**Process Safety Culture.** A combination of group values and behaviors that reflects whether there is a collective commitment by leaders and individuals to emphasize process safety over competing goals, in order to ensure protection of people and the environment.

**Process Safety Culture Assessment (PSCA).** A method to objectively define process safety values and beliefs.

**Process Safety Hazard.** A hazard of a process that has the potential for causing a major incident, death, or serious physical harm.

**Process Safety Management (PSM).** The application of management systems to ensure the safety of workers who interface with high-hazard processes.

**Promptly.** With little or no delay.

**Qualified Operator.** A person designated by the employer who, by fulfilling the requirements of the employer's training program, has demonstrated the ability to safely perform all assigned duties.

**Reactive Substance.** See the definition of *Reactive substance* in WAC 296-901-14024, Appendix B.

**Recognized and Generally Accepted Good Engineering Practices (RAGAGEP).** Engineering, operation or maintenance provisions established in codes, standards, technical reports or recommended practices, and published by recognized and generally accepted organizations such as, the American National Standards Institute (ANSI), American Petroleum Institute (API), American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE), American Society of Mechanical Engineers (ASME), American Society of Testing and Materials (ASTM), National Fire Protection Association (NFPA), and Instrument Society of America (ISA). RAGAGEP does not include standards, guidelines or practices developed for internal use by the employer, unless they are documented as meeting or exceeding external provisions.

**Replacement in kind.** A replacement which satisfies the design specification.

**Safeguard.** A device, system or action designed to interrupt the chain of events or mitigate the consequences following an initiating cause:

- (a) **Passive Safeguards.** Process or equipment design features that minimize a hazard by reducing either its frequency or consequence, without the active functioning of any device; for example, a diked wall around a storage tank of flammable liquids.

- (b) Active Safeguards. Controls, alarms, safety instrumented systems and mitigation systems that are used to detect and respond to deviations from normal process operations; for example, a pump that is shut off by a high-level switch.
- (c) Procedural Safeguards. Policies, operating procedures, training, administrative checks, emergency response and other management approaches used to prevent incidents or to minimize the effects of an incident. Examples include hot work procedures and emergency response procedures.

**Safeguard Protection Analysis (SPA).** A method for evaluating the risk of hazard scenarios and comparing it with risk tolerance criteria to decide if existing safeguards are adequate, and whether additional safeguards are needed.

**Safety Instrumented System.** Systems designed to achieve or maintain safe operation of a process in response to an unsafe process condition.

**Temporary Pipe or Equipment Repair.** A temporary repair of an active or potential leak from process piping or equipment. This definition includes active or potential leaks in utility piping or utility equipment that affect a process, and flange or valve packing leaks that could result in a major incident.

**Toxic.** An unreasonable risk to health or the environment.

**Turnaround.** A planned total or partial shutdown of a petroleum refinery process unit or plant to perform maintenance, overhaul or repair of a process and process equipment, and to inspect, test and replace process materials and equipment. Turnaround does not include outages, or unplanned shutdowns that occur due to emergencies or other unexpected maintenance matters in a process unit or plant. Turnaround also does not include routine maintenance, where routine maintenance consists of regular, periodic maintenance on one or more pieces of equipment at a refinery process unit or plant that may require shutdown of such equipment.

**Utility.** A system that provides energy or other process-related services to enable the safe operation of a refinery process. This definition includes water, steam and asphyxiants, such as nitrogen and carbon dioxide, when used as part of a process.

**WAC 296-XX-XXX Employee Collaboration.**

(1) In consultation with employees and employee representatives, the employer must develop, implement, and maintain an effective written plan to effectively provide for employee collaboration in all PSM elements. The plan must include the following:

(a) Collaboration by affected operating and maintenance employees and employee representatives, throughout all phases, in performing process hazard analyses (PHAs), damage mechanism reviews (DMRs), hierarchy of hazard controls analyses (HCAs), management of change (MOCs), management of organizational change (MOOCs), process safety culture assessment (PSCAs), incident investigations, safeguard protection analyses (SPAs), and process safety startup reviews (PSSRs);

(b) Collaboration by affected operating and maintenance employees and employee representatives, throughout all phases, in the development, training, implementation and maintenance of the PSM elements required by this section; and,

(c) Access by employees and employee representatives to all documents or information developed or collected by the employer pursuant to this section, including information that might be subject to protection as a trade secret.

(2) Authorized collective bargaining agents may select employee(s) to participate in overall PSM program development and implementation planning; and employee(s) to participate in PSM teams and other activities.

(3) Where employees are not represented by an authorized collective bargaining agent, the employer must establish effective procedures in consultation with employees for the selection of employee representatives.

(4) Within ninety calendar days of the effective date of this section, the employer must, in consultation with employee and employee representatives, develop, implement, and maintain the following:

(a) Effective Stop Work procedures that ensure:

(i) The authority of all employees, including employees of contractors, to refuse to perform a task where doing so could reasonably result in death or serious physical harm;

(ii) The authority of all employees, including employees of contractors, to recommend to the operator in charge of a unit that an operation or process be partially or completely shut-down, based on a process safety hazard;

(iii) The authority of the qualified operator in charge of a unit to partially or completely shut-down an operation or process, based on a process safety hazard; and

(iv) Measures to ensure that employees who exercise stop work authority as described in this part are protected from intimidation, retaliation, or discrimination.

(b) Effective procedures to ensure the right of all employees, including employees of contractors, to anonymously report hazards. The employer must respond in writing within thirty calendar days to written hazard reports submitted by employees, employee representatives, contractors, employees of contractors and contractor employee representatives. The employer must prioritize and promptly respond to and correct hazards that present the potential for death or serious physical harm.

(5) The employer must document the following:

(a) Recommendations to partially or completely shut down an operation or process;

(b) Partial or complete shut down of an operation or process; and

(c) A written log documenting instances when stop work authority was activated, and the action taken by the employer to address the circumstances under which that authority was exercised.

**WAC 296-XX-XXX Process Safety Information.**

The employer must develop, implement, and maintain a compilation of written process safety information (PSI) before conducting any process hazard analysis (PHA), hierarchy of hazard controls analysis (HCA), safeguard protection analysis (SPA), or damage mechanism review (DMR) required by the rule. The compilation of written process safety information shall be sufficient to enable the employer and the employees involved in operating the process the hazards posed by those processes involving highly hazardous chemicals.

(1) Information pertaining to the hazards of the highly hazardous chemicals used in, present in, or produced by the process. This information must consist of at least the following:

(a) Toxicity information; including acute and chronic health hazards;

(b) Permissible exposure limits in accordance with WAC 296-841-20025;

(c) Physical data;

- (d) Reactivity data;
- (e) Process-specific damage mechanisms;
- (f) Temperature, thermal and chemical stability data; and
- (g) Hazardous effects of inadvertent mixing of different materials that could foreseeably occur.

*Note: Safety Data Sheets meeting the requirements of WAC 296- 901- 14014 may be used to comply with this requirement to the extent they contain the information required by this section.*

(2) Information pertaining to the technology of the process.

(a) Information concerning the technology of the process must include at least the following:

- (i) Piping and instrumentation diagram\_or simplified process/block flow diagram;
- (ii) Process chemistry;
- (iii) Maximum intended inventory;
- (iv) Safe upper and lower limits for such items as temperatures, pressures, flows, or compositions; and
- (v) An evaluation of the consequences of deviations, including those affecting the safety and health of employees.

(b) Where the original technical information no longer exists, such information must be developed in conjunction with the process hazard analysis in sufficient detail to support the analysis.

(3) Information pertaining to the equipment in the process.

(a) Information pertaining to the equipment in the process must include:

- (i) Materials of construction;
- (ii) Piping and instrument diagrams (P&IDs);

(iii) Electrical classification; supply, and distribution systems;

(iv) Relief system design and design basis;

(v) Ventilation system design;

(vi) Design codes and standards employed;

(vii) Safety systems (e.g., interlocks, detection, or suppression systems);

(viii) The consequences of deviations, including chemical mixing and reactions that may affect the safety and health of employees; and

(ix) Results of prior damage mechanism reviews (DMRs).

(b) The employer must document that equipment complies with recognized and generally accepted good engineering practices or with more protective internal practices that ensure safe operation.

(c) For existing equipment designed and constructed in accordance with codes, standards or practices that are no longer in general use, the employer must determine and document that the equipment is designed, maintained, inspected, tested and operating in a safe manner.

(4) The employer must provide for employee collaboration. The process safety information (PSI) must be made available to all employees, and relevant process safety information must be made available to affected employees of contractors. Information pertaining to the hazards of the process must be effectively communicated to all affected employees.

**WAC 296-XX-XXX Process Hazard Analysis.**

(1) The employer must perform and document an initial process hazard analysis (PHA) on processes covered by this standard. The process hazard analysis must be appropriate to the complexity of the process and must identify, evaluate, and control the hazards associated with the process. Employers must determine and document the priority order for conducting process hazard analyses based on a rationale which includes, but is not limited to, such considerations as extent of the process hazards, number of potentially affected employees, age of the process, and operating history of the process.

(2) The employer must use process hazard analysis methodologies that are appropriate to the size, complexity, toxicity, and catastrophic potential of the process. These methodologies may include:

- (a) What-If;
- (b) Checklist;
- (c) What-If/Checklist;
- (d) Hazard and Operability Study (HAZOP);
- (e) Failure Mode and Effects Analysis (FMEA);
- (f) Fault Tree Analysis; or
- (g) An appropriate equivalent methodology.

(3) The process hazard analysis must address:

- (a) The hazards of the process;
- (b) The findings of incident investigations relevant to the process;
- (c) Engineering and administrative controls associated with the process;
- (d) Potential consequences of failure of engineering and administrative controls;
- (e) Facility siting, including the placement of processes, process equipment, buildings, and employee occupancies and work stations, in order to effectively protect employees from process safety hazards;
- (f) Human factors;
- (g) Previous publicly documented major incidents in the petroleum refinery and petrochemical industry sectors that are relevant to the process;
- (h) Damage mechanism review (DMR) reports that are applicable to process equipment;
- (i) Hierarchy of hazard controls analysis (HCA) reports that are applicable to the process units;
- (j) The potential effects of external events, including seismic events, if applicable;
- (k) An evaluation of the types, severity and likelihood of possible incidents that could result from a failure of the process or of process equipment; and

- (l) A review of applicable management of change (MOC) documents completed since the most recent PHA.
- (4) The process hazard analysis must be performed by a team with expertise in engineering and process operations, and the team must include at least one employee who has experience and knowledge specific to the process being evaluated. Also, one member of the team must be knowledgeable in the specific process hazard analysis methodology being used. The employer must provide for employee collaboration. As appropriate, the team must consult with individuals with expertise in damage mechanisms, process chemistry, safeguard protection analyses (SPA), control systems, or other such relevant skills.
- (5) For each scenario in the PHA that identifies the potential for a major incident, the employer must perform:
- (a) An effective written safeguard protection analysis (SPA) to determine the effectiveness of existing individual safeguards;
  - (b) The combined effectiveness of all existing safeguards for each failure scenario in the PHA;
  - (c) The individual and combined effectiveness of safeguards recommended in the PHA;
  - (d) The individual and combined effectiveness of additional or alternative safeguards that may be needed; and
  - (e) The employer must complete all SPAs within six months of completing the PHA.
- (6) The employer must conduct an HCA in a timely manner, for all recommendations made by a PHA team for each scenario that identifies the potential for a major incident. The employer must attach the HCA report to the PHA report.
- (7) All independent protection layers for each failure scenario must be independent of each other and independent of initiating causes.
- (8) The SPA must utilize a method, such as layer of protection analysis (LOPA), or an equally effective method to identify the most protective safeguards. The risk reduction obtainable by each safeguard must be based on site-specific failure rate data, or in the absence of such data, industry failure rate data for each device, system or human factor.

(9) The SPA must include at least one individual with expertise in the specific SPA methodology being used. The SPA may be performed as part of the PHA or as a stand-alone analysis. The employer must provide for employee collaboration in the performance of all SPAs.

(10) The SPA must document the likelihood and severity of all potential initiating events, including equipment failures, human factors, loss of flow control, loss of pressure control, loss of temperature control, loss of level control, excess reaction, and other conditions that may lead to a loss of containment. The SPA must document the risk reduction achieved by each safeguard for all potential initiating events.

(11) The employer must complete all SPAs within six months of the revalidation or change of any PHA based on its next evaluation date.

(12) The team must document and promptly address its findings and recommendations in a PHA report, which must be available in the respective work area for review by any person working in that area.

(13) The PHA report must include:

(a) The methodologies, analyses and factors considered by the PHA team;

(b) The findings of the PHA team; and

(c) The PHA team's recommendations, including additional safeguards to address any deficiencies identified by the SPA.

(14) The employer must make the report available to operating, maintenance and other persons whose work assignments are in the petroleum refinery and who may be affected by the findings and recommendations.

(15) At least every five years after the completion of the initial process hazard analysis, after a major incident or when changes to the process warrant a more timely revision, the process hazard analysis must be updated and revalidated by a team meeting the requirements of this section, to ensure that the process hazard analysis is consistent with the current process.

(16) Employers must retain the initial, updated or revalidation of process hazard analyses and SPAs for each process covered by this part, as well as the documented resolution of recommendations described in this section for the life of the process.

**WAC 296-XX-XXX Operating Procedures.**

(1) The employer must develop, implement, and maintain effective written operating procedures that provide clear instructions for safely conducting activities involved in each covered process consistent with the process safety information and must address at least the following:

(a) Steps for each operating phase:

- (i) Start up;
- (ii) Normal operations;
- (iii) Temporary operations;
- (iv) Emergency shutdown, including the conditions under which emergency shutdown is required; provisions granting the authority of the qualified operator to partially or completely shut down the operation or process; and the assignment of responsibilities to qualified operators in order to ensure that emergency shutdown is executed in a safe and timely manner;
- (v) Normal shutdown; and
- (vi) Start-up following a turnaround, or planned or unplanned shutdown, or after an emergency shutdown.

(b) Operating limits:

- (i) Consequences of deviation; and
- (ii) Steps required to correct or avoid deviation.

(c) Safety and health considerations:

- (i) Properties of, and hazards presented by, the chemicals used in the process;
- (ii) Precautions necessary to prevent exposure, including engineering controls, administrative controls, active and passive controls and personal protective equipment;
- (iii) Protective measures to be taken if physical contact or airborne exposure occurs;
- (iv) Verification of the composition and properties of raw materials and control of hazardous chemical inventory levels;

(v) Any special or specific hazards;

(vi) The minimum number of personnel required to safely execute the procedure; and

(vii) The safety procedures for opening process equipment.

(d) Safety systems and their functions.

(2) Operating procedures must be readily accessible to employees who work in or maintain a process, and to any other person who works in or near the process area.

(3) The operating procedures must be reviewed and updated as often as necessary to ensure that they reflect safe, current operating practices, including changes that result from changes in process chemicals, technology, and equipment, and changes to facilities and personnel.

(4) The employer must develop, implement, and maintain effective safe work practices to prevent or control hazards during operations applicable to both host employer employees and contractor employees. Safe work practices must be established for specific activities that include:

(a) Lockout/tagout;

(b) Confined space entry;

(c) Opening process equipment or piping;

(d) Control over entrance into a facility by maintenance, contractor, laboratory, or other support personnel;

(e) Response to the over-pressurizing or overheating of equipment or piping;

(f) The handling of leaks, spills, releases, or discharges of highly hazardous materials.

(i) Define the conditions for handling leaks, spills, or discharges that provide a level of protection that is functionally equivalent to, or safer than, shutting down or isolating the process;

(ii) Isolate any vessel, piping, and equipment where a leak, spill, or discharge is occurring;

(iii) Shutdown and depressurize all process operations where a leak, release, or discharge is occurring.

(g) Any other hazard that requires the documentation of safe work practices.

(5) The employer must annually certify and document that these operating procedures are current and accurate.

**WAC 296-XX-XXX Training.**

(1) Initial training. Each employee, including contract employees presently involved in or maintaining a process, and each employee before being involved in operating or maintaining a newly assigned process, must be trained in an overview of the process and in the operating procedures. The training must include emphasis on specific safety and health hazards, emergency operations, and safe work practices applicable to the employee's job tasks.

(2) Refresher and supplemental training. Effective refresher and supplemental training must be provided at least every three years, and more often if necessary, to each maintenance and operations employee involved in operating a process to ensure that the employee understands and adheres to the current maintenance and operating procedures of the process. The employer, in consultation with the employees involved in operating the process, must determine the appropriate frequency of refresher training.

(3) Training certification. The employer must ensure that each employee involved in operating and maintaining a process has received, understood and successfully completed training. The employer, after the initial or refresher training, must prepare a certification record, which contains the identity of the employee, the date of training, the signature(s) of the person(s) who administered the training, and the means used to verify that the employee understood the training.

(4) The employer must develop, implement, and maintain an effective written program that includes the following:

(a) The requirements that an employee must meet in order to be designated as qualified; and,

(b) Employee testing procedures to verify understanding and to ensure competency in job skill levels and work practices that protect employee safety and health.

(5) The employer must develop, implement, and maintain an effective training program to ensure that all affected employees are aware of and understand all PSM elements described in this section. Employees and employee representatives participating in a team must be trained in the PSM elements relevant to that team.

(6) The employer must provide for employee collaboration in developing and implementing the training program.

**WAC 296-XX-XXX Contractors.**

(1) Application. This section applies to contractors performing maintenance, repair, turnaround, major renovation, or specialty work on or adjacent to a covered process. It does not apply to contractors providing incidental services, which do not influence process safety, such as janitorial work, food and drink services, laundry, delivery, or other supply services.

(2) Employer responsibilities.

(a) The employer, when selecting a contractor, must obtain and evaluate information regarding the contract employer's safety performance, including programs used to prevent employee injuries and illnesses, and must require that its contractors and any subcontractors use a skilled and trained workforce.

(b) The employer must inform contract employers of the known potential fire, explosion, or toxic release hazards related to the contractor's work and the process. The employer must ensure that the contractor has informed each of its employees of the following:

(i) Potential process safety hazards associated with the contractor's work;

(ii) Applicable refinery safety rules; and

(iii) Applicable provisions of this section, including the provisions of [WAC 296-XX-XXX](#), Emergency Planning and Response Plan.

(c) The employer must develop, implement and maintain effective written procedures and safe work practices, to control the entrance, presence and exit of contract employers and contract employees in covered process areas.

(d) The employer must periodically evaluate the performance of contract employers in fulfilling their obligations as specified in this section. The employer must ensure and document that the requirements of this subsection are performed and completed by the contractor.

(e) The employer must maintain a contract employee injury and illness log related to the contractor's work in process areas.

(3) Contract employer responsibilities.

(a) The contract employer must ensure that each contract employee is trained in the work practices necessary to safely perform his/her job, including:

(i) Potential process safety hazards related to their jobs;

(ii) Applicable refinery safety rules;

(iii) The specific actions to take in an emergency; and

(iv) Other applicable provisions of this section, including the provisions of the emergency action or response plan.

(b) The contract employer must document that each contract employee has received and understood the training required by this subsection. The contract employer must 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.

(c) The contract employer must advise the employer of any specific hazards presented by the contract employer's work, or of any hazards identified by the contractor while performing work for the host employer.

**WAC 296-XX-XXX Prestartup Safety Review.**

(1) The employer must perform a prestartup safety review (PSSR) for new facilities and for modified facilities when the modification is significant enough to require a change in the process safety information (PSI). The employer must not move forward with a process startup until all prestartup safety review items have been resolved and processing systems and components are in place and in appropriate condition for that startup.

(2) The prestartup safety review must confirm that prior to the introduction of highly hazardous chemicals to a process:

(a) Construction, maintenance and repair work has been performed in accordance with design specifications;

(b) Effective safety, operating, maintenance, and emergency procedures are in place and are adequate;

(c) For new processes, a process hazard analysis (PHA), hierarchy of hazard controls analysis (HCA), damage mechanism review (DMR), and safeguard protection analysis (SPA) have been performed and recommendations have been resolved or implemented before startup; and modified facilities meet the requirements contained in management of change;

(d) Training of each operations, maintenance, or other affected employee involved in operating a process has been completed.

(3) The employer must involve operating or maintenance employees in the PSSR who have expertise and experience in the operations and engineering of the process being started. An operating employee who currently works in the unit and who has expertise and experience in the process being started must be designated as the employee representative.

**WAC 296-XX-XXX Mechanical Integrity.**

(1) Application. This section applies to all process equipment.

(2) Written procedures. The employer must develop, implement, and maintain effective written procedures to ensure the ongoing integrity of process equipment. These procedures must include a documented review of industry leading factors.

(a) The procedures must provide clear instructions for safely conducting maintenance activities on process equipment, consistent with the PSI.

(b) The procedures and inspection documents developed under this subsection must be readily accessible to employees and employee representatives.

(3) Training for process maintenance activities. The employer must train each employee involved in maintaining the ongoing 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 ensure that the employee can perform the job tasks in a safe manner.

(4) Inspection and testing.

(a) Inspections and tests must be performed on process equipment.

(b) Inspection and testing procedures must meet or exceed recognized and generally accepted good engineering practices (RAGAGEP).

(c) The frequency of inspections and tests of process equipment must be consistent with:

(i) The applicable manufacturers' recommendations;

(ii) Recognized and generally accepted good engineering practices (RAGAGEP);

(iii) Operating history of process equipment; and

(iv) Internal practices that are at least as or more protective than (i), (ii) or (iii) of this subsection.

(v) Inspections must be done more frequently if determined to be necessary by prior operating experience.

(d) The employer must retain documentation for each inspection and test that has been performed on process equipment. The documentation must 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.

(5) Equipment deficiencies.

(a) The employer must correct deficiencies in equipment that are outside acceptable limits (defined by the process safety information (PSI)) before further use or in a safe and timely manner when necessary means are taken to ensure safe operation. For purposes of this section, "Safe and timely" is defined as the first outage after the deficiency is detected or when a temporary repair fails one time, whichever occurs first.

(b) Repair methodologies must be consistent with RAGAGEP or more protective methodologies.

(6) Quality assurance.

(a) In construction of new plants and equipment, the employer must ensure that equipment, as it is fabricated, is suitable for the process application for which they will be used. If the employer installs new process equipment or has existing process equipment for which no RAGAGEP exists, the

employer must document and ensure that this equipment is designed, constructed, installed, maintained, inspected, tested and operated in a safe manner.

(b) Once an equipment deficiency is identified, substantially similar equipment throughout other areas of the facility must be evaluated for the same deficiency.

(c) Vessels, piping, and all affected equipment must be inspected after each power outage, emergency shut down, emergency operation, or other detrimental processing event. The service life of the equipment must be re-evaluated in order to identify any deficiencies that may have adversely impacted its original service life.

(d) The employer must establish a process for evaluating new or updated codes and standards and implementing changes as appropriate to ensure safe operation.

(e) The employer must ensure that all process equipment at a minimum complies with the criteria established by the PSI. The employer must ensure that all process equipment is:

(i) Suitable for the process application for which it is or will be used;

(ii) Fabricated from the proper materials of construction; and

(iii) Designed, constructed, installed, maintained, inspected, tested, operated and replaced in compliance with manufacturer's and other design specifications and all applicable codes and standards.

**WAC 296-XX-XXX Hot Work Permit.**

(1) The employer must issue a hot work permit prior to the commencement of hot work operations conducted on or near a covered process.

(2) The permit must document that fire prevention and protection requirements were implemented prior to beginning the hot work operations. The permit must:

- (a) Indicate the date(s) and time(s) authorized for hot work;
- (b) Identify the object on which hot work is to be performed;
- (c) Identify the name and employer of the party performing the hot work.
- (d) Document an expiration date.

(3) The employer must develop, implement and maintain an effective written procedure for the issuance of hot work permits.

(4) The permit must be kept on file for one year.

**WAC 296-XX-XXX Management of Change.**

(1) The employer must develop, implement, and maintain effective written procedures to manage changes (except for “replacements in kind”) to process chemicals, technology, equipment, and procedures; and, changes to facilities that affect a covered process. The management of change (MOC) procedure must include provisions for temporary repairs, including temporary pipe repairs.

(2) The MOC procedures must ensure that the following considerations are documented and addressed prior to any change:

- (a) The technical basis for the proposed change;
- (b) Impact of change on safety and health;
- (c) Modifications to operating and maintenance procedures, or development of new operating and maintenance procedures;
- (d) Necessary time period for the change; and
- (e) Authorization requirements for the proposed change.

(3) Employees involved in operating a process and maintenance and contract employees whose job tasks will be affected by a change in the process must be informed of, and effectively trained in, the change prior to start-up of the process or affected part of the process.

(4) For contractors and employees of contractors who are operating the process and whose job tasks will be affected by a change, the employer must make the MOC documentation available and require effective training in the change in a timely manner, prior to implementation of the change.

(5) If a change covered by this section results in a change in the process safety information, such information must be updated accordingly.

(6) If a change covered by this section results in a change in the operating procedures or practices, such procedures or practices must be updated accordingly.

(7) The author, staff member, employer representative, or manager who is responsible for the management of change (MOC) document must participate in the MOC exercise with affected personnel; and certify in writing that the MOC evaluation is safe, complete, and all action items are completed prior to executing the change.

(8) Prior to implementing a major change, the employer must review or conduct a damage mechanism review (DMR) and perform a hierarchy of hazard controls analysis (HCA). The findings of the DMR and recommendations of the HCA must be included in the MOC documentation

(9) The employer must use qualified personnel and appropriate methods for all MOCs based upon hazard, complexity and type of change.

(10) The employer must provide for employee collaboration.

**WAC 296-XX-XXX Incident Investigation—Root Cause Determination.**

(1) The employer must develop, implement and maintain effective written procedures for promptly investigating and reporting any incident that results in, or could reasonably have resulted in, a major incident. The written procedures must include an effective method for determining the root cause of an incident.

(2) An incident investigation must be initiated as promptly as possible, but not later than forty-eight hours following the incident.

(3) An incident investigation team must be established and consist of at least:

- (a) One person with expertise and experience in the process involved;
- (b) A contract employee if the incident involved work of the contractor;
- (c) A person with expertise in determining root causes of incidents;
- (d) A person with expertise in facilitating the investigation and analysis; and
- (e) Any other persons with appropriate expertise and experience to thoroughly investigate and analyze the incident.
- (f) The employer must provide for employee collaboration.

(4) A written report must be prepared at the conclusion of the investigation, which includes, at a minimum:

(a) Date and time of the incident;

(b) Date and time the investigation began;

(c) A detailed description of the incident;

(d) The factors that contributed to the incident including direct causes, indirect causes and root causes;

(e) A list of any DMR(s), PHA(s), SPA(s), and HCA(s) that were reviewed as part of the investigation;

(f) Documentation of relevant findings from the review of DMR(s), PHA(s), SPA(s) and HCA(s);

(g) Any recommendations resulting from the investigation; and

(h) Interim safety measures implemented by the employer.

(5) The employer must establish a system to promptly address and resolve the incident report findings and recommendations. Resolutions and corrective actions must be documented. The recommendations must include interim measures that will prevent a recurrence or similar incident until final corrective actions can be implemented.

(6) The incident investigation team must review the incident scenarios evaluated in the most recent PHA, and must revise the safeguard protection analyses (SPAs) in the PHA if necessary.

(7) Investigation reports must be provided within one week of its completion, and upon request, reviewed with employees whose job tasks are affected by the incident. Investigation reports must also be made available to all operating, maintenance and other personnel, including employees of contractors where applicable, whose work assignments are within the facility where the incident occurred or whose job tasks are relevant to the incident findings. Investigation reports must be provided on request to employee representatives and, where applicable, contractor employee representatives.

(8) The team must prepare a written investigation report within ninety calendar days of the incident. If the team demonstrates in writing that additional time is needed due to the complexity of the investigation, the

team must prepare a status report within ninety calendar days of the incident and every thirty calendar days thereafter until the investigation is complete. The team must prepare a final investigation report within four months of the incident.

(9) The employer must complete an HCA in a timely manner for all recommendations that result from the investigation of a major incident. The employer must attach the HCA report to the investigation report.

(10) Incident investigation reports must be retained for the life of the process.

#### **WAC 296-XX-XXX Emergency Planning and Response.**

(1) The employer must develop, implement and maintain an effective emergency response or emergency action plan for the entire plant. An emergency response plan must define and include procedures for handling small releases.

(2) If the employer plans to rely on external emergency response organization during an emergency, it must document the nature and agreement between itself and any expected assistance from that entity. All drills, scenarios, response time sequences, and debrief action items must be included in the documentation with the assistance and input by the external emergency response entity.

#### **WAC 296-XX-XXX Compliance Audits.**

(1) Employers must certify that they have evaluated compliance with the provisions of this section at least every three years to verify that the procedures and practices developed under the standard are effective and are being followed.

(2) The compliance audit must be conducted by at least one person with expertise and experience in the process being audited. As part of the compliance audit, the employer must consult with operators with expertise and experience in each process audited and must document the findings and recommendations from these consultations in the written report. The report must state the qualifications and identity of the persons performing the compliance audit.

(3) The employer must promptly determine and document an appropriate response to each of the findings of the compliance audit, and document that deficiencies have been corrected.

(4) The employer must make the report available to employees and employee representatives. The employer must respond in writing within sixty calendar days to any written comments submitted by an employee or employee representative regarding the report.

(5) Employers must retain the three most recent compliance audit reports.

**WAC 296-XX-XXX Trade Secrets.**

(1) Employers must make all information necessary to comply with the section available to those persons responsible for:

- (a) Compiling the process safety information (required by [WAC 296-67-071](#));
- (b) Assisting in the development of the process hazard analysis (required by [WAC 296-67-081](#));
- (c) Developing the operating procedures (required by [WAC 296-67-085](#));
- (d) Incident investigations (required by [WAC 296-67-113](#));
- (e) Emergency planning and response ([WAC 296-67-117](#)); and
- (f) Compliance audits ([WAC 296-67-121](#)) without regard to possible trade secret status of such information.

(2) Nothing in this section must preclude the employer from requiring the persons to whom the information is made available under this section to enter into confidentiality agreements not to disclose the information as set forth in [WAC 296-67-117](#).

(3) Subject to the rules and procedures set forth in [WAC 296-67-117](#), employees and their designated representatives must have access to trade secret information contained within the process hazard analysis and other documents required to be developed by this standard.

**WAC 296-XX-XXX Damage Mechanism Review.**

(1) The employer must complete a damage mechanism review (DMR) for each existing and new process for which a damage mechanism exists. Where no DMR is performed, the employer must document the rationale for the determination that no damage mechanisms exist. The employer must determine and

document the priority order for conducting DMRs based on the process operating history, the PHA schedule, and inspection records.

(2) The employer must complete no less than fifty percent of initial DMRs within three years and all remaining DMRs within five years of the effective date of this section. If the employer has conducted and documented a DMR for a process unit up to five years prior to the effective date of this section, and that DMR includes the elements identified in **subsection xxx**, that DMR may be used to satisfy the employer's obligation to complete an initial DMR under this subsection.

(3) A DMR must be revalidated at least once every five years.

(4) A DMR must be reviewed as part of a major change related to a process for which a damage mechanism exists, prior to approval of the change. If the change may introduce a damage mechanism, a DMR must be conducted, prior to approval of the change.

(5) Where a damage mechanism is identified as a contributing factor in an incident investigation, the employer must review the most recent DMRs that are relevant to the investigation. If a DMR has not been performed on the processes that are relevant to the investigation, the incident investigation team must recommend that a DMR be conducted and completed within a specified timeframe.

(6) The DMR for a process unit must be available to the team performing a PHA for that process unit.

(7) The DMR must be performed by a team with expertise in engineering, equipment and pipe inspection, damage and failure mechanisms, and the operation of the process or processes under review. The team must include one member knowledgeable in the specific DMR methodology being used. The employer must provide for employee collaboration.

(8) The DMR for each process must include:

(a) Assessment of process diagrams;

(b) Identification of all potential damage mechanisms;

(c) Determination that the materials of construction are appropriate for their application and are resistant to potential damage mechanisms;

(d) Methods to prevent or mitigate damage; and

(e) Review of operating parameters under the following operating conditions:

- (i) Within and outside of normal conditions,
- (ii) That could accelerate or otherwise worsen damage; and
- (iii) That could minimize or eliminate damage.

(9) For purposes of this subsection, damage mechanisms include, but are not limited to:

- (a) Mechanical loading failures, such as ductile fracture, brittle fracture, mechanical fatigue and buckling;
- (b) Erosion, such as abrasive wear, adhesive wear and fretting;
- (c) Corrosion, such as uniform corrosion, localized corrosion and pitting;
- (d) Thermal-related failures, such as creep, metallurgical transformation and thermal fatigue;
- (e) Cracking, such as stress-corrosion cracking;
- (f) Embrittlement, such as high-temperature hydrogen attack; and
- (g) Microbiologically-Induced Corrosion.

(10) DMRs must include an assessment of previous experience with the process, including the inspection history and all damage mechanism data; and a review of industry-wide experience with the process. Any applicable standards, codes, practices, and recognized and generally accepted good engineering practices (RAGAGEPs) must be used to identify and predict damage mechanism hazards.

(11) At the conclusion of the analysis, the team must prepare a written DMR report, which must include the following:

- (a) The process unit and damage mechanisms analyzed;
- (b) Results of all analyses conducted;

- (c) Recommendations for temporarily mitigating damage and ensuring worker safety;
- (d) Recommendations for preventing damage;
- (e) Damage mechanism flow diagrams, piping and instrumentation diagrams, or other technical data relevant to the report; and
- (f) Operating metrics, instrumentation and alarm, and other related equipment that could cause, worsen, or mitigate damage mechanisms.

(12) The report must be provided to and, upon request, reviewed with employees whose work assignments are within the process unit described in the DMR.

(13) The employer must implement all recommendations in accordance with [subsection xxx](#).

(14) DMR reports must be retained for the life of the process unit.

**WAC 296-XX-XXX Hierarchy of Hazard Controls Analysis.**

(1) The employer must conduct a hierarchy of hazard controls analysis (HCA) as a stand-alone analysis for all existing processes. For the HCA on existing processes, the team must review the process hazard analysis (PHA) while conducting the HCA. The HCA for existing processes must be performed in accordance with the following schedule, and may be performed in conjunction with the PHA schedule:

- (a) Fifty percent of existing processes within three years of the effective date of this section;
- (b) Remaining processes within five years of the effective date of this section;
- (c) All HCAs for existing processes must be updated and revalidated as standalone analyses at least every five years, and may be performed in conjunction with the PHA schedule.

(2) The employer must also conduct an HCA in a timely manner as follows:

- (a) For all recommendations made by a PHA team for each scenario that identifies the potential for a major incident;

(b) For all recommendations that result from the investigation of a major incident;

(c) As part of a MOC review, whenever a major change is proposed; and

(d) During the design and review of new processes, new process units and new facilities, and their related process equipment.

(3) HCAs must be documented, performed, updated and revalidated by a team with expertise in engineering and process operations. The team must include one member knowledgeable in the HCA methodology being used and at least one operating employee who currently works on the process and has expertise and experience specific to the process being evaluated. The employer must provide for employee collaboration. As necessary, the team must consult with individuals with expertise in damage mechanisms, process chemistry and control systems.

(4) The HCA team must:

(a) Compile or develop all risk-relevant data for each process or recommendation;

(b) Identify, characterize and prioritize risks posed by each process safety hazard;

(c) Identify, analyze and document all inherent safety measures and safeguards for each process safety hazard in the following sequence and priority order, from most preferred to least preferred:

(i) First order inherent safety measures;

(ii) Second order inherent safety measures;

(iii) Passive safeguards;

(iv) Active safeguards; and

(v) Procedural safeguards.

For purposes of this section, first order inherent safety measures are considered to be most effective and procedural safeguards are considered to be least effective.

(d) Identify, analyze, and document relevant, publicly available information on inherent safety measures and safeguards. This information must include inherent safety measures and safeguards that have been:

(i) Achieved in practice by the petroleum refining industry and related industrial sectors; and

(ii) Required or recommended for the petroleum refining industry and related industrial sectors, by a federal or state agency, or local agency, in a regulation or report.

(e) For each process safety hazard identified, develop written recommendations in the following sequence and priority order:

(i) Eliminate hazards to the greatest extent feasible using first order inherent safety measures;

(ii) Reduce any remaining hazards to the greatest extent feasible using second order inherent safety measures;

(iii) Effectively reduce remaining risks using passive safeguards;

(iv) Effectively reduce remaining risks using active safeguards; and

(v) Effectively reduce remaining risks using procedural safeguards.

(5) The HCA team must complete an HCA report within ninety calendar days of developing the recommendations. The report must include:

(a) A description of the composition, experience and expertise of the team;

(b) A description of the HCA methodology used by the team;

(c) A description of each process safety hazard analyzed by the team;

(d) A description of the inherent safety measures and safeguards analyzed by the team; and

(e) The rationale for the inherent safety measures and safeguards recommended by the team for each process safety hazard; and the basis for using other than best practices to arrive at those recommendations.

(6) The employer must implement all recommendations.

(7) The employer must retain all HCA reports for the life of each process.

**WAC 296-XX-XXX Process Safety Culture Assessment.**

(1) The employer must develop, implement and maintain an effective process safety culture assessment (PSCA) program.

(2) The employer must conduct an effective PSCA and produce a written report within eighteen months following the effective date of this section, and at least every five years thereafter. If the employer has conducted and documented a PSCA up to eighteen months prior to the effective date of this section, and that PSCA includes the elements identified in this subsection, that PSCA may be used to satisfy the employer's obligation to complete an initial PSCA under this subsection.

(3) The PSCA must be developed and implemented by a team that must include at least one member knowledgeable in refinery operations and at least one employee representative with processing and maintenance experience. The employer must provide for employee collaboration; and consult with at least one employee or another individual with expertise in assessing process safety culture in the petroleum refining industry.

(4) The PSCA must include an evaluation of the effectiveness of the following elements of process safety leadership:

(a) The employer's hazard reporting program;

(b) The employer's response to reports of hazards;

(c) The employer's procedures to ensure that incentive programs do not discourage reporting of hazards; and

(d) The employer's procedures to ensure that process safety is prioritized during upset or emergency conditions.

(5) The team must develop a written report within ninety calendar days of completion of the PSCA, which must include:

- (a) The method(s) used to conduct the PSCA;
- (b) The findings and conclusions of the PSCA; and
- (c) The team's recommendations to address the findings of the PSCA.

(6) The employer, in consultation with the PSCA team, must prioritize recommendations and implement corrective actions within twenty-four months of completion of the written report.

(7) The PSCA team must conduct a written interim assessment of the implementation and effectiveness of each PSCA corrective action within three years following the completion of a PSCA report. If a corrective action is found to be ineffective, the employer must implement changes necessary to ensure effectiveness in a timely manner not to exceed six months.

(8) The refinery manager or designee must serve as signatory to all PSCA reports, corrective action plans and Interim Assessments.

(9) PSCA reports, corrective action plans and Interim Assessments must be communicated and made available to employees, their representatives and participating contractors within sixty calendar days of completion.

(10) Participating contractors must provide PSCA reports, corrective action plans and Interim Assessments to their employees and employee representatives within fourteen calendar days of receipt.

**WAC 296-XX-XXX Human Factors.**

(1) The employer must develop, implement and maintain an effective written human factors program within eighteen months following the effective date of this section.

(2) The employer must include a written analysis of human factors that represents industry best practices relevant to major changes, incident investigations, PHAs, MOOCs and HCAs. The analysis must include a description of the selected methodologies and criteria for their use.

(3) The employer must assess human factors in existing operating and maintenance procedures and must revise these procedures accordingly. The employer must complete fifty percent of assessments and

revisions within three years following the effective date of this section and one hundred percent within five years.

(4) The human factors analysis must apply an effective method in evaluating the following:

- (a) Staffing levels;
- (b) Complexity of tasks;
- (c) Length of time needed to complete tasks;
- (d) Level of training, experience and expertise of employees;
- (e) Human-machine and human-system interface;
- (f) Physical challenges of the work environment in which the task is performed;
- (g) Employee fatigue and other effects of shiftwork and overtime;
- (h) Communication systems; and
- (i) Comprehension of operating and maintenance procedures.

(5) The human factors analysis of process controls must include:

- (a) Error-proof mechanisms;
- (b) Automatic alerts; and
- (c) Automatic system shutdowns.

(6) The employer must include an assessment of human factors in new and revised operating and maintenance procedures.

(7) The employer must train operating and maintenance employees in the written human factors program.

(8) The employer must provide for employee collaboration in the human factors program.

(9) The employer must make available and provide on request, a copy of the written human factors program to employees and their representatives and to affected contractors, employees of contractors, and contractor employee representatives.

**WAC 296-XX-XXX Management of Organizational Change.**

(1) The employer must develop, implement and maintain effective written procedures to manage organizational changes.

(2) The employer must designate a team to conduct a management of organizational change (MOOC) assessment prior to reducing staffing levels, reducing classification levels of employees changing shift duration, or increasing employee responsibilities at or above fifteen percent. The employer must provide for employee collaboration. The MOOC assessment is required for changes with a duration exceeding ninety calendar days affecting operations, engineering, maintenance, health and safety, or emergency response. This requirement must also apply to employers using employees of contractors in permanent positions.

(3) The MOOC assessment must be in writing and must include a description of the change being proposed, the make-up of the team responsible for assessing the proposed change, the factors evaluated by the team, and the team's findings and recommendations.

(4) Prior to conducting the MOOC assessment, the employer must ensure that the job function descriptions are current and accurate for all positions potentially affected by the change.

(5) The refinery manager or designee must certify based on information and belief formed after reasonable inquiry that the MOOC assessment is accurate and that the proposed organizational change meets the requirements of this subsection.

(6) All MOOC analyses must include an analysis of human factors.

(7) Prior to implementing a change, the employer must inform all employees potentially affected by the change.

**WAC 296-XX-XXX Process Safety Management Program.**

(1) The employer shall designate the refinery manager as the person with authority and responsibility for compliance with this section.

(2) The employer must develop, implement, and maintain an effective written process safety management (PSM) program, which must be reviewed and updated at least every three years.

(3) The employer must develop and maintain an organizational chart that identifies management positions responsible for implementing the PSM Program elements required by this section.

(4) The employer must develop, implement and maintain an effective program to track, document, and assess process safety performance indicators against best practices, as well as leading and lagging factors.

**WAC 296-XX-XXX Implementation.**

(1) The employer must develop, implement and maintain an effective written corrective action program to prioritize and implement the process safety performance indicators recommended as the result of a process hazard analysis (PHA), safeguard protection analysis (SPA), damage mechanism review (DMR), hierarchy of hazard controls analysis (HCA), incident investigation and compliance audit, pursuant to this section.

(2) All findings and associated recommendations must be provided to the employer by the team performing the review or analysis.

(3) The employer may reject a team recommendation if the employer can demonstrate in writing that the recommendation meets one of the following criteria:

(a) The analysis upon which the recommendation is based contains material factual errors;

(b) The recommendation is not relevant to process safety; or

(c) The recommendation is infeasible; however, a determination of infeasibility must not be based solely on cost.

(4) The employer may change a team recommendation if the employer can demonstrate in writing that an alternative measure would provide an equivalent or higher order of inherent safety. The employer may change a team recommendation for a safeguard if an alternative safeguard provides an equally or more effective level of protection.

(5) The employer must document all instances where any one of the criteria in **subsections xxx** is used for the purpose of rejecting or changing a team recommendation.

(6) Each recommendation that is changed or rejected by the employer must be communicated to onsite team members for comment and made available to offsite team members for comment. The employer must document all written comments received from team members for each changed or rejected recommendation. The employer must document a final decision for each recommendation and must communicate it to onsite team members and make it available to offsite team members.

(7) The employer must develop and document corrective actions to implement each accepted recommendation. The employer must assign a completion date for each corrective action and a person responsible for completing the corrective action.

(8) If the employer determines that a corrective action requires revalidation of any applicable process hazard analysis (PHA), safeguard protection analysis (SPA), hierarchy of hazard controls analysis (HCA) or damage mechanism review (DMR), these revalidations must be subject to the corrective action requirements of this subsection. The employer must promptly append all revalidated PHAs, SPAs, DMRs, and HCAs to the applicable report.

(9) The employer must promptly complete all corrective actions and must comply with all completion dates required by this subsection. The employer must conduct an MOC for any proposed change to a completion date. The employer must make all completion dates available, upon request, to all affected operation and maintenance employees and employee representatives.

(10) Except as required in **subsections xxx and xxx**, each corrective action that does not require a process shutdown must be completed within thirty months after the completion of the analysis or review, unless the employer demonstrates in writing that it is infeasible to do so.

(11) Each corrective action from a compliance audit must be completed within eighteen months after completion of the audit, unless the employer demonstrates in writing that it is infeasible to do so. Each corrective action from an incident investigation must be completed within eighteen months after completion of the investigation or during an outage or turnaround, whichever comes first. If the employer deems the corrective action timeline to be infeasible, the employer must document the basis for that determination in writing that it is infeasible to do so.

(12) Each corrective action requiring a process shutdown must be completed during the regularly scheduled turnaround of the applicable process, following completion of the PHA, SPA, DMR, HCA, MOC, Compliance Audit or Incident Investigation.

(13) Notwithstanding **subsections xxx and xxx**, corrective actions addressing process safety hazards must be prioritized and promptly corrected, either through permanent corrections or temporary, interim safeguards sufficient to ensure employee safety and health, pending permanent corrections.

(14) Where a corrective action cannot be implemented within the time limits required in **subsections xxx** the employer must ensure that interim safeguards are sufficient to ensure employee safety and health, pending permanent corrections. The employer must document the decision and rationale for any delay and must implement the corrective action as soon as possible. The documentation must include:

- (a) The rationale for deferring the corrective action;
- (b) All MOC requirements;
- (c) A revised timeline describing when the corrective action will be implemented; and
- (d) An effective plan to make available the rationale and revised timeline to all affected employees and their representatives.

(15) The employer must track and document the completion of each corrective action and must append the documentation to the applicable PHA, SPA, DMR, HCA, Incident Investigation or compliance audit.