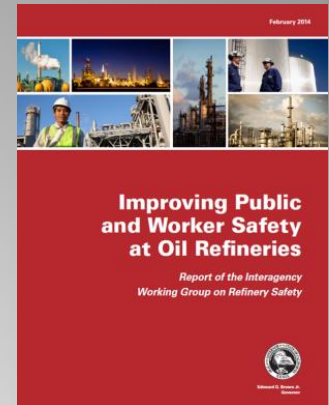


California's Proposed Process Safety Management (PSM) Regulation §5189.1

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Governor's Report on Refinery Safety Recommendations:



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Strengthen PSM and Cal ARP Programs:

1. Implement inherently safer systems to the greatest extent feasible;
2. Perform periodic safety culture assessments;
3. Adequately incorporate damage mechanism hazard reviews into Process Hazard Analyses;
4. Complete root cause analysis after significant accidents or releases;
5. Explicitly account for human factors and organizational changes; and
6. Use structured methods such as Layer of Protection Analysis to ensure adequate safeguards.

Additional areas: Reporting of leading and lagging indicators, increasing worker and community involvement, and exploring the safety case approach.

GISO Section 5189.1

Process Safety Management for Petroleum Refineries

Applicability: Petroleum Refineries
(NAICS Code 324110)

Purpose

- PSM: This Section contains requirements for petroleum refineries to prevent major incidents and minimize the process safety risks to which employees may be exposed.

Selected General Definitions

“Major Incident” means an event within or affecting a process that causes a fire, explosion or release of a highly hazardous material which has the potential to result in death or serious physical harm (as defined in Labor Code Section 6432(e)), or which results in a shelter-in-place, or an evacuation order.

“Feasible” means capable of being accomplished in a successful manner within a reasonable period of time, taking into account health, safety, economic, environmental, legal, social, and technological factors.

“Major change” means any of the following: (1) introduction of a new process, new process equipment, or new regulated substance; (2) any change in safe operating limits; or (3) any alteration in a process, process equipment, or process chemistry that introduces a new hazard or worsens an existing hazard.

Additional Definitions

- “Highly hazardous material” means a substance possessing a toxic, reactive, flammable, explosive, or other dangerous property, exposure to which could result in death or serious physical harm as defined by Labor Code 6432 (e). Highly hazardous material includes all regulated substances listed in Appendix A.
- “Process” for purposes of this Article, means petroleum refining activities involving a highly hazardous material, including use, storage, manufacturing, handling, piping, or on-site movement. Utilities and safety related devices may be considered part of the process if, in the event of an unmitigated failure or malfunction, they could potentially contribute to a major incident.

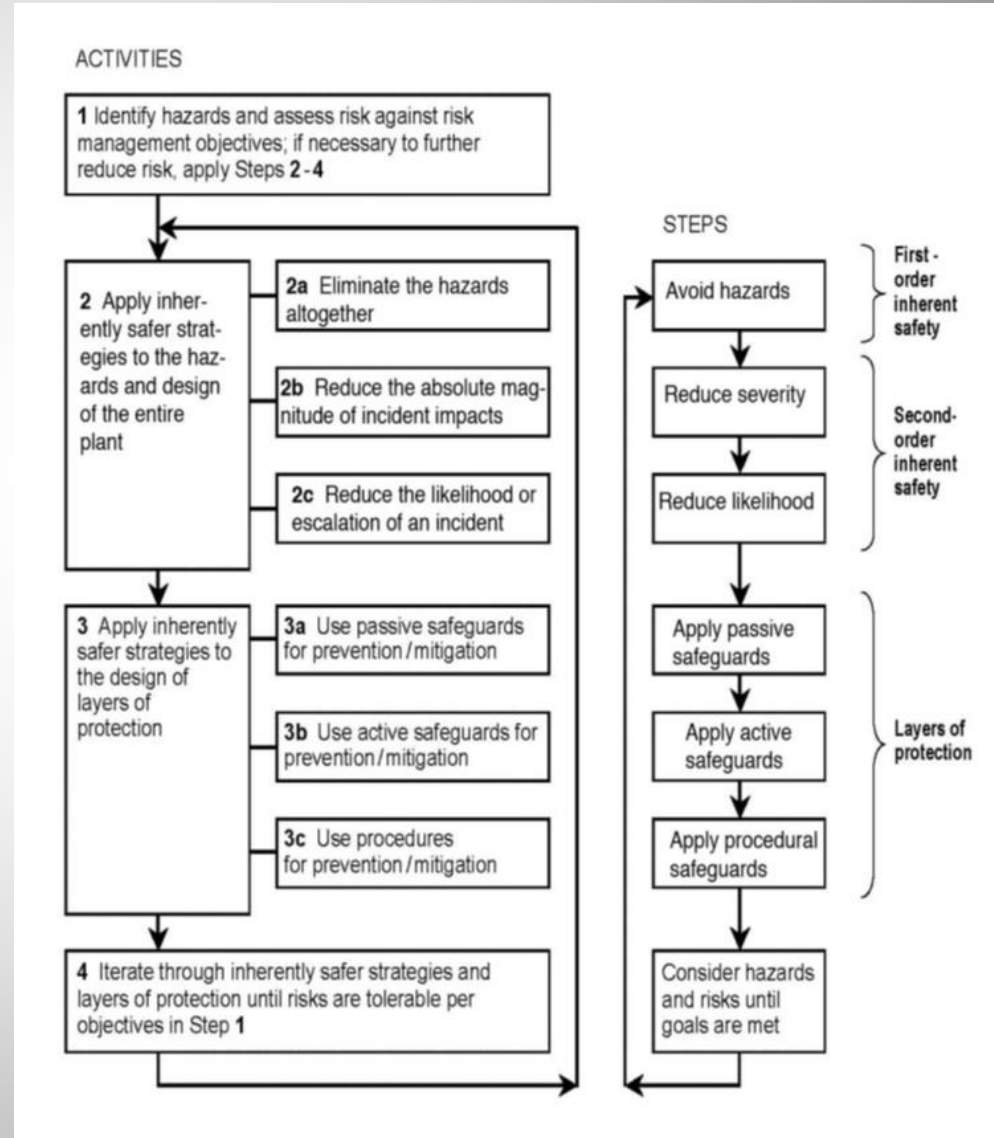
Damage Mechanism Review (DMR)

- Scope: “each process for which a damage mechanism exists”;
- Initial DMR within 5 years (50% within 3 yrs);
- Revalidated every 5 years or prior to a major change;
- Reviewed as part of an incident investigation;
- Team must include experts and employees;
- Feeds into the Process Hazard Analysis.



Hierarchy of Hazard Control

Hierarchy of Hazard Control; A system used to minimize or eliminate exposure to a hazard or to reduce the risk presented by a hazard. Control measures listed from most effective control measure to least effective control measure are: (1) eliminating the hazards altogether (first order inherent safety), (2) reducing severity of hazard or likelihood of release (second order inherent safety), or (3) applying layers of protection, including passive, active, or procedural safeguards (layers of protection).



Hierarchy of Hazard Control Analysis

- Initial HCA for all processes, & revalidation every five years. Refineries also must conduct an HCA when: (1) recommendations from a Process Hazard Analysis (PHA) show a potential for a major incident, (2) a major change is proposed, or (3) a major incident occurs.
- Also during the design of any new process, process unit, or facility. *An HCA done for this purpose must be made available to the public, with appropriate protections for trade secret information.*
- HCAs are conducted by a team with expertise in inherent safety and safeguards, with employee representation.
- Refineries must select the highest order safety measure unless it is not feasible. Any finding of infeasibility must be documented.

1st Order Inherent Safety (Safer chemicals)

2nd Order Inherent Safety (Lower volume of chemicals)

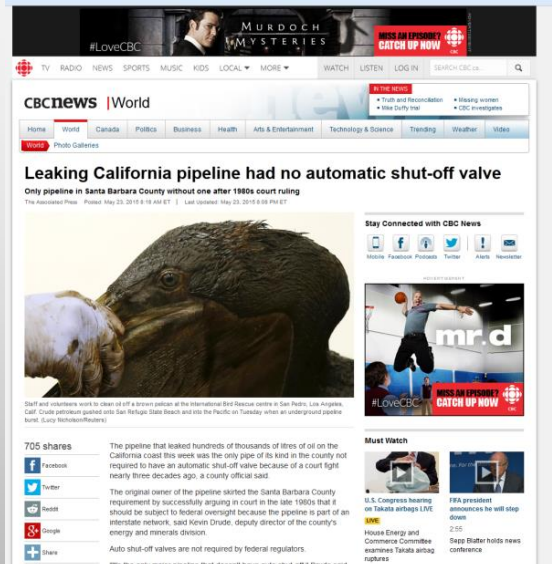
Passive layers of protection (Corrosion resistant piping)

Active layers of protection (Auto shut-downs)

Procedural protections

Safeguard Protection Analysis (SPA)

- “Safeguard” means a device, system, or action that interrupts the chain of events following an initiating cause, or that mitigates the impacts of an incident. [Passive/Active/Procedural Safeguards]
- Conduct and update within 6 months of finalizing a Process Hazard Analysis (PHA), to ensure the effectiveness of the individual and combined safeguards for each failure scenario identified in the PHA, and to assure that the safeguards are independent of each other.
- Team with expertise in engineering and process operations, the methodology, and the safeguards being evaluated; at least one employee representative.



Management of Organizational Change (MOOC)

- An analysis of impacts of any staffing changes or reorganization of operations, including reducing staffing levels, changing experience levels of employees, changing shift duration, or making changes in employee responsibilities.
- Analysis of change by a team; documentation of analysis, decision, and basis.
- Certification by the refinery manager that the proposed change(s) will not increase the likelihood of a major incident.
- Workers and their representatives must be involved in these processes.



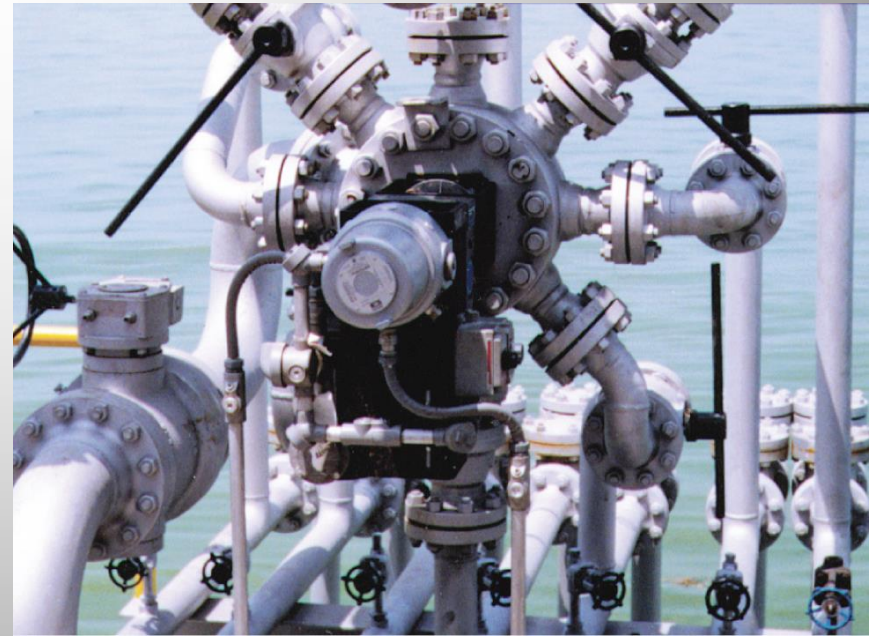
Incident Investigation

- Investigate incidents using effective methods that identify root causes to determine the underlying safety management system causes of the incident, which if corrected would prevent or significantly reduce the likelihood of the problem's recurrence.
- Investigate all incidents that resulted in, or could reasonably have resulted in, a major incident.
- Incident investigations are conducted by a team, including experts and employees.
- Investigation must begin within 48 hours; an initial report within 90 days of the incident; final report in 5 months.
- Interim and final recommendations to prevent recurrence and reduce the risk of future incidents.
- *For major incidents, reports will be made publicly available by the CUPA.*



Human Factors

- A discipline concerned with designing machines, operations, and work environments so that they match human capabilities, limitations, and needs. Human factors can be further referred to as environmental, organizational, and job factors, and human and individual characteristics, such as fatigue, that influence behavior at work in a way that can affect health and safety.
- Human factors program shall take into account staffing levels, complexity of tasks, time needed to complete tasks, level of training and expertise, human-machine interface, fatigue, communication systems, and other factors.
- Human factors must be assessed and included in all PHAs, incident investigations, written operating and maintenance procedures, and in management of change processes for major changes and organizational changes.
- Written program must include:
 - Training, operating, and maintenance procedures.
 - Staffing, shiftwork, overtime, and fatigue.



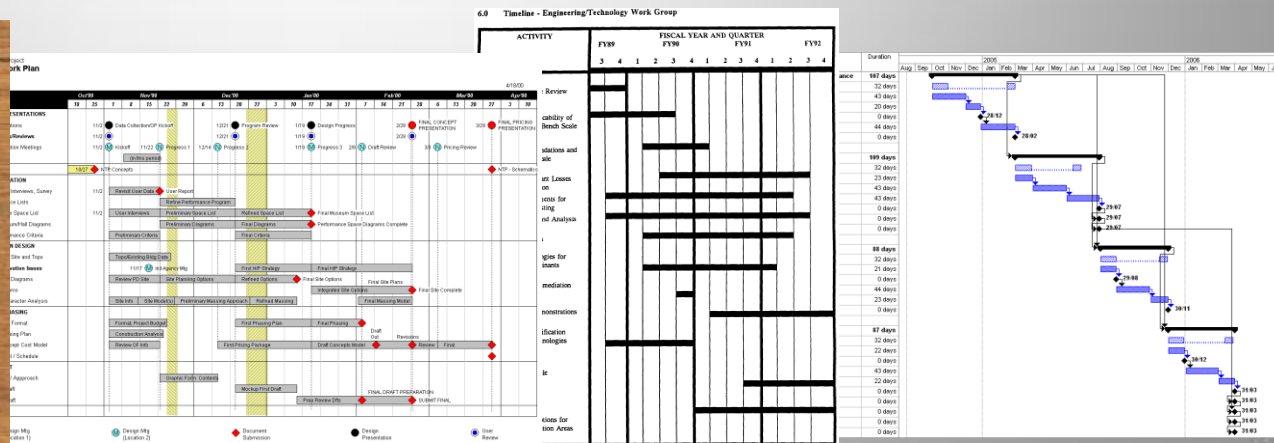
Process Safety Culture Assessment

- Assessment of the core values and behaviors resulting from a collective commitment by leaders and individuals to emphasize safety over competing goals in order to ensure protection of people and the environment.
- Shall be done every 5 years, with a mid-term check on progress to:
 - Ensure that reporting of safety concerns is encouraged;
 - Ensure that reward or incentive programs do not deter reporting of concerns or incidents;
 - Ensure that safety is not compromised by production pressures;
 - Promote effective process safety leadership at all levels of the organization.
- Employees and their representatives shall participate in all phases of the safety culture assessment.
- The refinery manager, or his or her designee, must sign off on all process safety culture assessment reports and corrective action plans.



Program Management

- Written management system to ensure that all program elements are developed, implemented, modified when needed, communicated, and roles and responsibilities are assigned.
- Compliance audit every 3 years.
- Review all recommendations from team reports against defined rejection criteria; generate corrective actions; and implement corrective actions according to a specified timeline. Communicate reasons for all delays in the corrective action work process to employees. Document close-out of all recommendations and corrective actions.





QUESTIONS?