CALIFORNIA BOILER INSPECTORS ASSOCIATION

UPDATES TO THE PETROLEUM SAFETY ORDERS (PSO) AND PROCESS SAFETY MANAGEMENT REGULATIONS FOR REFINERIES.

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UPDATE TO PETROLEUM SAFETY ORDER 6845(A) A SLIP OF THE TONGUE

- During a #4 Crude meeting with regulators, Chevron personnel admitted they were “thinking about” clamping the leak in the Crude Unit.
- So the question was asked, “How many of these leak seals do you have?”
- “We installed about 2,000 clamps/leak seals in last ten years”.

Cal/OSHA Refinery Regulators

- No, seriously Clyde; About 2,000 in the last ten years.

PSO 6845 PIPING, FITTINGS, AND VALVES

- 6845(a) states in part:
  - the testing, inspection, and repair of all piping systems shall comply with ….. ***API 570, Piping Inspection Code, Second Edition, October 1998, Addendum 3, August 2003***; and ASME B31.3-2002, Process Piping; herein incorporated by reference.
- API 570 Section 8.1.4 – Non-welding Repairs (On-Stream) states in part:
  - "***During turnaround or other appropriate opportunities***, temporary leak sealing and leak dissipating devices, including valves, shall be removed and appropriate actions taken to restore the original integrity of the piping system."

THE QUESTION WAS…..

- Does “During turnaround or other appropriate opportunities” mean:
  - temporary leak sealing and leak dissipating devices must be replaced at the next turnaround or
  - “other appropriate opportunities” means sometime after the turnaround.

- This inspection went to Hearing, then Appealed i.e. Decision after Reconsideration, and then Superior Court.

SUPERIOR COURT DECISION…

- Actually Settlement Reached Between the Parties (Errata to Decision after Reconsideration);

> Pursuant to the terms of the settlement agreement and API 570, section 8.1.4 removal and permanent repairs must be made at the "next maintenance opportunity". That term is defined as and shall not exceed (go beyond the date of) the next scheduled turnaround where the portion of the process unit within which the clamp is located is shut down, and the piping at the location of the clamp to be removed is isolated, drained, and cleaned, enabling repairs to occur.

- Does this DAR apply to All Refineries in California?
- YES….

TITLE 8 §5189.1
PROCESS SAFETY MANAGEMENT FOR REFINERIES

EFFECTIVE DATE OCTOBER 1, 2017

WHAT DOES THIS MEAN?

- All Refineries in California must comply with Title 8 §5189.1 on October 1st, 2017
- Any Refinery Inspections that are opened as of October 1, 2017 are also subject to 5189.1
  - As of today, That Would Be Two
- How Heavy Handed will Enforcement Be?
  - See Turnaround Inspections

EXPECTATIONS OF REFINERIES

- Employer is responsible for establishing effective programs to fulfill the requirements of the regulation.
- Teams with expert input and employee participation conduct analysis and document recommendations to promote safe operations of the refinery
- Contractors have a greater voice in new regulation
- Employer has ultimate decision making authority that must be documented for transparency/accountability

5189.1 – STILL A PERFORMANCE BASED REGULATION

- Definition-
  - A regulatory approach that focuses on desired, measurable outcomes, rather than prescriptive processes, techniques, or procedures. Performance-based regulation leads to defined results without specific direction regarding how those results are to be obtained.

- Example – (f)(1) Operating Procedures
  - The Operating Procedures *shall provide clear instructions* for safely conducting activities involved in each process. (What does that mean?)
  - Use of CCPS Book on "Guidelines for Writing Effective Operating and Maintenance Procedures"

GRANDFATHERING

- Grandfathering:
  - PHA(e)(1)
    - PHAs performed in accordance with the requirements of CCR Title 8, Section 5189 shall satisfy the initial PHA requirements of this Section.
  - DMR(k)(2)
    - If the employer has conducted and documented a DMR for a process unit up to five (5) years prior to the effective date of this section, and that DMR includes the elements identified in subsection (k)(8), that DMR may be used to satisfy the employer's obligation to complete an initial DMR under this subsection.
  - PSCA(r)(2)
    - If the employer has conducted and documented a PSCA up to eighteen (18) 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.

IMPLEMENTATION

- Unless otherwise noted below:
  - Training (g)(5) - (24) months of the effective date of this section.
  - DMR (k)(2) - fifty (50) percent of initial DMRs within three (3) years and all remaining DMRs within five (5) years of the effective date of this section.
  - HCA – (l)(1)(A-C) - 50% of existing processes within three (3) years of the effective date of this section. Remaining processes within five (5) years of the effective date of this section.
  - PSCA (r)(2) - If the employer has conducted and documented a PSCA up to eighteen (18) months prior to the effective date of this section … that PSCA may be used to satisfy the employer's obligation… under this subsection.
  - HF (s)(1) The employer shall develop, implement and maintain an effective written Human Factors program within eighteen (18) months following the effective date of this section.

CURRENT PROCESS SAFETY MANAGEMENT ELEMENTS

1. Scope & Application
2. Definitions
3. Process Safety Information
4. Process Hazard Analysis
5. **Operating Procedures**
6. **Training**
7. **Contractors**
8. Pre-Start-Up Safety Review
9. Mechanical Integrity
10. Hotwork
11. Management of Change
12. **Incident Investigation**
13. Emergency Planning and Response
14. Employee Participation
15. IIPP
16. Trade Secrets

5189.1 PSM FOR REFINERIES

- (a) Scope and Purpose
- (b) Application
- (c) Definitions
- (d) Process Safety Information (PSI)
- (e) Process Hazard Analysis (PHA) and (SPA)
- (f) Operating Procedures
- (g) Training
- (h) Contractors
- (i) Pre Start-Up Safety Review (PSSR)
- (j) Mechanical Integrity
- (k) Damage Mechanism Review (DMR)
- (l) Hierarchy of Hazard Controls Analysis (HCA)
- (m) Hot Work
- (n) Management of Change (MOC)
- (o) Incident Investigation—Root Cause Analysis
- (p) Emergency Planning and Response
- (q) Employee Participation
- (r) Process Safety Culture Assessment (PSCA)
- (s) Human Factors
- (t) Management of Organizational Change (MOOC)
- (u) Compliance Audits
- (v) Process Safety Management Program
- (w) Division Access to Documents and Information
- (x) Implementation

5189.1 PSM FOR REFINERIES

- Some sections that may be in interest to Boiler Inspectors
- Definitions
  - Major change. Any of the following:
    - Introduction of a new process, new process equipment, or new highly hazardous material;
    - Any operational change outside of established safe operating limits; or,
    - Any alteration that introduces a new process safety hazard or worsens an existing process safety hazard.

5189.1 PSM FOR REFINERIES

- Management of Change (as part of previous slide)
- (n)(3) Prior to implementing a major change, the employer *shall review or conduct a DMR pursuant to subsection (k) and perform an HCA pursuant to subsection (l).* The findings of the DMR and recommendations of the HCA shall be included in the MOC documentation.

5189.1 PSM FOR REFINERIES

- Definitions:
- PROCESS. Petroleum refinery activities including use, storage, manufacturing, handling, piping or on-site movement that involve a highly hazardous material. Utilities and process equipment shall be considered part of the process if in the event of a failure or malfunction they could potentially contribute to a major incident. For purposes of this definition, any group of vessels that are interconnected, or separate vessels that are located such that an incident in one vessel could affect any other vessel, shall be considered a single process. This definition includes processes under partial or unplanned shutdowns. This definition excludes ancillary administrative and support functions, including office buildings, labs, warehouses, maintenance shops, and change rooms.

5189.1 PSM FOR REFINERIES

- RAGAGEP (Recognized and Generally Accepted Good Engineering Practices). Engineering, operation or maintenance activities 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), Instrument Society of America (ISA). RAGAGEP does not include standards, guidelines or practices developed for internal use by the employer.

5189.1 PSM FOR REFINERIES

- Process Safety Information
- (d)(7) The employer shall document that process equipment complies with RAGAGEP, where RAGAGEP has been established for that process equipment, or *more protective* internal practices that ensure safe operation.
- (8) If the employer installs new process equipment for which no RAGAGEP exists, the employer shall document that this equipment is designed, constructed, installed, maintained, inspected, tested and operating in a safe manner.

5189.1 PSM FOR REFINERIES

- Process Safety Information
- (9) If existing process equipment was designed and constructed in accordance with codes, standards or practices that are no longer in general use, the employer shall document that the process equipment is designed, installed, maintained, inspected, tested and operating in a safe manner for its intended purpose.

5189.1 PSM FOR REFINERIES

- Mechanical Integrity
- (j)(2)(B) The frequency of inspections and tests shall be consistent with: (1) the applicable manufacturer's recommendations, (2) RAGAGEP, or (internal practices that are more protective than (1) or (2). Inspections and tests shall be conducted more frequently if necessary, based on the operating experience with the process equipment.
- (j)(3)(A) The employer shall correct deficiencies to ensure safe operation of process equipment. Repair methodologies shall be consistent with RAGAGEP or more protective internal practices.

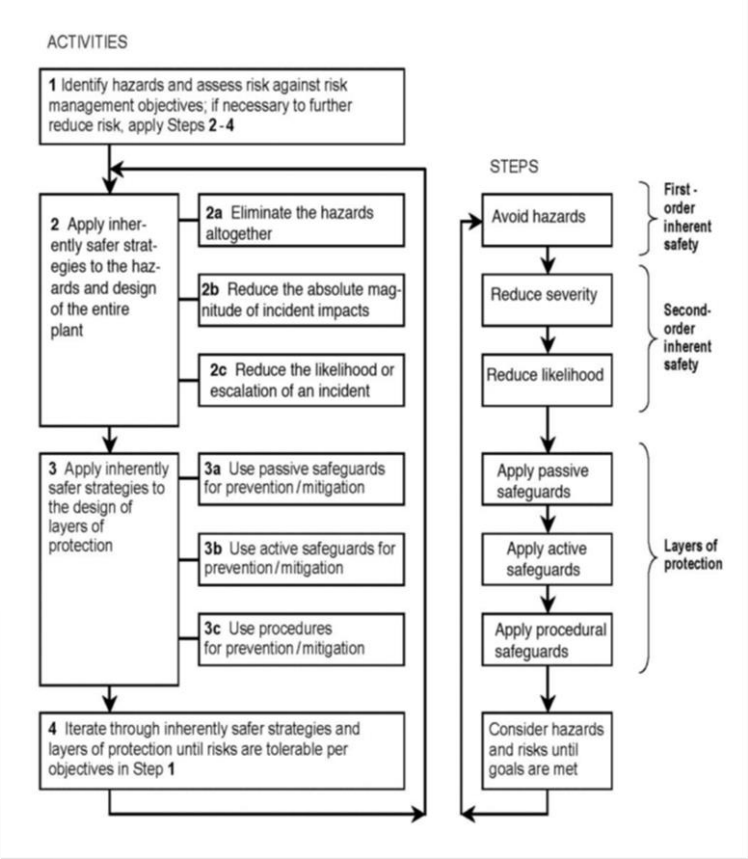
OTHER ELEMENTS OF 5189.1 BOILER INSPECTORS MAY WHAT TO KNOW…

- Damage Mechanism Review (DMR)
  - Required for all existing and new processes for which a damage mechanism exists; must be completed prior to approving major changes; must be reviewed in incident investigations and by the PHA team.
  - Recommendations based on an assessment of previous experience with the process, including the inspection history and all damage mechanism data; a review of industry-wide experience with the process; and all applicable standards, codes and practices.

Timeframe: Half within 3 years, all within 5 years; prior DMRs that meet requirements count; update every 5 years.

HIERARCHY OF HAZARD CONTROL ANALYSIS

- Required for:
  - PHA scenarios with potential for a major incident
  - Recommendations from incident investigations
  - Major changes
  - During the design of new process.
- Focus on Inherent Safety, with prioritized order based on effectiveness of risk reduction.



- Timeframe: complete half within 3 years, all within 5 years; update every 5 years with PHA schedule.

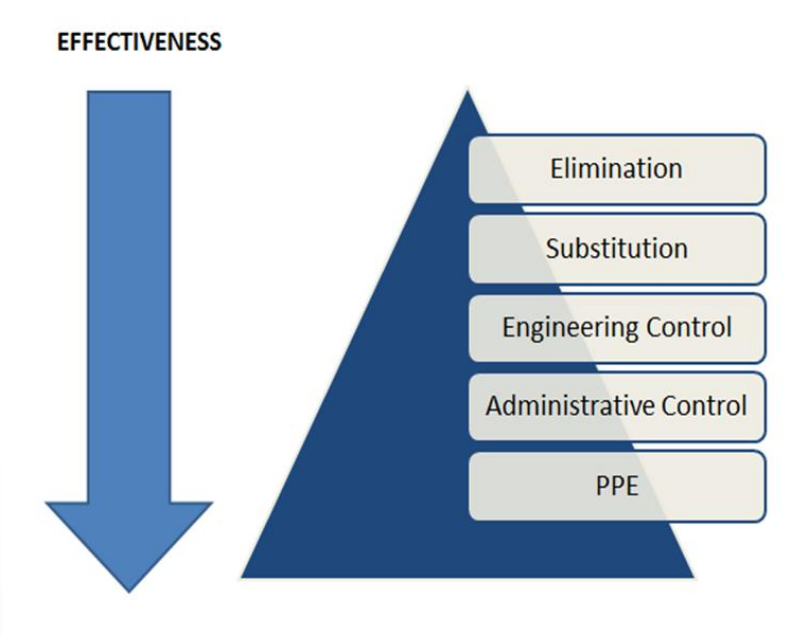
HIERARCHY OF HAZARD CONTROL

"the team shall develop written recommendations to eliminate hazards to the greatest extent feasible using first order inherent safety measures. The team shall develop written recommendations to reduce any remaining hazards to the greatest extent feasible using second order inherent safety measures. If necessary, the team shall also develop written recommendations to address any remaining risks in the following sequence and priority order:

(1) Effectively reduce remaining risks using passive safeguards;

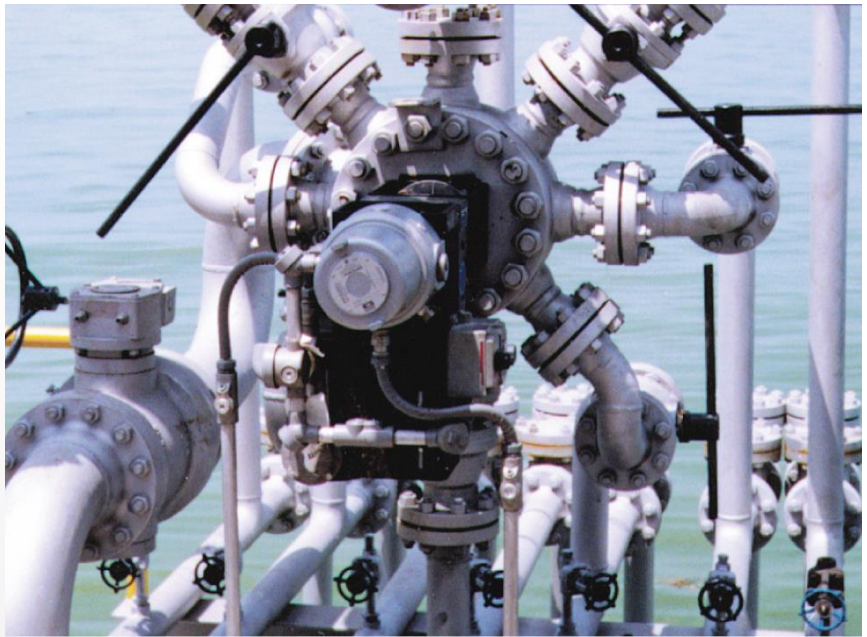
(2) Effectively reduce remaining risks using active safeguards;

(3) Effectively reduce remaining risks using procedural safeguards."



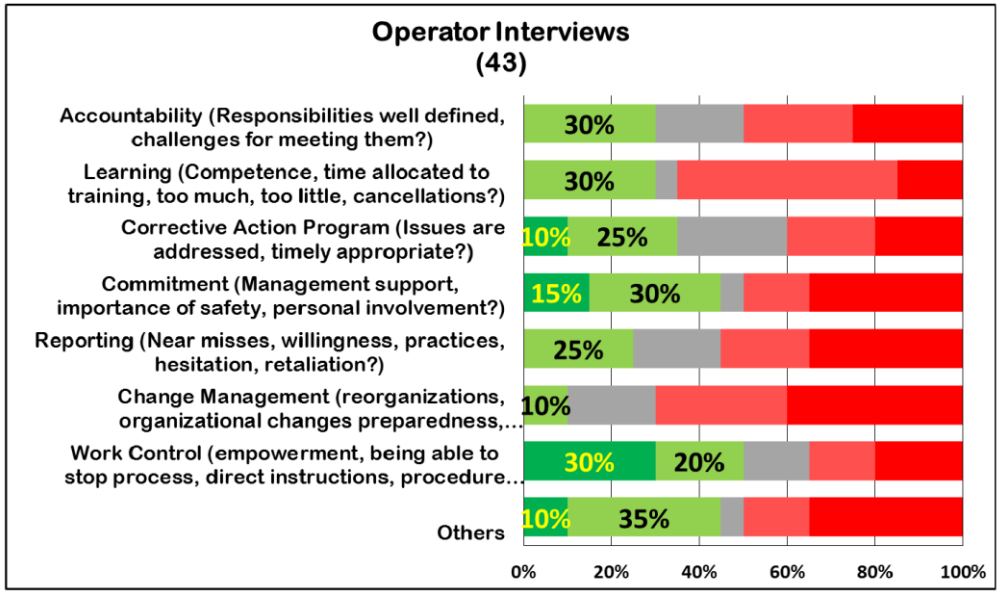
HUMAN FACTORS PROGRAM

- Designing machines, operations, and work environments so they match human capabilities, limitations, and needs. Environmental, organizational, and job factors and characteristics, such as fatigue, that can affect health and safety.
- 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 included in all PHAs, incident investigations, operating and maintenance procedures, and for major changes and organizational changes.
- Program must include:
  - Training, operating, and maintenance procedures.
  - Staffing, shiftwork, overtime, and fatigue.



PROCESS SAFETY CULTURE ASSESSMENT

- Values and behaviors resulting from a commitment by leaders and individuals to emphasize safety over competing goals.
- Conduct every 5 years, with a mid-term check on progress.
- Participation by employees and their representatives in all phases of the assessment.
- The stationary source manager, or his or her designee, must sign off on all process safety culture assessment reports and corrective action plans.



1. Reporting of safety concerns is encouraged;
2. Reward or incentive programs do not deter reporting of concerns or incidents;
3. Safety is not compromised by production pressures;
4. Effective safety leadership is promoted at all levels of the organization.

5189.1(V): PSM MANAGEMENT SYSTEM

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

(2) The employer shall develop and implement an effective written Process Safety Management (PSM) Program, which shall be reviewed and updated at least every three (3) years.

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

(4) The employer shall develop, implement and maintain an effective program to track and document process safety performance indicators.

5189.1(X): CORRECTIVE ACTION TIMELINES

- Recommendations transmitted from teams to management within 14 days.
- Management accepts or rejects recommendations and develops corrective actions.
- Most corrective actions must be completed within $2^1/_2$ years after completion of the analysis or review, or at the next turnaround.
- Issues from compliance audits or incident investigations must be corrected within $1^1/_2$ years.
- Process safety hazards must be corrected promptly.

HTTP://WWW.DIR.CA.GOV/DOSH/PSM-UNIT.HTML