

**OCCUPATIONAL SAFETY  
AND HEALTH STANDARDS BOARD**

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**NOTICE OF PROPOSED RULEMAKING****CALIFORNIA CODE OF REGULATIONS**

TITLE 8: Chapter 4, Subchapter 7, Article 109  
(Published July 15, 2016)

New Section 5189.1 of the General Industry Safety Orders  
[Process Safety Management for Petroleum Refineries](#)

**NOTICE IS HEREBY GIVEN** that the Occupational Safety and Health Standards Board (Board) proposes to adopt the proposed regulations governing Process Safety Management (PSM) for petroleum refineries. These regulations are found in Subchapter 7, General Industry Safety Orders (GISO) of Chapter 4, commencing with New Section 5189.1, of Title 8 of the California Code of Regulations (CCR).

**PUBLIC HEARING**

The Board will hold a public hearing starting at 10:00 a.m. on September 15, 2016, in the Auditorium of the State Resources Building, 1416 9<sup>th</sup> Street, Sacramento. At this public hearing, any person may present statements or arguments orally or in writing relevant to the proposed action described in the Informative Digest. The Board requests, but does not require, that people who make oral comments at the hearing also submit a written copy of their testimony at the hearing.

**WRITTEN COMMENT PERIOD**

In addition to written or oral comments submitted at the public hearing, written comments may also be submitted to the Board's office. The written comment period commences on July 15, 2016 and closes at 5:00 p.m. on September 15, 2016. Comments received after that deadline will not be considered by the Board unless the Board announces an extension of the time in which to submit written comments.

Written comments can be submitted as follows:

- By mail to Sarah Money, Occupational Safety and Health Standards Board, 2520 Venture Oaks Way, Suite 350, Sacramento, CA 95833; or
- By fax at (916) 274-5743; or
- By e-mail to [oshsb@dir.ca.gov](mailto:oshsb@dir.ca.gov).

**AUTHORITY AND REFERENCE**

Labor Code (LC) Section 142.3 establishes the Board as the only agency in the state authorized to adopt occupational safety and health standards. In addition, Labor Code Section 142.3 requires the adoption of occupational and health standards that are at least as effective as federal occupational safety and health standards. Labor Code Section 7856 mandates the adoption of process safety management standards

for refineries. The proposed regulations implement, interpret, and make specific Labor Code Section 7856.

### **INFORMATIVE DIGEST/POLICY STATEMENT OVERVIEW**

The federal Clean Air Act Amendments of 1990 [42 U.S.C. Section 7412(r)] directed the federal Occupational Safety and Health Administration (OSHA) and the United States Environmental Protection Agency (EPA) to develop regulations to prevent accidental chemical releases. These became known as the Process Safety Management (PSM) and Risk Management Plan (RMP) regulations, respectively. On February 24, 1992, OSHA published a Final Rule for *Process Safety Management of Highly Hazardous Chemicals* (57, Fed. Reg., 6356, February 24, 1992), codified as 29 CFR Section 1910.119.

The Department of Industrial Relations (DIR) subsequently adopted a PSM standard (CCR Title 8, Section 5189) pursuant to its mandate to adopt standards that are at least as effective as federal standards. Section 5189 is substantially the same as the federal counterpart, in that it addresses the prevention of catastrophic releases of toxic, reactive, flammable, and explosive chemicals and applies to employers who use a process involving a particular chemical (or chemicals) at or above certain threshold quantities (listed in Appendix A) or a flammable liquid or gas as defined in subsection (c) of the regulation.

Since 1992, California's PSM standard has covered approximately 1,500 facilities in the state that handle or process certain hazardous chemicals including its 12 oil refineries, which process approximately two million barrels of crude oil per day into gasoline, diesel fuel, jet fuel, and chemical feedstocks.

Following a chemical release and fire at the Chevron refinery in Richmond, CA, on August 6, 2012, the Governor's Interagency Working Group on Refinery Safety prepared a report raising concerns and recommendations about the safety of California's oil refineries. The report recommended the establishment of an Interagency Refinery Task Force to: (1) coordinate revisions to the state's PSM regulations and California Accidental Release Program (Cal/ARP) regulations; (2) strengthen regulatory enforcement; and (3) improve emergency preparedness and response procedures.

In accordance with the recommendations of the report, the Division of Occupational Safety and Health (known as Cal/OSHA), a division of DIR, is promulgating a new PSM regulatory proposal for oil refineries, GISO Section 5189.1. The proposal implements the recommendations of the report and other PSM elements that safety experts have learned over the past two decades are essential to the safe operation of a refinery. These beneficial elements include: applying a *hierarchy of controls* to implement first- and second-order inherent safety measures; conducting *damage mechanism reviews*; applying rigorous *safeguard protection analyses*; integrating *human factors* and *safety culture assessments* into safety planning; *involving front-line employees* in decision-making; conducting *root-cause analysis* following significant incidents; and performing comprehensive *process hazard analyses*.

The refineries operating in California have adopted many of these practices over the past decade, with significant improvements in safety performance; however, the industry continues to experience significant upset events.<sup>1</sup>

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<sup>1</sup> U.S. Department of Energy, Office of Electricity Delivery and Energy Reliability, *Energy Assurance Daily*, available at <http://www.oe.netl.doe.gov/ead.aspx> (accessed December 9, 2014). (Note: For weekly summaries, go to "Download EADs" and scroll to "Petroleum.")

The regulatory proposal sets safety performance standards for refinery employers and ensures that those standards are met through improvements in transparency, accountability, worker participation, and enforcement.

The Board evaluated the proposed regulations pursuant to Government Code section 11346.5(a)(3)(D) and has determined that the regulations are not inconsistent or incompatible with existing state regulations. This proposal is part of a system of occupational safety and health regulations. The consistency and compatibility of that system's component regulations is provided by such things as: (1) the requirement of the federal government and the Labor Code to the effect that the State regulations be at least as effective as their federal counterparts, and (2) the requirement that all state occupational safety and health rulemaking be channeled through a single entity (the Standards Board).

### **THE GOVERNOR'S REPORT**

Governor Jerry Brown convened the Interagency Working Group on Refinery Safety, consisting of representatives from thirteen state, federal, and local agencies and departments. The Working Group examined strategies to improve public and worker safety through enhanced oversight of refineries and to strengthen emergency preparedness in anticipation of any future incident. The Working Group issued its report in February 2014, recommending changes in the PSM standard that would require petroleum refineries to:

1. Implement inherently safer systems to the greatest extent feasible
2. Perform periodic safety culture assessments
3. Incorporate damage mechanism hazard reviews into process hazard analyses
4. Conduct root-cause analyses after significant accidents or releases
5. Account for human factors and organizational changes
6. Use structured methods, such as layer of protection analysis, to ensure adequate safeguards in process hazard analyses.

The Governor's Office directed the relevant agencies, including DIR, to respond to these and other recommendations in the report with regulatory changes.

New regulatory requirements to implement these and other recommendations appear in the 24 subsections of the proposed PSM regulation for petroleum refineries, GISO Section 5189.1. These changes represent a comprehensive safety performance standard for the state's refinery sector that prioritize implementation of inherently safer systems to reduce the risk of incidents and eliminate or minimize process safety hazards to which employees may be exposed.

### **STAKEHOLDER INPUT**

In developing revisions to the PSM regulations, DIR conducted extensive outreach to industry, refinery workers, community-based organizations, and the public. During 2014-15, 26 meetings and hearings were held to discuss process safety and elicit participant input. Four of these meetings involved DIR's PSM Advisory Committee, whose membership comprised invited representatives of labor and industry. All Advisory Committee meetings were open to the public.

The final text of the proposed regulations incorporates the significant improvements suggested by labor, industry, associations, academia, and the public.

### **DISCLOSURES REGARDING THE PROPOSED ACTION**

**Cost or Savings to any State Agency:** DIR Cal/OSHA PSM Unit will enforce the proposed regulations and has contemplated the associated cost of enforcement. The California Legislature approved a budget that added new inspector positions to this unit, which are user funded through Cal/OSHA's fee authority. DIR will implement the proposed regulations using currently approved resources and staffing levels. If ongoing monitoring of workload and performance indicates a need for additional resources to meet the requirements, a budget change proposal will be prepared and submitted in accordance with standard Department of Finance protocol.

**Cost to any Local Agency or School District which must be Reimbursed in Accordance with Government Code Sections 17500 through 17630:** None.

**Other Nondiscretionary Cost or Savings Imposed on Local Agencies:** None.

**Cost or Savings in Federal Funding to the State:** None.

#### **Cost Impacts on a Representative Private Person or Business:**

In recent years, gasoline consumption in California has averaged about 14.5 billion gallons per year. California requires a unique reformulated gasoline blend to meet the state's pollution control requirements. Gasoline made in other states to meet other state and federal pollution requirements does not meet California standards. Consequently, all gasoline consumed in California is typically refined in the state. Therefore, California refiners' cost of implementing the proposed regulations can be distributed over the cost to consumers of purchasing 14.5 billion gallons of California gasoline.

Spreading the \$58 million estimated cost of the regulations across this volume of sales indicates an increase in price of about \$0.004, or slightly less than half a cent per gallon. The lower estimate of \$20 million reduces this impact to \$0.0014 or about 1/7 of a cent, while the upper estimate of \$183 million increases the impact to \$0.013, or 1.3 cents per gallon. Aggregating this to calculate the impact on the average adult Californian yields an estimated cost per person of about \$2 per year, with a low estimate of \$0.68 and a high estimate of \$6.20 per person per year.

**Statewide Adverse Economic Impact Directly Affecting Businesses and Individuals: Including the Ability of California Businesses to Compete:** DIR makes an initial determination that the action will not have a significant, statewide adverse economic impact directly affecting business, including the ability of California businesses to compete with businesses in other states. The estimated costs of the proposed regulations are relatively small compared to the size of the industry (\$131 billion per year and the fourth-largest industry by output in the state).

Based on the economic modeling, refiners in California complying with the proposed PSM regulations will experience the advantage of cost avoidance due to the reduced likelihood and severity of a major refinery incident, such as the ExxonMobil incident in Torrance in 2015. This will reduce the cost

associated with lost output, which in the ExxonMobil incident had an estimated value of \$323 million (not including the additional equipment repair costs, which could not be estimated).

**Significant Effect on Housing Costs:** None.

#### **DETERMINATION OF MANDATE**

The Occupational Safety and Health Standards Board has determined that the proposed standard does not impose a local mandate. There are no costs to any local government or school district which must be reimbursed in accordance with Government Code Sections 17500 through 17630.

#### **SMALL BUSINESS DETERMINATION**

The Board has determined that the proposed regulations do not affect small businesses. Petroleum refineries are not considered small business under Government Code Section 11342.610(b)(9).

#### **RESULTS OF THE STANDARDIZED REGULATORY ECONOMIC IMPACT ANALYSIS**

##### ***The creation or elimination of jobs in the state.***

The proposed PSM and CalARP regulations will create an estimated 158 jobs in the state's petroleum refining sector (between 57 and 325 jobs), based on an estimated total compensation (generated by macroeconomic analysis software) in the California refinery sector of \$334,000 per employee and a total increase in labor costs of \$58 million. There is no associated elimination of jobs anticipated.

##### ***The creation of new businesses or the elimination of existing businesses in the state.***

There is no anticipated creation or elimination of businesses in California.

##### ***The competitive advantages or disadvantages for businesses currently doing business in the state.***

Based on the economic modeling, refiners in California complying with the proposed PSM regulations will experience the advantage of cost avoidance due to the reduced likelihood and severity of a major refinery incident, such as the ExxonMobil incident in Torrance in 2015. This will reduce the cost associated with lost output, which in the ExxonMobil incident had an estimated value of \$323 million (not including the additional equipment repair costs, which could not be estimated).

##### ***The increase or decrease of investment in the state.***

Multiple stakeholder and advisory meetings with labor, industry, advocacy groups, and other agencies have contributed to the development of the proposed regulations. All input has been considered, and the current proposed regulations reflect a balanced, enforceable, and prevention-focused approach to reducing risks in this industry. There is no indication that the regulations will affect investment in California.

Given the expected annual loss of \$800 million to the California economy due to a costly major refinery incident, the proposed regulations will have to reduce the risk of a costly major incident by 7.3% to be economically justified. Additional sensitivity analysis was conducted to assess how varying expected amounts of annual loss affect the critical risk reduction values.

***The incentives for innovation in products, materials, or processes.***

The proposed regulations require the establishment of several programs that drive refiners to analyze and implement processes and select materials that offer the highest levels of risk reduction. The inherent safety requirements promote an approach to safety that focuses on eliminating or reducing the hazards associated with certain 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 than a process with only passive, active, or procedural safeguards. The process of identifying and implementing inherent safety in a specific context is known as “inherently safer design.” Examples of how innovation is incentivized are described in the prioritized approaches to safety:

- **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 nontoxic.
- **Second-Order Inherent Safety Measure**—a measure that effectively reduces risk by reducing the severity of a hazard or the likelihood of a release, without the use of additional safety devices. 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 levels of pressure.

***The benefits of the regulations, including, but not limited to, benefits to the health, safety, and welfare of California residents, worker safety, environment and quality of life, and any other benefits identified by the agency.***

The proposed regulations may improve safety at California refineries, which will in turn result in fewer major process incidents and fewer releases of hazardous materials from refineries. Because the number of major refinery incidents may be reduced under the proposed regulation, it could provide safety and health benefits to workers and the public in nearby communities as well as other economic benefits for businesses. The proposed regulations will also increase the openness and transparency of business and government.

**Department of Finance Comments and Responses**

1. Please specify the costs of implementing and enforcing the proposed regulations for state level agencies.

For PSM, as documented in the STD 399: Fiscal Impact Statement B.4.: DIR will implement the proposed regulations using currently approved resources and staffing levels. If additional resources are determined to be necessary, a budget change proposal will be submitted to DOF.

2. What can be shared with readers regarding the efficacy of the Safety Case Regime that is proposed as Alternative #2?

As noted in Improving Public and Worker Safety at Oil Refineries Report of Governor Brown's Interagency Working Group on Refinery Safety  
<https://www.calepa.ca.gov/files/2016/10/Publications-Reports-2014yr-RefineryRpt.pdf>, p.10:

RAND Corporation Findings. The RAND Corporation prepared a memo, Refinery Process Safety Performance and Models of Government-Industry Relations, discussing some of the issues involved in considering new models of industry regulation. RAND suggested that Cal/OSHA could move in the direction of the safety case approach, but noted that evidence to date on whether the safety case has improved performance is mixed, and that implementing this approach would require significantly greater division resources than currently employed. The memo suggests that Cal/OSHA adopt an incremental approach for transitioning to the safety case, perhaps by expanding the Contra Costa County Industrial Safety Ordinance. The memo also discussed the desirability of developing lagging and leading indicators of refinery performance and suggested that this be done through a collaborative industry-labor process. RAND Corporation testimony is available at [http://www.rand.org/content/dam/rand/pubs/testimonies/CT300/CT392/RAND\\_CT392.pdf](http://www.rand.org/content/dam/rand/pubs/testimonies/CT300/CT392/RAND_CT392.pdf) (see .5 in particular for relevant discussion).

### **CONSIDERATION OF ALTERNATIVES**

#### **Alternative 1: Maintain status quo**

One alternative considered was continued enforcement of petroleum refineries under the existing PSM regulation without revising the requirements. In the past four years, there have been two major incidents (Chevron in 2012 and Exxon in 2015). Per the Governor's Task Force Report, existing law, regulation, and level of staffing were unable to forestall the Chevron incident and more needs to be done to prevent future incidents of similar or worse consequences. Since 2012, Cal/OSHA has increased enforcement staffing from 4 to 10 safety inspectors dedicated to refineries. The additional level of safety achieved through the increased enforcement efforts will be maintained under the current PSM requirements. The costs associated with the continued enforcement or status quo under the existing regulation reflect an unknown but anticipated number of incidents that may happen in the absence of the requirements and tools provided in the proposed new PSM regulation. These consequences are largely untenable, given the levels of incidents experienced in the recent years.

#### **Alternative 2: Safety Case Model**

California's existing model of work safety regulation in process safety management emphasizes investigating serious accidents that have occurred. As examined by the RAND Center for Health and Safety in the Workplace, over the last 25 years, a perspective has developed that argues that the models currently used—nationwide and in California—are inadequate to ensure safety at very complex facilities, especially those characterized by risks that have low frequency but very high disaster potential. This perspective emerged first in Europe, triggered by disasters in the North Sea and at Seveso (RAND 2013). The former led the United Kingdom and Norway to develop a "safety case" approach to regulating off-shore oil platforms in the 1990s, an approach that later expanded to other high-hazard process industries.

The "safety case" approach involves considerably more resources in terms of time and agency inspectors. The Hazardous Facilities Unit, which oversees the United Kingdom with safety cases, typically

conducts several audits each year at refineries to assess their safety case activities. The safety case model requires facilities to explain what they will do in order to try to ensure their safety. The regulatory authority is charged with determining whether a facilities' explanation or effort is acceptable or effective. Most regulatory scrutiny goes to auditing the facility to determine whether it has been carrying out the activities called for in the safety case document. Although some contend that the safety case process leads to initial gains in hazard recognition and abatement, however, it must remain "a living document" in order to fulfill its objectives.

A concern with the safety case approach is that describing and documenting how a refinery will manage risks is not equivalent with actually managing risks. Further, augmenting oversight from the existing regulations to a level prescribed by the "safety case" approach would be largely infeasible given the related requisite resource demands for regulatory authorities. This approach is estimated to require a fourteen fold increase in staff for Cal/OSHA – from 10 inspectors statewide to 10 inspectors for each of California's 14 refineries. Additional costs for refineries would also be anticipated, given the significant changes this would necessitate in regulatory dynamics. For these reasons, the "safety case" model is not considered a reasonable alternative to the proposal.

In accordance with Government Code Section 11346.5(a)(13), the Board must determine that no reasonable alternative it considered to the regulation or that has otherwise been identified and brought to its attention would either be more effective in carrying out the purpose for which the action is proposed or would be as effective and less burdensome to affected private persons than the proposed action or would be more cost-effective to affected private persons and equally effective in implementing the statutory policy or other provision of law than the proposal described in this Notice.

The Board invites interested persons to present statements or arguments with respect to alternatives to the proposed regulation at the scheduled public hearing or during the written comment period.

#### **CONTACT PERSONS**

Inquiries regarding this proposed regulatory action may be directed to Marley Hart (Executive Officer) or Michael Manieri (Principal Safety Engineer) at the Occupational Safety and Health Standards Board, 2520 Venture Oaks Way, Suite 350, Sacramento, CA 95833; (916) 274-5721.

#### **AVAILABILITY OF STATEMENT OF REASONS, TEXT OF THE PROPOSED REGULATIONS AND RULEMAKING FILE**

The Board will have the entire rulemaking file available for inspection and copying throughout the rulemaking process at its office at the above address. As of the date this notice is published in the Notice Register, the rulemaking file consists of this notice, the proposed text of the regulations, the Initial Statement of Reasons, supporting documents, or other information upon which the rulemaking is based. Copies may be obtained by contacting Ms. Hart or Mr. Manieri at the address or telephone number listed above.

#### **AVAILABILITY OF CHANGED OR MODIFIED TEXT**

After holding the hearing and considering all timely and relevant comments received, the Board may adopt the proposed regulations substantially as described in this notice. If the Board makes modifications which are sufficiently related to the originally proposed text, it will make the modified text (with the changes clearly indicated) available to the public at least 15 days before the Board adopts the regulations as revised. Please request copies of any modified regulations by contacting Ms. Hart or Mr.



Manieri at the address or telephone number listed above. The Board will accept written comments on the modified regulations for at least 15 days after the date on which they are made available.

**AVAILABILITY OF THE FINAL STATEMENT OF REASONS**

Upon its completion, copies of the Final Statement of Reasons may be obtained by contacting Ms. Hart or Mr. Manieri at the address or telephone number listed above or via the internet.

**AVAILABILITY OF DOCUMENTS ON THE INTERNET**

The Board will have rulemaking documents available for inspection throughout the rulemaking process on its web site. Copies of the text of the regulations in an underline/strikeout format, the Notice of Proposed action and the Initial Statement of Reasons can be accessed through the Standards Board's website at <http://www.dir.ca.gov/oshsb>.