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Joint Legislative Budget Committee
1020 N Street, Room 553
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Attention: Ms. Peggy Collins

Joint Legislative Budget Committee Members:

Senator Mark Leno (Chair)
Senator Patricia C. Bates
Senator Jean Fuller
Senator Ricardo Lara
Senator Holly J. Mitchell
Senator Bill Monning
Senator Jim Nielsen
Senator Lois Wolk

Assembly Member Shirley N. Weber (Vice Chair)
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Assembly Member Melissa A. Melendez
Assembly Member Jay Obernolte
Assembly Member Philip Y. Ting

Subject: Status Report on Process Safety Management Regulatory Oversight

Pursuant to the Budget Act of 2014 (Provisions 1 and 2 of item 7350-001-3121, Chapter 25, Statutes of 2014), the Department of Industrial Relations (DIR) is pleased to report to the Director of Finance, the Joint Legislative Budget Committee, and the Legislative Analyst's Office on DIR and Cal/OSHA's efforts to design and implement a new approach to regulating the petroleum refining industry. This report is also available online at www.dir.ca.gov.

DIR is facilitating the enhanced coordination of oversight and enforcement activities of petroleum refineries with federal, state, and local agencies. Highlights of the implementation of the Process Safety Management (PSM) refinery program include the successful establishment of appropriate funding, staffing and training structures. A new assessment on the state's oil refineries, implemented by DIR in 2013, requires refineries to provide funding support to DIR for Cal/OSHA's PSM refinery program and is based on the number of barrels of oil processed each year as a percentage of the state's total. These funds, which are independent of the state's General Fund, have allowed DIR to expand the staffing of the PSM Unit from 10 positions in 2012 to 26 positions today. All of the newly hired staff came to Cal/OSHA

with substantial industry experience and/or advanced academic training in engineering and other relevant disciplines, including graduate-level training in science, law, and policy. The new funding has also supported eleven weeks of advanced technical training. Cal/OSHA will continue monitoring workload and inspection/enforcement needs to ensure staffing levels and fee amounts are sufficient to support enforcement efforts.

New regulations are also in progress with a goal of adopting a new PSM regulation that is practical, meaningful, and legally enforceable. DIR and the California Environmental Protection Agency (CalEPA) are working together to incorporate elements of process safety management that experts have learned over the last two decades are essential to the safe operation of refineries.

The ultimate goal of this increased engagement is to lower the number of accidents, explosions, and other unplanned events at refineries, provide greater safety protection for refinery employees and their many contractors, and provide greater protection of community residents.

Sincerely,

A handwritten signature in cursive script that reads "Christine Baker". The signature is written in a dark ink and is positioned below the word "Sincerely,".

Christine Baker
Director

Attachment

Status Report
Process Safety Management Regulatory
Oversight

California Department of Industrial Relations
Christine Baker, Director

April 2015



EXECUTIVE SUMMARY

This report is prepared pursuant to Provisions 1 and 2 of item 7350-001-3121 of the 2014 Budget Act (Chapter 25, Statutes of 2014) (see Attachment 1). It summarizes the efforts of the Department of Industrial Relations (DIR) and Cal/OSHA to design and implement a new approach to regulating the petroleum refining industry. This report is respectfully submitted to the Director of Finance, the chairpersons of the fiscal committees of both houses of the Legislature, and the Legislative Analyst's Office.

A report by the Governor's Interagency Working Group on Refinery Safety, issued in February 2014, raised concerns about the safety of the state's petroleum refineries. The report called for the establishment of an Interagency Refinery Task Force to (1) coordinate revisions to the state's refinery safety regulations, known as the Process Safety Management (PSM), and to California Accidental Release Program (CalARP) regulations; (2) strengthen regulatory enforcement; and (3) improve emergency preparedness and response procedures.

DIR and the California Environmental Protection Agency (CalEPA) are working together to incorporate new elements of process safety management that safety experts and the industry itself have learned over the past two decades are essential to the safe operation of a refinery. These include applying a *hierarchy of controls* to identify the most robust and resilient process safety solutions, conducting comprehensive *damage mechanism reviews*, applying rigorous *safeguard protection analyses*, integrating *human factors* and *safety culture assessments* into safety planning, *involving employees* in decision-making, conducting *root cause analysis* following significant incidents, and organizing a comprehensive *process safety management system*.

In 2014, DIR convened or participated in over 20 stakeholder meetings with the petroleum refining industry, refinery workers, community-based organizations, and the public. At each of these meetings, DIR presented the findings and recommendations of the Governor's report and described DIR's proposed revisions to the PSM standard for refineries for discussion and feedback. Three of these meetings consisted of DIR's PSM Advisory Committee, made up of representatives of labor and industry. All twenty meetings were open to members of the public.

All of these meetings served as an important vehicle for accessing the technical expertise of refinery managers and workers, representatives of labor unions and community-based organizations, members of professional associations, and members of the public. Many of the recommendations generated in these meetings were incorporated into the PSM revisions. DIR will continue to work with the PSM Advisory Committee in 2015, with the goal of adopting a new PSM regulation that is practical, meaningful, and legally enforceable.

DIR has transformed the recommendations of the Governor's report into the following seven new elements of the revised PSM standard (General Industrial Safety Order 5189.1):

- 1) *Damage Mechanism Reviews*: Physical degradation, such as corrosion and mechanical wear, is often identified as the technical cause of serious process failures in the U.S. refinery sector; many of these incidents have resulted in fires, fatalities, and releases of hazardous substances. The refinery industry identifies physical degradation and other damage mechanisms through Damage Mechanism Reviews, which also include recommended corrective actions.
- 2) *Hierarchy of Hazard Controls Analysis*: In the face of competing demands and costs, refineries do not always choose the safest, most enduring technologies or materials when correcting hazards. For example, it is currently permissible for a refinery to provide splash suits and goggles to protect employees who work with acids, rather than installing a properly engineered, closed system that eliminates the risk of an acid splash. The Hierarchy discourages reliance by refineries on such procedural safeguards, which are implemented by management and considered to be the weakest approach to solving process safety problems.
- 3) *Human Factors*: Human factors include staffing levels, training and competency levels, fatigue and other effects of shift work, communication systems, the human-machine interface, and the general physical challenges of the work environment.
- 4) *Management of Organizational Change*: Refineries are continually implementing changes to operations, maintenance procedures, and personnel. This recommendation calls for procedures to ensure that plant safety is considered during personnel changes. Such changes can undermine plant safety, if, for example, employees are placed in positions for which they are not sufficiently trained, or if staffing is reduced to levels that do not allow for an adequate response to an emergency.
- 5) *Root Cause Analysis*: This type of analysis focuses on identifying the underlying causes of an incident and then recommending corrective actions to prevent a reoccurrence. For example, an incident that appears to be the result of worker inattention might, following a root cause analysis, reveal underlying pressures in the organization of the work environment that motivate workers to cut corners. The recommendations from the investigation would focus on these aspects of the work environment, rather than solely on strategies to improve worker vigilance.
- 6) *Safeguard Protection Analysis*: This is a structured analysis to assess the effectiveness of safeguards that are applied on a particular process. The goal

of the analysis is to ensure that the safeguards will prevent an initiating event from cascading into a major catastrophe. For example, if a loss of electrical power could lead to a failure of important safety instruments, such as temperature indicators, the safeguard analysis would identify the instruments that should be supported with back-up power systems, and it would require that those systems be brought on-line automatically in the event of a power failure.

- 7) *Safety Culture Assessments*: A group's culture reflects the attitudes, beliefs, perceptions, and values that employees share in relation to safety. If the group places a high value on safety, the group is said to have a "strong safety culture." Safety culture assessments are used to determine whether and to what extent management encourages a culture that values safety.

Currently refineries in California are complying, to varying degrees, with six of the seven elements listed above. Hierarchy of Hazard Controls Analysis is a relatively new concept, with which only refineries in Contra Costa County who are subject to the County's Industrial Safety Ordinance are fully familiar.

1. Implementation of Senate Bill 1300

In 2014, the Legislature passed and the Governor signed into law Senate Bill (SB) 1300, Refinery Turnarounds. Specifically, this bill requires refinery employers in California to report to Cal/OSHA annually (by September 15 of the current year) a schedule of “turnaround” maintenance periods planned for the following calendar year. During a turnaround, a unit is brought offline for maintenance and repair work. It is reported that refineries often have over a thousand workers (including refinery employees and contractors) performing multiple work activities simultaneously in limited spaces and on intensive work schedules, potentially creating unsafe conditions and work practices. Some of the most serious worker and process safety risks at refineries occur during turnarounds, particularly during the process of shutting down and restarting the unit.

In addition to the calendar of scheduled turnarounds, the bill requires refineries to submit specific documents and reports detailing the current maintenance and structural issues of the refinery unit where a turnaround will be conducted. Refineries will also be required to flag any scheduled maintenance and repairs of equipment being deferred to a later turnaround period. Based on Cal/OSHA’s experience, the rush to restart refinery units as soon as possible after a turnaround shutdown has at times caused necessary scheduled repair and maintenance work to be postponed or abandoned, allowing unsafe equipment to be restarted without repairs or replacement and resulting in worker injuries and deaths.

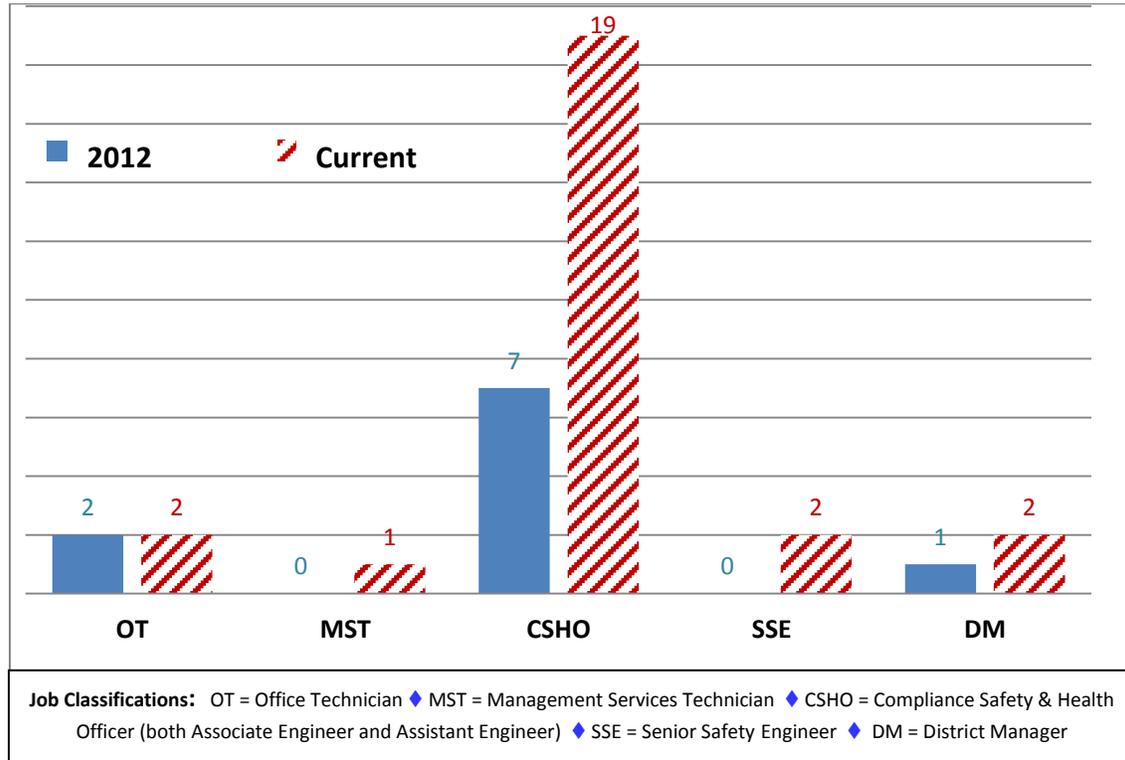
As a result of the detailed reporting requirements of SB 1300, Cal/OSHA’s inspectors will be able to review the refineries’ plans for scheduled work and ask for clarification when scheduled work is postponed or dropped. Cal/OSHA inspectors will also be on site continuously throughout the turnaround to observe the turnaround repairs and maintenance as they are performed. The ultimate goal of this increased oversight of turnarounds is to lower the number of accidents, explosions, and other unplanned events at refineries and to provide greater safety protection for refinery employees and their many contractors, as well as greater protection of community residents.

2. Staffing, Training, and Enforcement

A new assessment on the state's oil refineries, implemented by DIR in 2013, requires refineries to provide funding support to DIR for Cal/OSHA’s PSM refinery program. The assessment is based on the number of barrels of oil processed each year as a percentage of the state's total. These funds, which are independent of the state's General Fund, have allowed DIR to expand the staffing of the PSM Unit from 10 positions in 2012 to 26 positions today, including support personnel and Compliance Safety and Health Officers (CSHOs). Figure 1 shows the number of positions in the

PSM Unit before and after 2012. Cal/OSHA will continue monitoring workload and inspection/enforcement needs to ensure staffing levels and fee amounts are sufficient to support enforcement of existing Labor Code section 7870. Additionally, please see comments under Section 4, Next Steps.

Figure 1: PSM Unit Staffing Positions



All of the newly hired CSHOs came to Cal/OSHA with substantial industry experience and/or advanced academic training in engineering and other relevant disciplines. The new professional support staff includes personnel with graduate-level training in science, law, and policy.

Figure 2 provides detail on PSM staff by job classification, as of January 1, 2015. In addition to the 26 PSM Unit staff listed, the PSM Statewide Program Manager and Policy Advisor and two employees in the Director’s Office provide guidance and professional staff support, for a total of 29 staff devoted to the function.

When reviewing the staffing detail below it is important to note:

- The total number of 21 inspectors includes Assistant Safety Engineers, Associate Engineers, and Senior Safety Engineers.
- Senior Safety Engineers are an integral component of the division’s core strategy to conduct comprehensive Program Quality Verification (PQV) inspections of all PSM facilities (see page seven for additional information regarding PQV inspections).

Figure 2: PSM Unit Statewide Staffing Levels (as of January 1, 2015)

Current Staffing	Office Technician	Management Services Technician	Assistant Safety Engineer (CSHO)	Associate Safety Engineer (CSHO)	Senior Safety Engineers	District Manager	Total
PSM Unit North	1	1	1	10	1	1	15
PSM Unit South	1	0	0	7	1	1	10
Vacant				1*			1
Total	2	1	1	18	2	2	26

*This vacancy will be filled by the end of April 2015.

The new funding has also supported PSM training for the new cohort of CSHOs. Before entering the field to conduct a PSM inspection, all newly hired CSHOs received eleven weeks (600 hours for each CSHO) of intensive technical training. Figure 3 shows the breakdown of those hours by course title.

Figure 3: Breakdown of Intensive Technical Training by Course Title and Hours

Course	Title	Hours
Federal OSHA PSM 3300	PSM for Refineries	40
Federal OSHA PSM 3400	PSM for Chemical Facilities	40
Federal OSHA PSM 3430	Advanced PSM	80
Center for Chemical Process Safety	Advance PSM Methods	40
PSM Field Operations	Refinery and Chemical Facilities	170
Cal/OSHA Operations	Enforcement Procedures	230
Total		600

Prior to 2013, inspections of the state's high hazard process industries were limited by time and resource constraints. In most cases, a single Cal/OSHA CSHO conducted two to three planned refinery inspections per year, in addition to responding to complaints, accidents, and referrals. Planned inspections typically focused on one element of the PSM standard, such as Operating Procedures, usually in a single unit of the refinery. The inspection required about 80 hours over two weeks to complete.

In 2014, as new CSHOs were hired and trained, activities increased in the PSM Unit, and the inspections became far more thorough. By late 2014, after hiring and training new CSHOs and coordinating efforts with the Refinery Safety Task Force, the PSM Unit began deploying three to four CSHOs and a Senior Safety Engineer to planned inspections, joined by one or more compliance officers from Contra Costa or

Los Angeles County, the regional Air Quality Management District, and the U.S. EPA. For some inspections, the collaboration has now increased to eight or nine compliance officers.

In the 2014 Calendar Year, the PSM Unit conducted 37 refinery inspections, two of which were planned Program Quality Verification (PQV) inspections (see Figure 4). A PQV inspection is a multi-point inspection in an establishment covered by the PSM regulation, performed by compliance personnel who have successfully completed Cal/OSHA's sponsored or approved PSM Training. The PQV inspection is more thorough than any other inspection performed by the division and entails a comprehensive evaluation of the establishment's "program", the "quality" of the establishment's procedures compared to the recognized and generally accepted good engineering practices (RAGAGEP), and "verification" of the effectiveness of the establishment's program implementation.¹

Figure 4: PQV Refinery Inspections Conducted in Calendar Year 2014

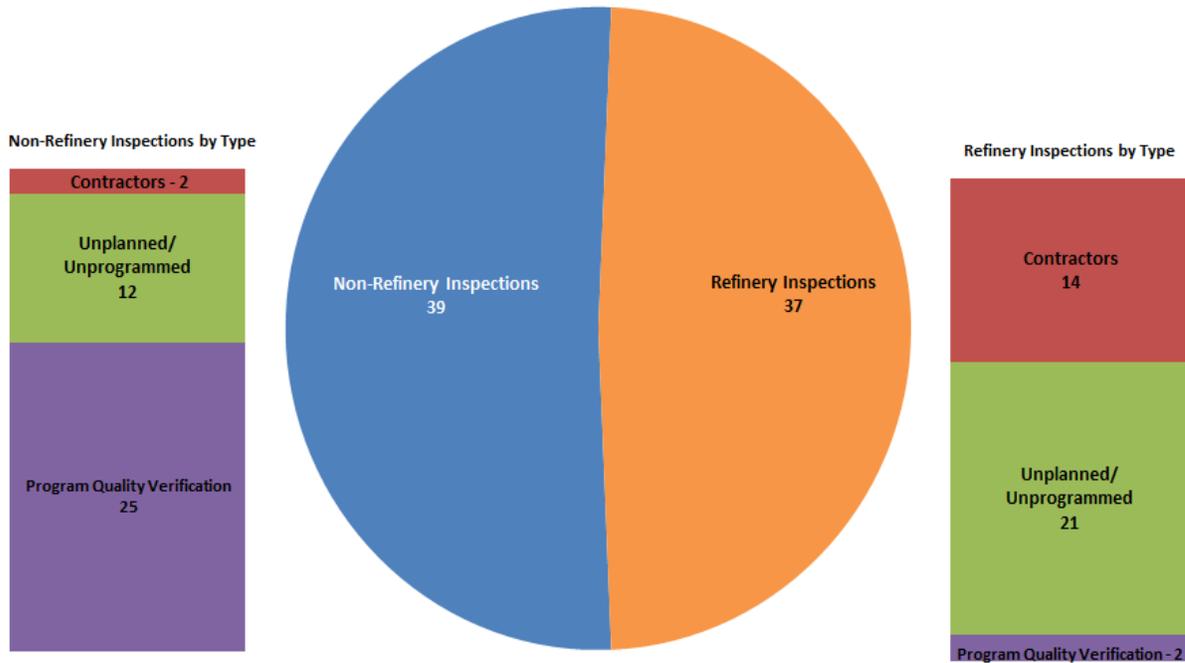
Case	Facility	Opening Date	Inspection hours
1	Exxon Mobile	5/30/2014	2,096
2	Chevron Richmond Refinery	7/14/2014	1,413

The PSM Unit plans to conduct four PQV refinery inspections each year beginning in 2015. In addition, the PSM Unit is expecting to perform four focused turnaround inspections per year.

California is also home to about 1,500 non-refinery industrial facilities that handle or process anywhere from 50 to 120 million pounds of hazardous chemicals. These facilities include, but are not limited to, ammonia refrigeration, water treatment and waste water treatment, chemical plants, and explosive manufacturers. All of these facilities fall under the jurisdiction of the PSM Unit. In the 2014 Calendar Year, the PSM Unit conducted 39 non-refinery inspections. See Figure 5 below for a complete breakdown of both refinery and non-refinery inspections.

¹ Due to the overall scope, depth, and superior quality of the PQV inspection, these inspections have replaced the National Emphasis Program (NEP) and Special Emphasis Program (SEP) inspections as a key component in the division's overall inspection strategy. NEP and SEP inspections will still be conducted on a situational basis as required by Federal OSHA and/or as determined necessary by the PSM Statewide Manager and Policy Advisor respectively, but PQV and Turnaround inspections, in conjunction with other planned and unplanned inspections (including but not limited to follow up inspections), will help ensure that every refinery is inspected on a three-year inspection cycle.

Figure 5: Refinery and Non-Refinery Inspections in the 2014 Calendar Year.



To target non-refinery PSM inspections on facilities that pose the greatest risks to workers and the public, DIR collaborated with the U.S. EPA to obtain access to risk information that is otherwise barred by the federal Chemical Safety Information Site Security and Fuels Regulatory Relief Act, among other restrictions. With the help of U.S. EPA Region IX, DIR gained access to these data in 2014 and has now ranked the 1,500 non-refinery PSM facilities in California on the basis of their risks to workers and the public. These risk estimates are derived from "worst case scenarios" self-reported by these facilities, pursuant to §112(r) of the Clean Air Act Amendments of 1990.

In Calendar Year 2015, the PSM Unit plans to conduct 40 PQV inspections of non-refinery sites, beginning with the highest-risk facilities. Each of these inspections will last between 100 to 300 hours. PSM staff will enforce the terms of the existing PSM standard (General Industry Safety Order 5189), since the PSM revisions (new, proposed General Industry Safety Order 5189.1) apply only to the refinery sector.

3. *Interagency Coordination of Oversight and Enforcement Activities*

DIR is taking the lead in developing enhanced coordination of oversight and enforcement activities of petroleum refineries with federal, state, and local agencies. In Calendar Year 2014, Cal/OSHA provided a total of 160 hours of PSM and Advanced PSM training to newly hired CSHOs, local Certified Unified Program Agencies (CUPA) representatives (i.e., representatives of local agencies certified by

the CalEPA to implement CalEPA Unified Program elements in the CUPA jurisdiction), U.S. EPA compliance officers, and County Hazardous Materials Technicians.

4. Next Steps

In 2015, DIR is coordinating an Interagency Enforcement Working Group to discuss the coordination of enforcement activities, including cross-referrals, cross-training, and joint or coordinated inspections and auditing. The working group will also identify the refineries to be targeted for inspection. Lastly, the group will discuss the facilitation and development of an electronic information and data sharing system among federal, state, and local agencies. This system will include information about inspections, compliance, and enforcement activity, as well as the means to collect information identified in reports and a process for timely flow of information between regulatory agencies.

DIR and Cal/OSHA will be submitting the proposed PSM changes, along with an economic analysis of those changes, to the Occupational Safety and Health Standards Board in 2015. This will initiate the process of formal rulemaking and public comment. After the Standards Board adopts the proposed changes, the new standard for refineries will be submitted to the Office of Administrative Law for approval. It is anticipated that the revised standard will go into effect in 2016.

In the interim, the existing PSM standard will be enforced, SB 1300 will be implemented, and the department's revised annual inspection plan will be executed (see Attachment 2). Ongoing analyses of workload demands will continue to be monitored during implementation of both the regulations and the new legislation. As determined necessary by the Administration, any additional needs to fulfill statutory requirements will be addressed in the future through the budget change proposal process as appropriate.

ATTACHMENT 1

Provisions 1 and 2 of item 7350-001-3121 of the 2014 Budget Act (Chapter 25, Statutes of 2014):

"DIR shall report on

- (a) The status of the Process Safety Management and Risk Management Program regulatory changes, and
- (b) The status of all efforts the department is making to implement recommendations of the final report from the Governor's Interagency Working Group on Refinery Safety."

"DIR shall report on

- (a) the status of the department's annual workload evaluation of the staffing needed to meet the enforcement requirements of Section 7870 of the Labor Code, for both refinery facilities and non-refinery facilities that meet the threshold for Cal-OSHA Process Safety Management regulatory oversight, and the aggregate fees needed to support the function,
- (b) the department's process or plan for categorizing non-refinery facilities that meet the threshold for Cal-OSHA Process Safety Management regulatory oversight by type of facility, risk level, and inspection cycles,
- (c) the number of staffing vacancies, by classification, within the Process Safety Management Unit, and
- (d) the number of inspections performed, to date, during the current fiscal year, by both type of facility and type of inspection."

ATTACHMENT 2

The annual number of inspections and hours of inspections reflect the division's PSM inspection strategy going forward.

Maximum Projected Workload 2015 (at full capacity)

Refinery

	# of Inspections	# of Hours	Avg. hours per Inspection
a/ Inspection Activities			
Unplanned Inspections: Complaints, Accidents, Referrals, and Follow up Inspections	25	6,194	248
PQV's Inspections	4	6,555	1,639
Refinery Turnaround Inspections (as per 1300)	4	4,370	1,092
Contractor Inspections Onsite (as per SB 1300 and SB54)	30	5,081	169
Total Inspections and hours in refineries	63	22,200	352

Non Refinery

	# of Inspections	# of Hours	Avg. hours per Inspection
a/ Inspection Activities			
Unplanned Inspections: Complaints, Accidents, Referrals, and Follow up Inspections	25	3,064	123
PQV's Inspections (as per Federal FAME Report)	40	8,166	204
Contractor Inspections (Dependent upon use of contractors onsite)	5	314	63
Total Inspections and Hours Non Refineries	70	11,543	165

a/ All hours listed include both direct and indirect inspector time

b/ Indirect inspection hours include, but are not limited to: field preparation, report preparation, abatement, verification, training, travel, and review/research of Recognized and Generally Accepted Good Engineering Practices (RAGAGEP)