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Hearing on "Work Place Safety and Worker Protections in the Gas and Oil Industry"
Before the Committee on Health, Education, Labor and Pensions
Subcommittee on Employment and Workplace Safety
United States Senate
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Chairman Murray, Ranking Member Isakson, and Honorable Members of the Committee:

Thank you for inviting me to participate in today's hearing. My name is Randy Sawyer.

Contra Costa County is located on the San Francisco Bay estuary. Contra Costa County is the home to four petroleum refineries and many small to medium chemical facilities. Many accidental releases from these facilities impacted the employees of these facilities and the surrounding communities during the 1990s. There was an average of one accident a year that resulted in a release or fire that caused the death of workers or had a major impact to the community. Members of the community, labor unions and the County's Board of Supervisors looked for solutions to this problem. Two major changes to how the County and industry operated occurred during this time. First was installation of the most integrated warning system in the Country and the second was implementation of the most encompassing accidental release prevention program in the Country.

History

Major Chemical Accidents and Releases

Below is a listing of major accidents and releases that occurred in the County during the 1990s.

- May 1992 lube spent acid was released and ignited and one worker died and another was seriously injured.
- August 1993 four to eight tons of sulfur trioxide was released that reacted with the water in the air to produce a sulfuric acid cloud and more than 20,000 people sought medical attention.
- September 1994 there was a release that occurred over 16 days that impacted the workers at the refinery and the surrounding community where more than 1,200 people sought medical attention at a special clinic established as a result of this release.
- June 1995 there was a crude unit fire where the refinery established alternative housing at a motel during and after the fire for more than 100 families.
- April 1996 there was a major release and fire at a catalytic gas unit that caused millions of dollars of damage at the facility.

- May 1996 there was an accidental release of hot coke[1] that ignited and caused millions of dollars of damage at the facility.
- January 1997 there was a runaway reaction at a hydrocracker unit, which caused increased temperatures and pressures and the outlet piping from the hydrocracker failed, killing one worker and injuring 46 contractor employees.
- February 1999 there was a flash fire at a crude unit where four employees died and one was seriously injured.
- March 1996 a six-inch valve failed at a gasoline process unit and a gas release occurred that exploded and ignited, causing millions of dollars of damage to the facility and smoke impacting the surrounding community.

There was also an accident that occurred at a non-chemical or petroleum refinery in which there was a dust explosion, resulting in the death of a worker and major damage at the facility. Since the 2000 accident a year after the Industrial Safety Ordinance became law, there has not has been an accident of this impact at a fixed facility.

Community Warning System

The County looked at how to alert and notify the surrounding community around an industrial site if there was a release or fire from the site that could impact area. The original concept was to develop local Traveler Information System radio stations, which could broadcast local emergency information; a telephone emergency notification system, which would call people with land lines downwind of a release; work with a local radio station to broadcast emergency information within Contra Costa County; and consider adding sirens in the industrial area of the County. After the 1993 release of sulfur trioxide, when more than 20,000 people sought medical attention, a committee was formed including eight community members, four industrial representatives, and three representatives from law enforcement, fire and health services to determine the best means to alert and notify the community during an incident. The committee visited industrial sites in Texas and Louisiana and met with warning system consultants to determine the best means to alert and notify the community as quickly and thoroughly as possible. The committee developed a report that looked at an "All Hazard" warning system, which they submitted to the County's Board of Supervisors in December 1993. The County accepted the report and created a Community Notification Advisory Board.

The Community Notification Advisory Board worked with the Contra Costa County Community Awareness and Emergency Response (CAER) Group to design and find funding for the final project. The Community Notification Advisory Board developed a means for funding to be paid for from the industries that handled acutely hazardous materials. A project manager was hired to oversee the project to completion. The final system includes activation computer terminals at the four refineries and two chemical facilities. The system can be activated with a push button from these six industrial sites

[1] Coke is a petroleum byproduct of some refineries. Coke is similar to coal. A delayed coker is one type of equipment that is used to produce this coke. The coke is formed in a delayed coker at high temperatures and then cooled. When the coke is cooled it is then dropped from the coker to a containment area below the delayed coker. This accident occurred when the coke was dropped before it was cooled properly, which caused a major fire.

that will sound sirens in the surrounding community, notify emergency response agencies, alert the surrounding community by broadcasting over the National Weather Service, activate the Emergency Alert System, send messages to the media using the California Emergency Digital Information System and call the community within 1,000 yards of the boundary of the community. The telephone area is modified when the wind direction is known and people who have registered their cell phones are called. The County has four locations where the system can activate different scenarios throughout the County. The four locations include the Contra Costa Health Services Hazardous Materials Programs, the Office of the Sheriff's Dispatch Center, the Office of the Sheriff's Community Warning System Offices, and the Contra Costa County Fire Protection District Dispatch Center. There are also terminals that can receive information at four other City Police Departments Dispatch Centers, the California Highway Patrol Bay Area Dispatch Center, the Bay Area Air Quality Management District's offices, and the San Ramon Valley Fire Protection District Dispatch Center. The Contra Costa Health Services Hazardous Materials Programs can also activate the Community Warning System from their hazardous materials response vehicles. This system was paid for by industry and given to the County in June 2001. There are three other notification levels that were developed and are detailed in the County's Hazardous Materials Incident Notification Policy that can be found at the following web address: http://www.cchealth.org/groups/hazmat/pdf/incident_notification_policy.pdf The Notification Policy describes the Community Warning System and when and at what level to notify the Contra Costa Health Services Hazardous Materials Programs.

Accident Prevention Programs

California passed one of the first accidental release prevention programs in the United Sates in 1986, which was called the Risk Management and Prevention Program. Contra Costa County started implementing this program in 1989. This program was a predecessor to the Federal Risk Management, OSHA's Process Safety Management, and the California Accidental Release Prevention Programs. If a facility handled some of the more toxic chemicals, which were called acutely hazardous materials, above a threshold they were required to develop and implement a Risk Management and Prevention Plan. In Contra Costa County, there was a 46% decrease in the highest amount of acutely hazardous materials that was handled between 1990 and 1994 to the amount of acutely hazardous materials that were handled at the end 1994 if sulfuric acid was not included. There were three chemical engineers with industrial experience who worked implementing this program in 1992 when Contra Costa County began auditing the regulated businesses for compliance with the law.

On January 1, 1997 California adopted the U.S. EPA's Risk Management Program and made it more stringent by adopting some of the requirements of the Risk Management and Prevention Program. The regulated communities that were required to submit a Risk Management Plan to the U.S. EPA by June 1999 were also required to submit a Risk Management Plan to the local Unified Program Agency. There were additional California-only regulated sources that were required to submit Risk Management Plans three years after the local Unified Program Agency requested them.

Because of the accidents that occurred in Contra Costa County during the 1990s, the community and the County Board of Supervisors wanted a more stringent accidental release prevention program than either the U.S. EPA or the Federal OSHA accidental release prevention programs. The County originally adopted what was called the "Good Neighbor" ordinance. This ordinance had some major faults and some of the petroleum refineries filed a lawsuit to stop its implementation. While the lawsuit was going through the court system, industry, the Paper, Allied Chemical, and Energy labor Union, and the County worked at finding an alternative to the "Good Neighbor" ordinance.

Industrial Safety Ordinance

In December 1998, the County passed the Industrial Safety Ordinance for facilities in the unincorporated areas of the County that became effective on January 15, 1999. Two years later, the City of Richmond adopted this ordinance for facilities in that City.

The Board of Supervisors passed the Industrial Safety Ordinance because of accidents that occurred at the oil refineries and chemical plants in Contra Costa County. The ordinance applies to oil refineries and chemical plants with specified North American Industry Classification System (NAICS) codes that were required to submit a Risk Management Plan to the U.S. EPA and are program level 3 stationary sources as defined by the California Accidental Release Prevention (CalARP) Program. The ordinance specifies the following:

- Stationary sources had one year to submit a Safety Plan to Contra Costa Health Services stating how the stationary source is complying with the ordinance, except the Human Factors portion.
- Contra Costa Health Services develop a Human Factors Guidance Document (completed January 15, 2000).
- Stationary sources had one year to comply with the requirements of the Human Factor Guidance Document that was developed by Contra Costa Health Services.
- For major chemical accidents or releases, the stationary sources are required to perform a root cause analysis as part of their incident investigations.
- Contra Costa Health Services may perform its own incident investigation, including a root cause analysis.
- All of the processes at the stationary source are covered as program level 3 processes as defined by the California Accidental Release Prevention Program.
- The stationary sources are required to consider Inherently Safer Systems for new processes or facilities or for mitigations resulting from a process hazard analysis.
- Contra Costa Health Services will review all of the submitted Safety Plans and audit/inspect all of the stationary source's Safety Programs within one year of the receipt of the Safety Plans (completed January 15, 2001) and every three years after the initial audit/inspection.
- Contra Costa Health Services will give an annual performance review and evaluation report to the Board of Supervisors.

The 2006 amendments to the Industrial Safety Ordinance requires or expands the following:

1. Expands the Human Factors to included Maintenance and all of Health and Safety

2. Requires the stationary sources to perform Safety Culture Assessments one year after the Hazardous Materials Programs develops guidance on the performing a Safety Culture Assessment (Safety Culture Assessment Guidance was completed November 9, 2009)
3. Perform Security Vulnerability Analysis

The seven stationary sources now covered by the County's Industrial Safety Ordinance are:
1. Air Products at the Shell Martinez Refining Company
2. Air Products at the Tesoro Golden Eagle Refinery
3. Shell Martinez Refining Company
4. General Chemical West in Bay Point
5. ConocoPhillips Rodeo Refinery
6. Tesoro Golden Eagle Refinery
7. Air Liquidé Large Industries

The City of Richmond Industrial Safety Ordinance are identical to the County's Industrial Safety Ordinance except the City of Richmond has not adopted the 2006 amendments. Two stationary sources are covered by the City of Richmond's Industrial Safety Ordinance:
1. Chevron Richmond Refinery
2. General Chemical West in Richmond

Human Factors Guidance

Regulated Sources are required to develop comprehensive human factors programs to include operations, Health & Safety, and maintenance departments. Comprehensive human factors programs must develop methods for evaluating and resolving active failures and latent conditions initiated within the following four dimensions or at the interfaces between the dimensions:

- Individuals (e.g., motivation, emotional states)
- The activity or task being conducted, including the procedures for the activity or task (e.g., routine, non-routine, written, practice, formal, informal)
- The physical environment (e.g., equipment) or workplace
- Management or organization (e.g., poor communication, reward and discipline system)

The goal of the guidance document is to develop the requirements from the Industrial Safety Ordinance to ensure that sources will evaluate and resolve failures and conditions initiated within the previous four dimensions. Stationary sources must identify potential unsafe acts or active failures occurring in hazardous circumstances. They must also assess the adequacy of their existing safeguards and incorporate improvements if necessary. Both of these requirements can be fulfilled by conducting traditional and possibly procedural Process Hazard Analyses. When incidents and accidents do occur, sources must perform incident investigations to identify the active failures and existing latent conditions that contributed to the incident. The latent

conditions[2] identified during the incident investigation must be incorporated into a program developed to manage and control latent conditions. Other programs must also be developed and implemented to manage and control latent conditions including a Management of Change[3] procedure to review staffing changes, a program for developing high quality procedures, and a program for developing a sound management system. Minimization of latent conditions should result in fewer unsafe acts or active failures or at least reduced risk from the unsafe acts and active failures that do occur.

Management of Organizational Change

The Human Factors section of the Industrial Safety Ordinance requires stationary sources to conduct a Management of Change prior to staffing changes for changes in permanent staffing levels/reorganization in operations or emergency response. Employees and their representatives shall be consulted in the Management of Change. The intent of this chapter is to identify those requirements that stationary sources must incorporate into their existing Management of Change procedure to satisfy these requirements. Stationary sources may elect to develop a separate Management of Change procedure for staffing changes. Primarily, the guidance document details requirements for identifying the technical basis for the organizational change and assessing the impact of the organizational change on safety and health. The requirements of this specified in the guidance document apply to:

- Reduction in the number of positions or number of personnel within those positions in operations, including engineers and supervisors with direct responsibilities in operations; positions with emergency response duties; and positions with safety responsibilities.
- Substantive increase in the duties in operations, including engineers and supervisors with direct responsibilities in operations; positions with emergency response duties; and positions with safety responsibilities (e.g., addition of equipment or instrumentation which significantly adds to the complexity of the system).
- Changes in the responsibilities of positions in operations, including engineers and supervisors with direct responsibilities in operations; positions with emergency response duties; and positions with safety responsibilities.

Each stationary source must develop criteria or guidance to assist appropriate personnel in determining “when” a Management of Change for an organizational change should be initiated.

Root Cause Analysis

The primary purpose of an incident investigation is to prevent reoccurrence through the identification and correction of the causal factors of the incident. The process of determining of the causal factors seeks to answer the basic questions about an incident:

[2] Latent conditions are underlying conditions that which can lead to an accident when some action combines with the underlying condition.

[3] Management of Change is a term that is used in the U. S. EPA Risk Management and Federal OSHA's Process Safety Management Programs referring how a facility manages change in their processes safely and ensuring that affected personnel are trained on the change.

- What happened?
- How did it happen?
- Why did it happen?

A root cause analysis is a systematic process that determines the causal factors, i.e., the events and conditions that are necessary to produce or contribute to an incident. The analysis develops what happened and how it happened, and then focuses on finding the underlying causes for why an incident happened by determining the causal factors of an incident. There are three types of causal factors:

- Direct cause
- Contributing causes
- Root causes

The direct cause of an incident is the immediate events or conditions that caused the incident. The direct cause addresses what happened. Contributing causes address how and why an incident happened. Contributing causes are causal factors that are events or conditions that collectively with other causes increase the likelihood of an incident but that individually did not cause the incident. The identification of root causes answers the question of why an incident happened. Root causes are the causal factors that if corrected, would prevent recurrence of the incident. Root causes can include system deficiencies, management failures, inadequate competencies, performance errors, omissions, non-adherence to procedures and inadequate organizational communication. Root causes are generally, but not always, attributable to an action or lack of action by a particular group or individual in the line organization. Root causes can be found at more than one level of an organization from management down through the first-line supervisors and to the worker.

As stated above, root causes may be found at the worker level. However, Contra Costa Health Services agrees with the guideline set forth in the Department of Energy Accident Investigation Workbook that a root cause of an accident can be found at the worker level if, and only if, the following conditions are found to exist:

- Management systems were in place and functioning, and provided management with feedback on system implementation and performance
- Management took appropriate actions based on the feedback
- Management, including supervision, could not reasonably have been expected to take additional actions based on their responsibilities and authorities.

Inherently Safer Systems

The intent of the Inherently Safer Systems requirements is that each stationary source, using good engineering practices and sound engineering judgment will incorporate the

highest level of reliable hazard reduction to the greatest extent feasible, to prevent Major Chemical Accidents and Releases[4].

"Inherently Safer Systems (ISS) means Inherently Safer Design Strategies as discussed in the 2008 Center for Chemical Process Safety Publication "Inherently Safer Chemical Processes" and means feasible alternative equipment, processes, materials, lay-outs, and procedures meant to eliminate, minimize, or reduce the risk of a Major Chemical Accident or Release by modifying a process rather than adding external layers of protection. Examples include, but are not limited to, substitution of materials with lower vapor pressure, lower flammability, or lower toxicity; isolation of hazardous processes; and use of processes which operate at lower temperatures and/or pressures."[5] "For all covered processes, the stationary source shall consider the use of inherently safer systems in the development and analysis of mitigation items resulting from a process hazard analysis and in the design and review of new processes and facilities."[6] The term inherently safer implies that the process is safer because of its very nature and not because equipment has been added to make it safer.[7]

2008 Center for Chemical Process Safety Publication Inherently Safer Chemical Processes has defined four categories for risk reduction:

- Inherent - Eliminating the hazard by using materials and process conditions which are nonhazardous; e.g., substituting water for a flammable solvent.
- Passive - Minimizing the hazard by process and equipment design features that reduce either the frequency or consequence of the hazard without the active functioning of any device; e.g., the use of equipment rated for higher pressure.
- Active – Using controls, safety interlocks and emergency shutdown systems to detect and correct process deviations; e.g., a pump that is shut off by a high-level switch in the downstream tank when the tank is 90% full. These systems are commonly referred to as engineering controls.
- Procedural – Using operating procedures, administrative checks, emergency response and other management approaches to prevent incidents or to minimize

[4] County Ordinance Code Section 450-8014(h) Major Chemical Accident or Release means an incident that meets the definition of a Level 3 or Level 2 incident in the Community Warning System incident level classification system defined in the Hazardous Materials Incident Notification Policy, as determined by Contra Costa Health Services; or results in the release of a regulated substance and meets one or more of the following criteria:

- Results in one or more fatalities
- Results in greater than 24 hours of hospital treatment of three or more persons
- Causes on- and/or off-site property damage (including cleanup and restoration activities) initially estimated at $500,000 or more. On-site estimates shall be performed by the regulated stationary source. Off-site estimates shall be performed by appropriate agencies and compiled by Health Service
- Results in a vapor cloud of flammables and/or combustibles that is more than 5,000 pounds

[5] County Ordinance Code Chapter 450-8, §450-8.014(g)

[6] County Ordinance Code Section 450-8.016(D)(3)

[7] Process Plants: A Handbook for Safer Design, 1998, Trevor Kletz

the effects of an incident; e.g., hot-work procedures and permits. These approaches are commonly referred to as administrative controls.

"Risk control strategies in the first two categories, inherent and passive, are more reliable because they depend on the physical and chemical properties of the system rather than the successful operation of instruments, devices, procedures, and people." The inherent and passive categories should be implemented when feasible for new processes and facilities and used during the review of Inherently Safer Systems for existing processes if these processes could cause incidents that that could result in a Major Chemical Accident or Release. The final two categories do require the successful operation of instruments, devices, procedures, and people. The concepts that are discussed in the CCPS book, Inherently Safer Chemical Processes, A Life Cycle Approach, for looking at active and procedural applications of risk reduction, should be used in developing recommendations and mitigations from process hazard analyses along with the inherent and passive categories. This is good risk reduction. These concepts should also be used in the review and application of human factors in the process hazard analysis of new and existing processes.

Approaches to consider Inherently Safer Systems include the following[8]:

- Minimization – Use smaller quantities of hazardous substances (also called Intensification).
- Substitute – Replace a material with a less hazardous substance.
- Moderate – Use less hazardous conditions, a less hazardous form of a material, or facilities that minimize the impact of release of hazardous material or energy (also called Attenuation or Limitation of Effects).
- Simplify– Design facilities that eliminate unnecessary complexity and make operating errors less likely, and that are forgiving of errors that are made (also called Error Tolerance).

The County's guidance on the review of Inherently Safer Systems is broken down into seven separate sections. The first section addresses new covered processes; the second section addresses existing processes; the third section addresses mitigations resulting from Process Hazard Analysis (PHA); the fourth section defines feasibility; the fifth section addresses recommendations from process hazard analyses; the sixth section addresses Inherently Safer System Reports; and the seventh section contains definitions. The ISS analyses must be performed for situations where a major chemical accident or release could reasonably occur.[9]

[8] CCPS, Inherently Safer Chemical Processes, A Life Cycle Approach, 1996

[9] Process Hazard Analysis methods determine the risk of a deviation or potential incident. The risk determination is based on a combination of the hazard (severity) of the potential incident and likelihood (probability) of an incident occurring. If the potential hazard (severity) of consequence of a deviation meets the definition of a Major Chemical Accident or Release an ISS Analysis should be done for those that could reasonably occur.

Safety Culture Assessment

Merriam-Webster defines “culture” as “the set of shared attitudes, values, goals and practices that characterizes an institution or organization.” Safety culture is a measure of the importance that individuals and organizations exhibit towards working safely. It is the summation of attitudes and actions workers do at 2 a.m. on a Sunday night when no one is watching. An organization can influence employees to embrace positive shared safety values with consistent policies and practices and by leading through example.

History is filled with tragic life-altering and -ending events that can be traced back to phrases like, “we’ve been doing it this way for years” or “this way is good enough.” This guidance document was prepared to help stationary sources identify pervasive attitudes or beliefs regarding risk tolerance in the work place. There is a correlation between improving safety culture and decreasing the number and severity of accidents.

Although stationary sources subject to Contra Costa County’s or the City of Richmond’s Industrial Safety Ordinances already frequently evaluate situations for “hidden” problems or latent conditions, safety culture is subtler and even more difficult to assess. A Safety Culture Assessment will enable a facility to understand where they are in terms of risk acceptance. Additional benefits of performing a Safety Culture Assessment include:

- Identify positive as well as negative aspects of the onsite health and safety program.
- Assist in identifying opportunities for improving health and safety.
- Another tool to improve facility personnel’s awareness and participation in health and safety.
- Identify perception gaps between managers, supervisors, and the workforce.
- Assist to demonstrate management’s commitment to safety by performing the assessment and visibly addressing the results.

Every company has a culture. Sometimes certain aspects of safety culture are more evident (e.g., using the proper personal protective equipment) and sometimes it is more of an undercurrent of how things are done (e.g., recommended hearing protection is absent when the ‘boss’ is not around). There will always be some element of risk in the workplace and in the work that is performed, but being cavalier about safety could lead to major problems beyond serious personal injury. Large facilities may have different cultures across departments, process units or even between shifts in the same process unit. Finding whether these differences exist is one of the challenges of the assessment. In general, the larger and more broad the population being assessed, the less evident these differences in perception may appear. For example, 10 similar perceptions from one workgroup may not be noticeable in a facility-wide survey of hundreds; whereas these same 10 perceptions out of a total work group size of 30 would stand out. Depending on the size of the facility, the following work groups should be assessed: management, supervisors, operators, maintenance, engineering, health and safety personnel and resident and applicable transient contractors. To better understand potential differences in behavior and develop improvement strategies, facilities should

consider identifying sub-work groups for the assessment between processing areas, shifts, crews, maintenance crafts or levels of management.

Performing an initial Safety Culture Assessment will give a company a baseline from which they can compare future assessments. Any Safety Culture Assessment represents only a snapshot in time. Since the safety culture of a company will change over time, only by performing multiple assessments can a company discover if the steps that were taken to improve safety are actually improving. If not, the company may need to adjust and focus future improvement topics.

The primary goal of a Safety Culture Assessment is to assess individual and group values towards safety and risk tolerance. An ultimate goal for each facility should be to assess values toward safety and risk tolerance associated with each work group. One objective of the Safety Culture Assessment is to gauge the commitment and effectiveness of an organization's health and safety management program by evaluating attitudes, perceptions, competencies and patterns of behavior. Once these issues are known, a facility can direct the design, execution, evaluation and continuous improvement in the work environment to affect changes to safety-related behaviors and attitudes that ultimately minimize accidents.

More information on Contra Costa County's Safety Ordinance, including the Industrial Safety Ordinance Guidance Document can be found at the following web page: http://www.cchealth.org/groups/hazmat/industrial_safety_ordinance.php

Auditing Regulated Stationary Sources

Contra Costa Health Services has six engineers with industrial experience dedicated to the California Accidental Release Prevention Program and the Industrial Safety Ordinance. When an audit occurs at a petroleum refinery, it can take five engineers four weeks to complete the audit. The audit includes a review of the policies and procedures establishing the prevention elements that are required, review of the documents ensuring that the policies and procedures are being implemented as designed, interviewing operators and maintenance personnel to see if what is on paper is what is occurring in the plants, and to perform field evaluations. The purpose of the audits is to ensure that the programs in place meet the requirements of the California Accidental Release Prevention Program and the Industrial Safety Ordinance.

The audit includes 430 questions, the findings from the audit team, determination if the facility is in compliance with the requirement, actions to come into compliance, if out of compliance, proposed remedy, and a schedule to meet compliance. The proposed remedies and schedule are developed by the regulated stationary source and reviewed by the lead auditor. The regulated stationary source has ninety days to come up with a plan of action that is agreed upon by the auditing team. Follow-up on the actions being taken by the regulated source is reviewed during the next audit or during unannounced inspections. Below is an example of one of the questions with the proposed remedies from the regulated source.

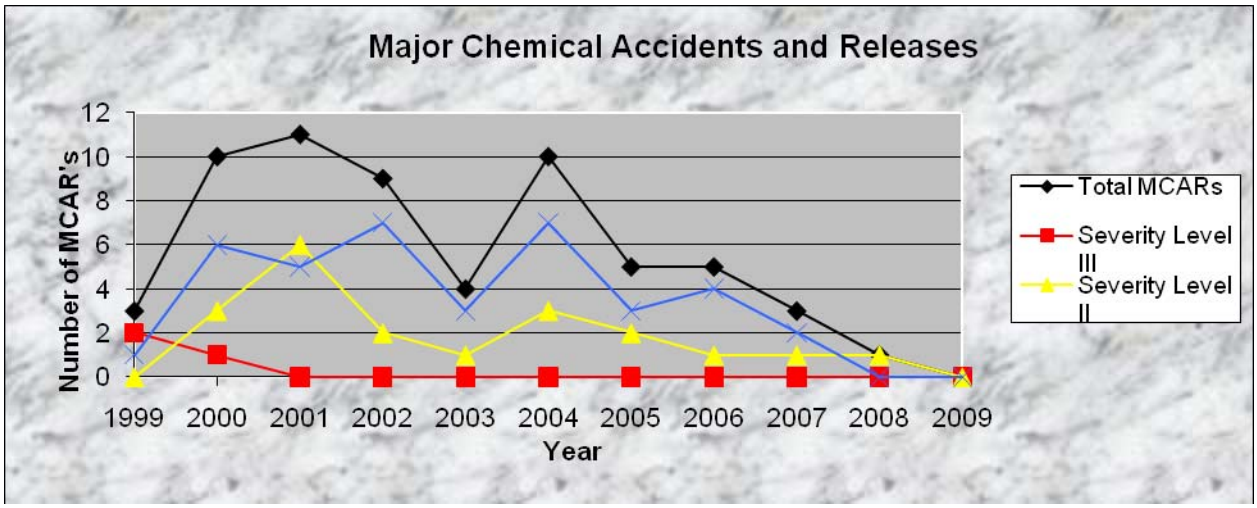
Number	Question ID#	Question	Findings	Answer	Actions	Proposed Remedy	Due Date	CCHS Comments
3	A12-08	Do the Process Hazard Analyses (PHA) address the identification of any previous incident, which had a likely potential for catastrophic consequences? [T19 CCR §2760.2(c)(2) & Section 450-8.016(d)(1)]	The PHA revalidation methodology includes a review of previous incidents. Tab 4 or 5 in the PHA binder is the listing of Chevron Incident investigation summary report reviewed by the PHA team. Per interview with personnel that participated in PHAs, incidents were reviewed and the likelihood of the event was adjusted to reflect incidents reviewed. The incidents discussed included Chevron events and incidents in other refineries/plants. These additional incidents discussed are not included in the PHA binder. CCHS reviewed TKC - (2/7/2008), there is an incident findings learning to "solicit the team members to identify specialty or unique equipment whose failure could result in a loss of containment. This will be documented as either 'No specialty equipment discovered' or 'Specialty equipment discovered.' The PHA database has been updated to include this as a standard deviation.' Based on CCHS review of PHAs, the PHA data have not been modified to capture this learning/requirement.	P	Ensure the PHA database is modified accordingly when changes to the PHA process occur.	Chevron will include at least the list of incidents reviewed during PHA's and will include the review and analysis of specialty equipment (if any are identified) as a core deviation in each PHA.	12/15/08	None

Results

As mentioned earlier there has been no Major Chemical Accident or Release Severity Level 3 that has occurred at a regulated stationary source since 1999. Contra Costa Health Services staff has analyzed the Major Chemical Accidents or Releases (MCAR) that have occurred since the implementation of the Industrial Safety Ordinance. The analysis includes the number of MCARs and the severity of the MCARs. Three different levels of severity were assigned:

- Severity Level III – A fatality, serious injuries, or major onsite and/or offsite damage occurred[10]
- Severity Level II – An impact to the community occurred, or if the situation was slightly different the accident may have been considered major, or there is a recurring type of incident at that facility
- Severity Level I – A release where there was no or minor injuries, the release had no or slight impact to the community, or there was no or minor onsite damage

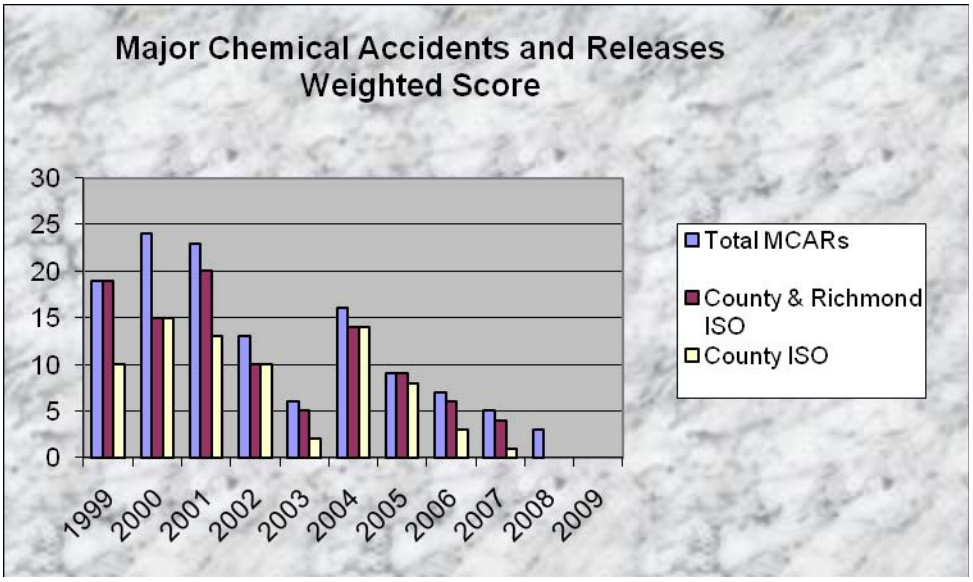
Below is a chart showing the number of MCARs from January 1999 through December 31, 2009 for all stationary sources in Contra Costa County, the MCARs that have occurred at the County's Industrial Safety Ordinance stationary sources, and a chart showing the MCARs that have occurred at the County and the City of Richmond's Industrial Safety Ordinance stationary sources. The charts also show the number of Severity I, II, and III MCARs for this period. **NOTE: The charts do not include any transportation MCARs that have occurred.**



A weighted score has been developed giving more weight to the higher severity incidents and a lower weight to the less severe incidents. The purpose is to develop a

[10] All the accidents that were listed during the 1990's were a Severity Level III MCAR

metric of the overall process safety of facilities in the County, the facilities that are covered by the County and the City of Richmond Industrial Safety Ordinances, and the facilities that are covered by the County's Industrial Safety Ordinance. A Severity Level III incident is given 9 points, Severity Level II 3 points, and Severity Level I 1 point. Below is a graph of this weighted scoring.



Fees

The maintenance, operations, training, and the continuous improvement of the Community Warning System is paid for by fees from regulated businesses that handle more than 500,000 pounds of hazardous materials. The fee is proportional to the cubic root of the amount of hazardous materials handled by the regulated business.

The Industrial Safety Ordinance is paid for by fees based on the potential hazard that the facility poses. The potential hazard is assessed taking into consideration the following factors:

- The toxicity or flammability of the chemical.
- The quantity of the chemical stored in the largest vessel.
- The distance the largest vessel is from the fenceline of the regulated business.
- The volatility of the chemical.

An equation is used to determine the chemical potential hazard factor using the above four factors. Each chemical potential hazard factor is calculated and then all of the chemical potential hazard factors are added together to get an overall factor for the chemicals handled by the regulated business. This factor is then multiplied by a factor based on the complexity of the regulated business and a factor based on the recent accidental history of the regulated business to give the regulated business potential hazard factor. The percentage of the regulated business potential hazard factor to the sum of all the regulated businesses potential hazard factors is multiplied by the total overall expenses to implement the Industrial Safety Ordinance to determine the fee for that regulated business.

Conclusions

The major chemical accidents and releases that occurred during the 1990s and the outcry from the community caused the County Board of Supervisors to adopt the Industrial Safety Ordinance and industry to pay for the Community Warning System. Today, there is a marked change in the way the petroleum refineries and chemicals operate. What was acceptable in the 1990s is not acceptable today. The industry is now held to higher standard than anywhere else in the Country through the County's Industrial Safety Ordinance and the way that alert and notifications were required to be performed through the Community Warning System. The thorough auditing and the follow-up by the Accidental Release Prevention Program Engineers ensure that the high standard is being met by the regulated sources. The result is the number and severity of accidents that have occurred within the County have declined to almost nothing