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Society of Fire Protection Engineers

New Jersey Chapter

FUSIBLE LINK

MAY 2010

President's Message...

The April 23rd joint NJ SFPE Chapter and AFAA NJ Chapter seminar was a great success with 104 people attending.
Our special thanks to the excellent speakers who made the theme "Changing Codes in a Changing World" a timely technical learning experience for all that attended. We would also like to thank the various equipment manufacturers for their participation in the trade show that helped make the seminar possible. The photo below lists the trade show participants.

Rich Reitberger
NJ Chapter President

Report on Governor's Red Tape Review Commission - Sprinkler Installations and Codes - New Jersey

The following is from NJ NAFED's Lobbyist, *Paul J. Bent*

As you know, the Red Tape Review Commission (chaired by the Lieutenant Governor) met on Tuesday at Montclair State University.

The meeting started shortly after 3:00pm with invited speakers. Topics included housing issues, gas sales, cigarette sales, public access to the waterfront among others.

Comments from the public, which we were included in, followed after a short break. Speaking before us was such groups as the NJ Hospital Association, Association of County Colleges, NJ Cable Companies Association, Verizon, etc. These groups talked about many regulations they found cumbersome.

Before starting the testimony related to fire sprinklers, the Lieutenant Governor noted that 25 people had signed up to speak and asked if this large group of speakers would be willing to defer to a few selected speakers. This would later be accomplished when several people indicated from the audience that they agree with comments made by a panel of four speakers who were comprised of:

Russ Flemming - NFSA
Stanley Sickles - Fire Marshall from Red Bank
Lisa Jones - St. Barnabas Burn Center
John Hoffman - Fire Chief from Washington Township (Gloucester County)

This panel covered every imaginable angle of the fire sprinkler debate from history of the code, what has happened in NJ, the protection to the public, cost, results of burn injuries, and fire fighter safety. They were given over 20 minutes to testify.

Following a short break the Lieutenant Governor gave the other speakers who had an interest on this topic to go on the record in support without the need to testify. Such groups included the Fire Marshall's of Rockaway, Saddle River, Camden County; Fire Chief Bob Melofchik of North Arlington Fire Department, and Mike Robertson of the Career Firefighters Association.

I left shortly after this at around 6:45.

As for the crowd, the room could accommodate over 300 people and appeared to have about 50% to 60% occupancy. I would put the number of uniformed fire service personnel at about 50.

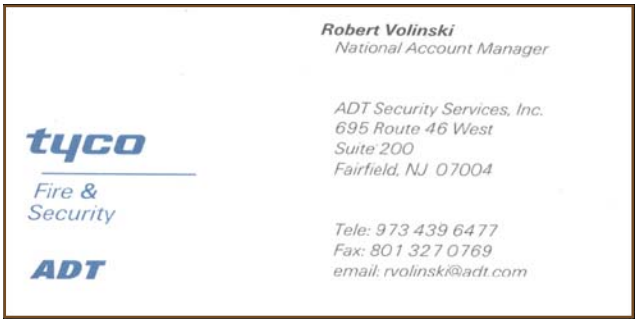
2010-2011 New Jersey SFPE Nomination for Officers and Directors

In compliance with the Nomination Section of the Constitution and By-Laws of the New Jersey Chapter of the Society of Fire Protection Engineers, the Nominating Committee submits the following slate of Officers and Directors. The election will be conducted at the Annual Business Meeting, scheduled for Monday, June 14, 2010 at the Hanover Manor.

President	Rich Reitberger
First VP	John Cholin
Second VP	Ed Armm
Secretary	Joe Janiga
Asst. Secretary	Brad Hart
Treasurer	Bob Murray
Asst. Treasurer	Rich Ravaioli
Board of Directors (2-year term)	Dave Kurasz

Chapter members, Glenn Buser (second year of second term), John Warnet (second year of second term) and Jerry Naylis (second year of second term) will remain as Board of Directors member-at-large.

Dave Gluckman will be Immediate Past President, a voting member of the Board of Directors and Chair of the Nominating Committee. The Nominating Committee and the Board of Directors welcomes volunteers to serve in leadership capacities within the organization including Committee activities and the Board itself. No other members made their interests and willingness to serve known to the Nominating Committee prior to this report. Any member with a desire to run as a candidate for Chapter Officer or Director is encouraged to do so. They must contact the Chapter Secretary, Joe Janiga (973-541-6774) at least four weeks prior to the Annual Business Meeting. In accordance with the New Jersey Chapter By-Laws, candidates must submit the signatures of five voting members of the New Jersey Chapter SFPE along with their letter of intention to run for any of the above positions. According to the calendar, the deadline is Monday, May 17, 2010.



Technical Topic for May 3rd Chapter Meeting
Pop Up Curbs for Flammable Liquid Containment

For our May meeting we will have a speaker that will discuss Pop Up curbing for Flammable liquid containment. Many of us run into containment problems on a regular basis. This topic and the products discussed may offer solutions to many of these exposures. Dag Anhamm of Anhamm Liquid Barrier Products LLC will be speaking to us. His Bio and a little about his company are as follows:

Dag Anhamm is a German mechanical engineer, President of Anhamm LLC in Webster (by Rochester) NY and also managing director of Anhamm Liquid Barrier products in Moers, by Düsseldorf, Germany.

Anhamm is a family run business, engaged in developing and manufacturing automatic doorway spill barrier solutions for different applications, including environmental protection, flood control and fire protection. The company has been providing these products for more than 15 years. Large amounts of liquids (water, chemicals, flammable liquids) flowing into-, out-, or within a building can cause huge damages and economic losses.

Heavy rainfalls can cause flooding of buildings within minutes. Underground parking is an easy entry point for water into the building.

Leakage of large chemical storage tanks can cause environmental damage to the surrounding areas, as can contaminated sprinkler water release.

Containment of a flammable liquid release is typically accomplished via use of passive construction features such as curbs, dikes, ramps, trenches and drains. The obstacle provided by some of these construction features often limits access to the Flammable Liquid Storage or Use Areas, and sometimes is hard to integrate in existing buildings. Recognition of this deficiency resulted in development of an active flammable liquid barrier for use in doorways by Anhamm. The active barrier allows vehicular and similar access to flammable liquid storage or use areas during normal operations. The all mechanical automatic spill barrier deployment is triggered by a liquid spill, independently from any outside power supply. Doorway spill barriers, if properly designed, manufactured, installed and maintained, have the potential to greatly reduce the likelihood of spread of flammable liquid and fire from the room of origin.

Dag will introduce the Anhamm flammable liquid barrier system, and give information on its approval process, installation and use of the system.

Coffee Break Training - Fire Protection Series

Automatic Sprinklers: Bonding and Grounding to Sprinkler Systems

No. FP-2010-16 April 20, 2010

Learning Objective: *The student shall be able to identify the difference between bonding and grounding with water-based fire protection systems.*

Fire inspectors occasionally find heavy gauge cables like the ones illustrated attached to standpipes or automatic sprinkler systems. They should take a few extra minutes to verify the purpose of these conductors before approving the fire protection system installation. An error can have catastrophic consequences.

This sprinkler riser is appropriately bonded to the metal building in which it is located.

These cables might be used for either electrical "bonding" or "grounding." Bonding is permitted, but grounding is not.

Bonding is the process of connecting the metal in the sprinkler piping to the metal in the building (like structural steel) and provides that metal with a path to ground stray electric currents. Bonding is a safety requirement for all metal. People would be electrocuted if a stray current happened to be in the pipe and a person touched the pipe if it was without a bond to ground.

Under normal conditions, there is no current in a bonded system. Bonding of all metal systems in a building is required by National Fire Protection Association (NFPA) 70, *National Electrical Code®*. Most fittings in sprinkler systems are metal-to-metal couplings and are listed as bonding devices. A metal pipe sprinkler system that has metal underground is usually bonded automatically. Also, metal hangers that attach metal sprinkler pipes to metal structural members can also provide sufficient connection to meet the bonding requirement. For plastic pipe sprinkler systems, a simple bonding strap may be necessary near the riser to bond the metal sprinkler piping to the other metal in the building and the ground.

Grounding, on the other hand, is the use of pipe to complete an electrical circuit so that a building's electrical system works. If an electrical system were grounded through the sprinkler system, it would mean that a current would run through the sprinkler pipe every time electricity was used in the building. Both NFPA 13, *Standard for the Installation of Sprinkler Systems*, and NFPA 24, *Standard for the Installation of Private Water Service Mains and Their Appurtenances*, prohibit the use of a sprinkler system for grounding the electrical system.

Occasionally, telephone and information technology equipment gets grounded to branch lines. Lightning rods have been grounded to standpipe risers in highrise or lowrise buildings, and heavy duty power equipment has been attached to branch lines, cross mains, or risers. None of these connections is permitted.

If you are in doubt as to whether the conductors have been connected as "bonding" or "grounding" devices, check with a qualified electrical inspector or engineer to resolve any discrepancies that might lead to tragic consequences.

LPG Fire at the Valero McKee Refinery

The following will be the first part of a loss investigation conducted by the CSB (Chemical Safety Board) that will contain certain sections of the report. Other sections of the report will be in the June Edition of the Fusible Link.

1.0 Introduction

1.1 Background

At 2:09 p.m. on Friday, February 16, 2007, liquid propane under high pressure was released in the Propane De-Asphalting (PDA)[1] unit of Valero's McKee Refinery, 50 miles north of Amarillo in the Texas panhandle, near the town of Sunray. The resulting propane vapor cloud found an ignition source, and the subsequent fire injured workers, damaged unit piping and equipment, and collapsed a major pipe rack. The fire grew rapidly and threatened surrounding units, including a Liquefied Petroleum Gas (LPG) storage area. Fire-fighting efforts were hampered by high and shifting winds and the rapid spread of the fire. A refinery-wide evacuation was ordered approximately 15 minutes after the fire ignited.

Three of the four workers injured were seriously burned, including a contractor. The refinery was completely shut down for just under two months, and operated at reduced capacity for nearly a year.

Because of the serious nature of this incident, the U.S. Chemical Safety and Hazard Investigation Board (CSB) launched an investigation to determine root and contributing causes and to make recommendations to help prevent similar incidents.

1.2 Investigative Process

The CSB investigators arrived at the McKee Refinery the morning of Sunday, February 18, 2007. The CSB interviewed Valero and contractor personnel, reviewed company documents and data from the PDA unit's computerized control system, examined physical evidence, and tested valves and piping components. The CSB investigation team was aided by experts in metallurgical analysis and high-pressure flow testing. The investigation focused on the refinery's programs to identify and address process hazards, and on the fire protection measures used in and around the PDA unit. Investigation activity was coordinated with the U.S. Occupational Safety and Health Administration (OSHA); the U.S. Environmental Protection Agency (EPA); and the Texas Commission on Environmental Quality (TCEQ).

2.0 Valero Energy Corporation

2.1 Company History

Valero Energy Corporation was formed in 1980 as a natural gas-gathering company[2] based in San Antonio, Texas. In the early 1980s, the company began expanding into the refining industry, and in 1997, separated its refining and marketing businesses into an independent company under the Valero name.

Valero Energy expanded rapidly in the late 1990s and early 2000s, as it acquired 16 U.S. refining facilities, as well as plants in Quebec, Canada; and Aruba. Valero Energy became North America's largest refiner in 2005, operating 18 refineries[3] with capacity of approximately 3.3 million barrels per day (bpd). In 2006 the company had assets of approximately $33 billion; annual revenues of $91.8 billion; and 21,800 employees.[4]

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1 The McKee PDA unit uses liquid propane as a solvent to separate gas oil from asphalt. The gas oil is fed to other units in the refinery for further processing. The asphalt is sold for use in paving materials.

2 Gathering companies consolidate gas production from many natural gas wells into one or more large production pipelines for treating and distribution.

3 This number includes two separate plants (east and west) at one physical location. Since the February 2007 incident, Valero has divested its Lima, Ohio, refinery, bringing Valero's total to 17.

4 Dunn & Bradstreet, Directory of Corporate Affiliations, s.v. "Valero Energy Corporation," dated Dec. 11, 2007, accessed Dec. 13, 2007.

2.2 McKee Refinery

The McKee Refinery in Sunray, Texas, was built in 1933 by Shamrock Oil and Gas Company.[5] Major unit upgrades were made in the 1950s, 1990s, and, most recently, in 2004. The refinery became part of Valero in late 2001 when Ultramar Diamond Shamrock (UDS), the previous owner, merged with Valero Energy.

On July 29, 1956, the McKee Refinery experienced a tragic workplace accident when a light hydrocarbon storage vessel failed catastrophically during a fire, resulting in the deaths of 19 emergency responders.

The refinery processes 170,000 barrels of crude oil per day, and distributes its products by pipeline to customers in Texas, New Mexico, Arizona, Colorado, and Oklahoma.

2.3 Propane Deasphalting (PDA) Unit

The PDA unit (Figure 1) recovered fuel feedstock and paving-grade asphalt from the heavy bottoms (pitch[6]) produced in the refinery's vacuum crude oil fractionator. In the McKee PDA process, two liquid/liquid extraction towers used liquid propane as a solvent to extract gas oil[7] from the pitch under approximately 500 pounds per square inch (psi)(3,447 kPa) pressure. The recovered gas oil was processed into gasoline in another refinery unit. The asphalt produced was sold for use in paving materials. Figure 2 is a simplified process flow diagram for the No. 1 Extractor, including the location from which the propane was initially released.

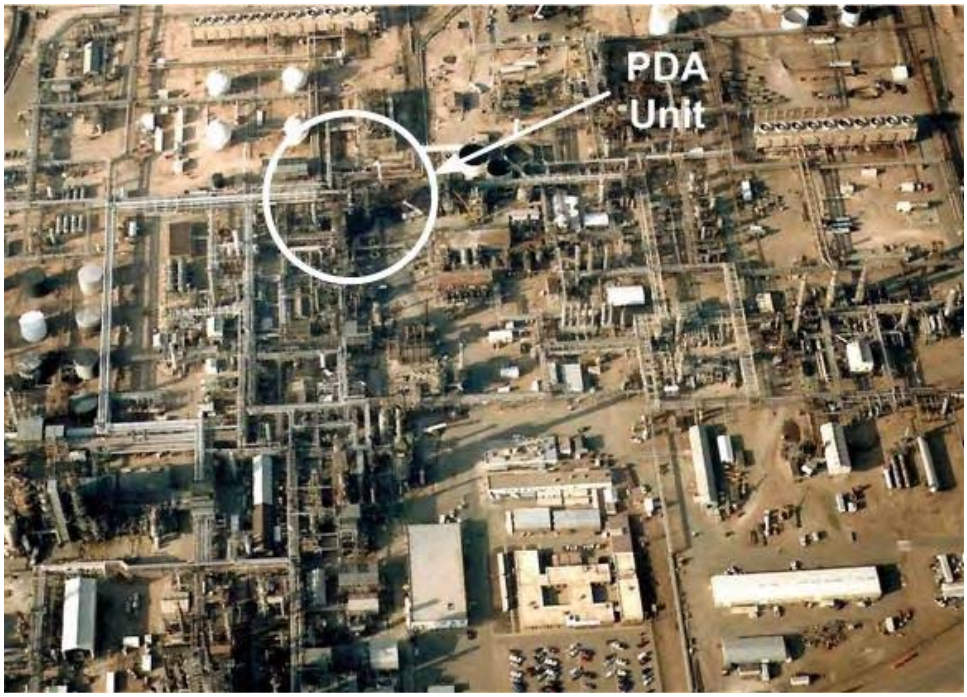

Figure 1. PDA unit location in the McKee Refinery

5 *Handbook of Texas Online*, s.v. "Diamond Shamrock." http://www.tshaonline.org/handbook/online/articles/DD/hed6.html, accessed Jan. 2, 2008.

6 Pitch is the heavy, viscous material discharged from the bottom of the vacuum fractionator after the lighter fractions have been removed – the heaviest hydrocarbon mixture produced from crude oil in the refinery.

7 Gas oil is a hydrocarbon mixture with molecular weight and viscosity somewhat higher than diesel.

The relatively dense pitch entered an upper section of the extractor and flowed to the bottom of the tower. Less dense liquid "wash" propane entered a lower section and flowed to the top of the extractor. Internal structures in the tower promoted effective contact between the two streams. DeAsphalted Gas Oil (DAGO) extracted from the pitch flowed out of the top of the tower with much of the propane. This liquid flowed through a series of flash drums[8] to remove propane from the gas oil. The DAGO was sent elsewhere in the refinery for processing.

A mixture of asphalt and propane flowed from the bottom of the extractor. This stream was also heated and flashed to remove entrained propane, and the asphalt sent to storage.

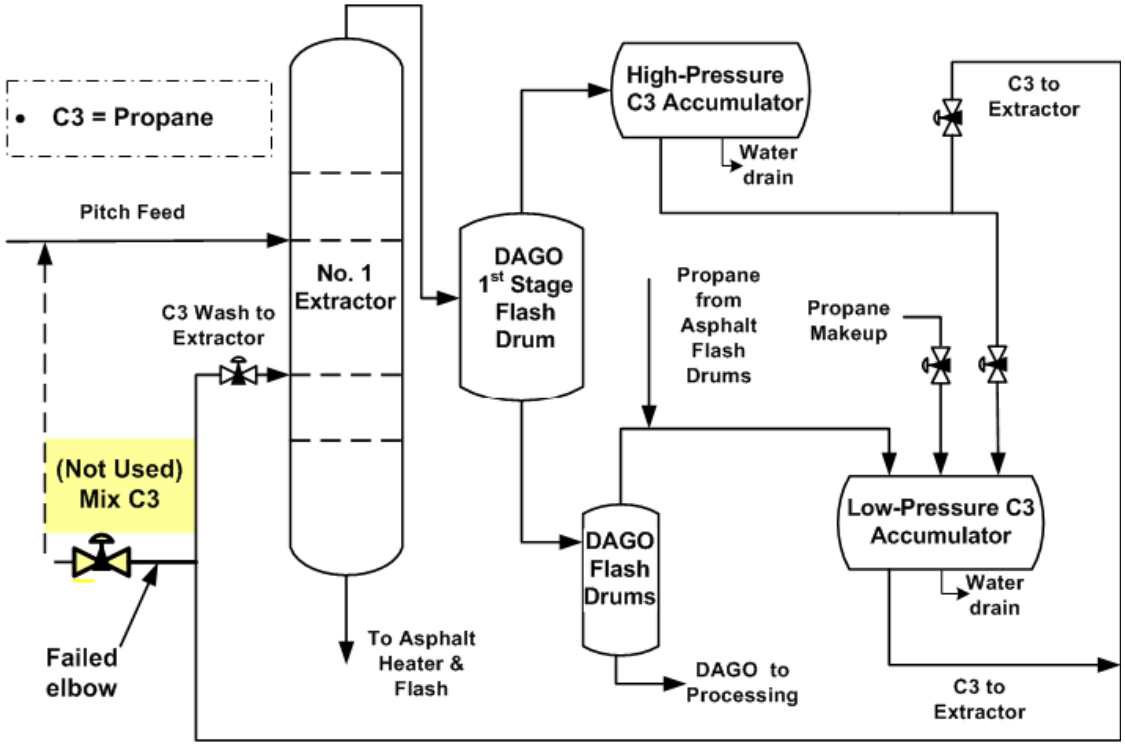

Figure 2. No. 1 Extractor simplified process flow diagram

Propane from the various flashing steps was condensed and sent to either the low- or high-pressure accumulators. Propane from both accumulators was pressurized by pumps, blended for temperature control, and recycled to the extractors. A small amount of makeup propane (about 0.5 percent of the circulating propane rate) entered the low-pressure accumulator to replace losses. Operators told the CSB investigators that the makeup propane contained a variable amount of entrained water, which was regularly drained from the low points on the accumulators.[9] Appendix A contains a more detailed process flow diagram of the PDA unit showing the major process flows and drainage points.

3.0 Incident Description

3.1 The Incident

On Friday, February 16, 2007, at approximately 2:09 p.m.,[10] plant personnel and contractors working in the PDA unit heard a "pop," and saw what appeared to be steam blowing from a control station near ground level at the No. 1 Extractor tower. Plant personnel quickly determined that the escaping cloud was propane and directed workers in the area to evacuate.

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8 This is referred to as "flashing," in which the pressure of a liquid mixture is suddenly reduced, causing light materials to vaporize, or "flash off," separating them from heavier liquid components.
9 Many refinery streams normally contain small amounts of water.
10 The time of 2:09 p.m. is based on control system records examined after the incident.

The propane escaping from the high-pressure system formed a vapor cloud that traveled downwind toward the boiler house, where it likely ignited.[11] The flames flashed back to the leak source. Surveillance video (Figure 3) shows the fire developing rapidly as flames impinged on piping around the No. 1 Extractor, releasing additional propane.

A steel support column on the east/west (E-W) pipe rack was impacted by a high-pressure propane jet fire. The column, which was not protected by fireproofing insulation, buckled, collapsing the rack and causing multiple pipe failures. Liquid petroleum products discharged from the damaged pipes, contributing to the rapid spread of the fire and the damage caused to surrounding equipment, such as the No. 2 Cooling Tower and No. 4 Naphtha Column.

Figure 3. Approximately 90 seconds after ignition (from surveillance video)

3.2 Injuries

Two Valero employees, who have since returned to work, and one contractor were seriously burned in the initial flash fire. The injured contractor continued to receive medical treatment for over a year after the incident. A member of the fire brigade received minor burn injuries while setting up fire-fighting equipment early in the response. Ten other Valero employees and contractors were treated for minor injuries and released. There were no fatalities and no reported off-site injuries.

3.3 Emergency Response and Refinery Evacuation

According to Valero's incident response records, the fire alarm was activated at 2:10 p.m., about one minute after employees heard the "pop" of the initial release. The refinery's emergency response team approached the fire, staging from the south. They attempted to activate stationary fire water monitors, but the high and shifting winds and the rapid growth of the fire hampered their efforts.

11 Nearby fired heaters were another possible source of ignition.

Fifteen minutes after the fire erupted, managers at the Emergency Operations Center (EOC) ordered a total refinery evacuation. Refinery alarm records show that the evacuation alarm sounded at 2:26 p.m. The EOC tactical operations director later stated that the main concerns driving the evacuation decision were the number of pressurized pipes rupturing as the pipe rack collapsed and the proximity of the responders to the liquid propane filled extractor vessels, which were engulfed in flames and possibly at risk of failing catastrophically. This decision pulled responders and workers away from a rapidly deteriorating situation that could have endangered many lives.

The refinery was shut down by isolating main feeds and the fuel gas supply. Emergency response teams later entered to isolate fuel sources, gradually shrinking the fire. Valero planned to stage a joint entry with responders from the nearby Conoco Phillips refinery[12] to extinguish the fire the following day; however, chlorine and sulfuric acid leaks[13] made this entry too hazardous. The fire was extinguished by Valero personnel on Sunday afternoon, February 18, 2008, approximately 54 hours after it ignited.

3.4 Aftermath

The refinery remained completely shut down for nearly two months. Media reports indicated spot shortages of reformulated gasoline in Denver, Colorado,[14] in the weeks immediately following the fire. This incident occurred during a period when unplanned refinery outages kept approximately 480,000 bpd of capacity offline nationwide, of which 170,000 bpd was attributed to the McKee fire.[15] Operations resumed at reduced throughput roughly two months after the fire.

The PDA unit was heavily damaged (Figure 4). Much of the piping, control wiring, and heat exchange equipment in the area of the extractors was destroyed and major equipment items, including the extractor towers, required extensive evaluation to determine if they were safe for continued use. Valero restarted the rebuilt PDA unit in January 2008, nearly one year after the fire, restoring the refinery to full production capacity.

3.5 Near-Miss Events

The Center for Chemical Process Safety[16], [17] (CCPS) defines a near-miss as "an extraordinary event that could reasonably have been expected to result in negative consequences, but actually did not" (1992). Two events during the February 16 fire could have resulted in serious, or even catastrophic, consequences if the wind direction had been different or if personnel had been nearby.

3.5.1 Butane Sphere Heat Exposure

At the time of the initial propane release, the wind was blowing from the west-northwest, pushing the fire in the general direction of the boiler house. Interviews, records, and security camera video footage indicate that the wind shifted several times during the fire, forcing the EOC to relocate.

Radiant heat from the intense PDA fire blistered the paint on a 10,000 barrel (420,000 gallon) capacity butane storage sphere located 270 feet northwest of the No. 1 Extractor (Figure 4). Fortunately, the wind tended to move the flames away from the sphere; strong winds from the southeast might have greatly exacerbated the sphere's thermal exposure. Even with favorable winds, heat from the fire kept responders from reaching the fire water deluge system valve for the sphere, preventing them from establishing a protective flow of water over its surface. During interviews, emergency responders indicated that they were concerned for the safety of the butane sphere, in light of a recent commemoration of the 1956 incident in which the failure of a vessel in similar service caused 19 fatalities.

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12 Refineries often establish mutual aid agreements to increase the resources available for responding to large emergencies.

13 The chlorine and sulfuric acid were used to treat water circulating in a nearby cooling tower.

14 Reformulated gasoline contains a specified content of oxygenated fuels to meet EPA requirements for automotive emissions in certain regions. Valero's McKee Refinery is located approximately 400 miles from Denver, and typically supplies, via pipeline, much of the gasoline consumed in the Denver market.

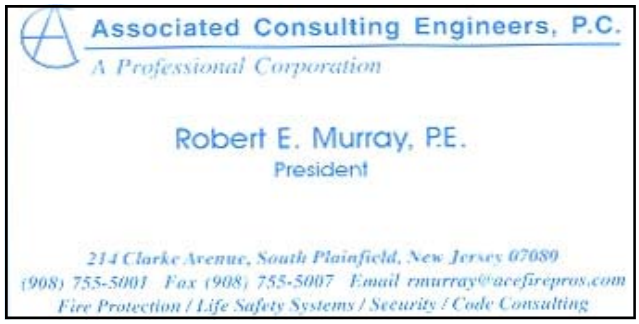
15 http://tonto.eia.doe.gov/oog/info/twip/twiparch/080221/twipprint.html; accessed Feb 2008.

16 The CCPS, an industry-sponsored affiliate of the American Institute of Chemical Engineers, publishes widely recognized process safety guidelines.

17 CCPS defines process safety as a "discipline that focuses on the prevention of fires, explosions and accidental chemical releases at chemical process facilities." Process Safety Management (PSM) applies management principles and analytical tools to prevent major accidents (CCPS, 1992).

Meeting Dates/Programs 2009-2010

DATE	TOPIC
May 3	Pop Up Curbs for Flammable Liquid Containment – Dag Anheim
June 14	FM Global Standards Update
June 28	SFPE Scholarship Fund Golf Outing—West Point Golf Club



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MEETING NOTICE

Date: May 3, 2010

Place: Hanover Manor
16 Eagle Rock Avenue
East Hanover, NJ

Price: $30.00

Dinner: 5:00-6:00 (Cash bar for mixed drinks)
Dinner at 6 PM

Topic: Pop Up Curbs for Flammable Liquid Containment – Dag Anheim

Please note for this meeting:
All officers, directors and committee chairman are requested to attend a meeting at 4:00 p.m. at the Hanover
Manor.

PLEASE COMPLETE AND RETURN WITH YOUR CHECK PAYABLE TO "SFPE NJ CHAPTER" TO:

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Affiliated FM
400 Interpace Parkway, Bldg C - 3rd Floor
Parsippany, NJ 07054-1196
vicki.serafin@affiliatedfm.com

OR PAY AT THE DOOR

NAME: _____

COMPANY:_____TELEPHONE:_____

2008-2009 Chapter Committees

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Richard Ravaioli
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Vicki Serafin, Chairperson

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Chuck Gandy

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Ana Crisostomo—Coordinator
Mailing/Automation/e-mail—Vicki Serafin, Chairperson
Website—Joe Janiga
Facebook & Twitter Coordinator—Todd Vazquez

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HELPFUL LINKS

ADAAG http://www.access-board.gov/adaag/about/index.htm
AFAA National http://www.afaa.org/
AFSA http://www.firesprinkler.org/
ANSI http://web.ansi.org/
ASHRAE http://www.ashrae.org/
Campus-Firewatch http://www.campus-firewatch.com/
Coffee Break Training http://www.usfa.dhs.gov/nfa/coffee-break/
CPSC http://www.cpsc.gov/
CSAA http://www.csaaul.org/
Municipal Codes (E Codes) http://www.generalcode.com/Webcode2.html
FDNY http://nyc.gov/html/fdny/html/home2.shtml
FM Global http://www.fmglobal.com/
FSDANY http://www.fsdany.org/regs.htm
FSI http://www.firesprinklerinitiative.org/
FSSA http://www.fssa.net/
Fire Tech Productions—Nicet Training (FTP) http://www.firetech.com/
Home Fire Spklr Coalition http://www.homefiresprinkler.org/
HVAC Bld. Control Fire Safety http://www.iklimnet.com/hotelfires/hotelfiresmain.html
AFAA-NJ http://www.afaanj.org/
International Code Council - http://www.iccsafe.org/
International Code Council Residential Sprinkler Exam - http://www.iccsafe.org/news/nr/2009/0709_ResidentialSprinklerExam.pdf
The Joint Commission (JCAHO) - http://www.jointcommission.org/www.JointCommission.org/
Material safety data Sheets (MSDS-OSHA Site) - http://www.osha.gov/SLTC/hazardcommunications/index.html
National of Fire Equipment Distributors (NAFED) - http://www.nafed.org/index.cfm