President’s Message...

Another Chapter year has begun. Your Board of Directors have put together a great Technical Program for you this coming year. In addition to our normal monthly dinner meetings and speakers, we are also planning a daytime bus trip in October to the Victaulic Manufacturing Plant in Easton, PA. This will be a most interesting tour that you won't want to miss. We are planning to conduct our Annual Technical Seminar in late April 2011 and of course our joint golf outing at West Point, NY next June.

This year we ask all members not only to attend a meeting that interests them but also to bring along a colleague or peer.

We hope you all had a great summer. See you in September.

Rich Reitberger
Chapter President
First VP John Cholin called the meeting to order at 6:15 p.m. with a salute to the flag and introductions. There were 17 in attendance. The dinner format was an extended appetizer and buffet assortment with free beer and wine. It was an impressive spread that we noshed on all evening.

The minutes of the May 2 meeting were read and accepted by the members.

The Treasurer’s Reports for May 3 and June 14 were read and accepted by the members. Financial results of the April Technical seminar were reviewed. Net income was $8590, half of which is due to our seminar partners the AFAA.

Dave Gluckman discussed the nomination of officers and directors for the upcoming year as has been posted in the May and June issues of our Fusible Link. There was a motion from the floor and the members voted to elect the nominated slate of officers.

Joe Janiga announced that the SFPE Board has voted to accept Mike Newman’s nomination as FELLOW of the Society. We plan to congratulate Mike during our September meeting. The Society presentation will be in October at the SFPE’s annual meeting in New Orleans. Congratulations Mike, well done!

The Scholarship Golf outing, being organized by the NY chapter this year, is set for June 28 at West Point Golf Course. Preregistration has past and the outing is nearly sold out so act quickly if you still want to go. Hole sponsors are still welcome.

April Berkol, Chair of the SFPE’s Educational & Scientific Foundation spoke to us about the work of the E&SF. Key among their activities they review and provide grants for worthwhile scientific (academic) research in our field, things that often lay the groundwork for future industry practice. The E&SF is developing Legacy Archives of original FP research for posterity. To recognize and encourage worthwhile fire protection research it makes several levels of awards annually for research papers in our field.

Following April, Joe Janiga gave a presentation discussing FM Global’s recent research into the “environmental impact of automatic fire sprinklers”. This first of its kind research was conducted in partnership with the Home Fire Sprinkler Coalition. It proves that fire sprinkler protection reduces fire damage, air and water pollution, greenhouse gas emissions and water consumption. Applying this data to commonly available fire statistics it goes on to quantify the impact, AND THE RESULTS ARE SIGNIFICANT. The full white paper is available to the public at www.fmglobal.com/researchreports. Other related references can be found at http://homefiresprinkler.org.

The May 2, 2010 Chapter’s general meeting minutes were inadvertently left out of the June edition of the Fusible Link and are now published below.

President Reitberger opened the meeting at 6:00 p.m. with a salute to the flag and introductions.

The April meeting minutes, as published in the Fusible Link were accepted by the members.

The Treasurer’s report for May 2 is unfinished. The preliminary report was read and the final report will be presented next month for acceptance.

The April joint technical seminar was a success. About 100 attended including numerous vendor sponsors, who were pleased with the opportunity. Financial details will be forthcoming.

The annual scholarship golf outing is set for June 28 at West Point Golf Course. NY Chapter is organizing it this year. Flyers have been distributed.

June 14th will be our annual chapter meeting and election of officers. An enhanced buffet meal with beer and wine is planned.

Dave Gluckman announced the nominations of officers and solicited candidates again.

Mr. Dag Anhamm of Anhamm LLC presented an interesting discussion on his company’s ‘spill barrier’ an alternative method to curbing for flammable liquid containment and for flood barriers. These spring loaded devices can be installed in doorways in lieu of curbing/ramps and are activated by buoyant forces. The barriers can be 12, 18, or 24 inches tall and as wide as 45ft. It requires a ‘sump’ 7in deep and one inch wider than the opening on 3 sides. Two inches of liquid in the sump deploys the barrier and because of springs loading it can be deployed and reset by hand. FM has approved the device. Costs are about $14K for a ten foot opening and delivery time is about 8 weeks.

The meeting was adjourned at 8:35.

Do you want your business to be known by over 125 professionals in the local Fire Protection industry? Advertise in the Fusible Link. $100 per chapter fiscal year. Contact Vicki Serafin for more info: Vicki.serafin@affiliated.fm.com
Michael Newman Becomes “Fellow” of SFPE National Nomination

Congratulations to Mike Newman, Long time NJ Chapter member, past president of the Chapter and National member becomes the latest Chapter member to attain the grade of “Fellow”. The following is notification of his award of this prestigious honor.

Dear Glenn,

I wanted to give you the great news that your nomination of Michael Newman’s for the member grade of Fellow was successful. Michael was recommended by the Honors Committee and made a Fellow of the Society by action of the Board of Directors. He will be presented with a plaque recognizing this honor at the Fellows Reception Monday evening, October 4, 2010 as part of the 2010 SFPE Professional Development Conference and Exposition. The Annual Meeting is in New Orleans, Louisiana. I invite you as the initiator to be the first to share this news with the recipient. If you prefer that the SFPE staff notify the new Fellow, please let me know. After the notification has been made Michael will receive a letter with further instructions about what is needed for the annual meeting. Thank you for contributing the time and energy into the nomination process that will allow the Society to recognize the contribution of this special member. If you have any questions or concerns please let me know.

Sincerely,

Elle

New Disaster Web Site

The Following comes from the National Underwriter NU Online News Service, July 9, 3:03 p.m. EDT

A new disaster news website is available to provide users with the latest news and updates on natural and man-made catastrophes.

The website, Disaster Updates, http://www.disasterupdates.com/ is ultimately a “disaster information portal,” said Dave Miller, website spokesman.

The site provides a series of links to disaster reports and news on earthquakes, tornadoes, tsunamis, wildfires, floods, avalanches and landslides, terrorism, accidents and more.

It also provides disaster resources and Federal Emergency Management Agency (FEMA) information.

Links are available to weather resources for hurricanes—including radar and satellite images—and to government resources for information on the BP oil spill, according to Mr. Miller.

“Existing disaster websites were either too specialized or too complex for the average homeowner or businessperson in need of quick, relevant information,” Mr. Miller said.

The Disaster Updates website was specifically designed to be a resource for families and businesses reacting to a disaster emergency, he added, noting the website includes links to the FEMA and Small Business Administration (SBA) websites and their online applications for government assistance.

The idea to create the website mainly came from on-the-job experience and from living through disasters, Mr. Miller said.

Mr. Miller said that he and his team would eventually like to do more with the website, including adding blogs and pictures to the site, and potentially making it into a mobile application.

“It is a work in progress,” he said. “Right now we’re seeing if there is any interest and what parts people like and don’t like about it.”

The website was designed by a disaster specialist with more than 20 years of disaster relief experience, including work for disasters such as Hurricane Katrina, the Northridge earthquake and the 9/11 terrorist attacks.

Disaster Updates went live last summer as Hurricane Bill approached the East Coast.
LPG Fire at the Valero McKee Refinery

The following is the third part of a loss investigation conducted by the CSB (Chemical Safety Board) that will contain certain sections of the report.

Figure 9. Pipe bridge support fireproofing

Fireproofing is a passive defense that can maintain the integrity of protected structures until a fire is controlled. According to Nolan (1996), “The primary value of fireproofing is obtained in the very early stages of a fire when efforts are primarily directed at shutting down [the] process, isolating fuel supplies to the fire…and conducting personnel evacuations.”

Key guidance for fireproofing in refineries is API Publication 2218, Fireproofing Practices in Petroleum and Petrochemical Processing Plants. API Publications 2510, Design and Construction of LPG Installations, and 2510A, Fire-Protection Considerations for the Design and Operation of Liquefied Petroleum Gas (LPG) Storage Facilities, provide additional information on fireproofing in LPG storage facilities. These publications recommend fireproofing pipe rack support steel that is 20 to 40 feet from fuel sources for general refinery service, and up to 50 feet from LPG vessels.

Valero Energy Corporation’s SP-00-04, Fire Proofing Specifications, calls for fireproofing pipe racks within 30 feet of equipment with the potential to cause a serious fire, but makes no special provisions for processes handling LPG. A loss-prevention report produced for the McKee Refinery listed fireproofing of pipe rack support steel, including the E-W pipe rack north of the PDA unit, as a top priority for the site fireproofing program, but the rack had not been fireproofed at the time of the incident.

34 LPG includes the following light hydrocarbons and mixtures: propane, propylene, normal and iso-butane, and butylenes (API Standard 2510, 2001). These materials are all commonly handled as liquefied gases under pressure.

35 LPG storage facilities are commonly found in refineries, including the McKee Refinery, which had four storage spheres northwest of the PDA unit.
Valero Energy Corporation’s SP-00-04, *Fire Proofing Specifications*, calls for fireproofing pipe racks within 30 feet of equipment with the potential to cause a serious fire, but makes no special provisions for processes handling LPG. A loss-prevention report produced for the McKee Refinery listed fireproofing of pipe rack support steel, including the E-W pipe rack north of the PDA unit, as a top priority for the site fireproofing program, but the rack had not been fireproofed at the time of the incident.

A failed inlet flange to the No.1 Extractor, located 77 feet away from the buckled pipe bridge support, was the most likely source of the jet fire that collapsed the pipe bridge (Figure 11). The closest major process vessel (the No. 2 Extractor) was 51 feet away from the support. These distances exceed both API’s and Valero’s recommended fireproofing distances.

API 2218 references the API 2210/2210A LPG fireproofing distance of 50 feet, developed for pool fires in LPG storage units. Neither standard addresses fireproofing for LPG processes or jet fire scenarios, even though process unit conditions, including pressure, can be more extreme than those found in storage facilities. In this incident, the high operating pressure of the extractors (500 psig, 3,447 kPa) likely produced a jet fire with a range and intensity beyond that anticipated in the API standards for LPG storage releases.

In the Formosa–Point Comfort, Texas, propane/propylene fire in October 2005 that the CSB investigated, non-fireproofed steel columns supporting a critical structure also collapsed while adjacent fireproofed supports survived without damage (CSB 2006-01-I-TX, 2006). If the E-W pipe rack support columns in
this incident had been fireproofed, the severity and duration of the fire would likely have been greatly reduced.\textsuperscript{36}

\subsection*{4.4 Emergency Isolation and Shutdown}

Although the PDA unit contained large inventories of high-pressure propane, it was not equipped with remotely operable shut-off valves (ROSOVs)\textsuperscript{37} to rapidly stop propane releases. ROSOVs should be used in facilities, such as the PDA unit, where fast and effective isolation is needed to reduce the impact of major hazardous releases (HSE, 1999).

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{rosov_figure.png}
\caption{Graphic based on FM Global Property Loss Prevention Data Sheet 7-14, 2004}
\end{figure}

\textbf{Figure 12. Insurer-recommended locations for ROSOVs}

\textsuperscript{36} Jet fire scenarios may require the use of fireproofing rated for longer fire exposure and greater resistance to erosion than might be required for protection in pool fire scenarios.

\textsuperscript{37} ROSOVs, also referred to as EIVs, are equipped with actuators and configured to be quickly and reliably operated from a safe location, such as a well-sited control room.
Figure 12 shows insurer-recommended ROSOV locations for a typical process unit. ROSOVs should be installed on large inventories of highly flammable materials, especially when downstream pumps are present that could produce pressurized releases. Such pumps should be interlocked to shut down when ROSOVs are closed.

4.4.1 American Petroleum Institute (API) Guidance

API’s Recommended Practice 2001, Fire Protection in Refineries and API 2030, Application of Fixed Water Spray Systems for Fire Protection in the Petroleum Industry, discuss the use of isolation valves in emergencies, including considering access to valves during fires. However, while these recommended practices briefly reference remotely operable isolation valves, they focus on fire- and heat-actuated valves and their limitations. The 2007 release of API 521, Pressure-relieving and Depressuring Systems, addresses the limitations of pressure relief systems in protecting against jet fires, and states that “unlike a pool fire, a jet fire can, in essence, be ‘turned off’ through isolation and depressurization of the jet fire source...” However, none of these guidance documents provide specific guidance on the design, location, and use of ROSOVs for the rapid isolation of LPG processes during emergencies.

4.4.2 Valero Corporate Emergency Isolation Valve (EIV) Standard

Valero’s Emergency Isolation Valve Standard (SP-40-01) requires evaluation and installation of ROSOVs during new construction projects, and application of the standard during PHA revalidations in existing process units, such as the PDA. The standard specifies giving the highest priority to installing EIVs on vessels containing 10,000 pounds or more of National Fire Protection Association (NFPA) Class 4 materials, such as propane. The CSB confirmed that both the high- and low-pressure accumulators (as well as the extractors) could contain well over 10,000 pounds of propane under normal operating conditions, yet neither was equipped with ROSOVs nor was SP-40-01 applied as required during the 2006 PDA unit PHA revalidation. A UDS PHA in 1996 had identified the need for ROSOVs in the PDA unit; however, they were never installed, and the action item was incorrectly closed out as having been completed.

4.4.3 Formosa–Point Comfort, Texas, Incident

In a similar incident in 2005 involving an uncontrolled release of LPG (CSB-2006-I-TX), operators were also unable to reach locally operated valves to isolate the fuel source of the fire. The resulting fire extensively damaged Formosa Plastics Corporation’s Point Comfort, Texas, Olefins 2 unit. In both the Formosa and Valero incidents, the use of ROSOVs would have enabled operators to quickly control the initial releases, prevent the rapid spread of the fires, and mitigate the serious damage that occurred.

38 Guidance varies on appropriate threshold quantities for installing ROSOVs. Valero’s corporate procedure gives highest priority to installing ROSOVs on vessels containing more than 10,000 pounds of LPG-like materials (NFPA Class 4 flammables), such as propane. One insurer recommends ROSOV use on flammable inventories greater than 4 m3 (4,225 gallons) in volume. The UK’s Health and Safety Executive (HSE) recommends installing the capability to physically isolate “large” inventories of hazardous substances.

39 API 521 (5th ed.) also highlights the need for an integrated approach to mitigating jet fire hazards, including fireproofing and other measures in addition to emergency isolation capability. However, it does not provide detailed guidance.

40 OSHA’s PSM regulation requires PHAs to be periodically “updated and revalidated.” CCPS (2001) states that PHAs are revalidated to “produce an updated PHA that adequately identifies, evaluates, and proposes controls for the hazards of the process, as they are currently understood.”

41 The NFPA develops widely recognized consensus fire protection codes and standards.

42 The NFPA classifies the degree of hazard of a material on a scale of 0-4, with 4 the most hazardous or “severe.” Class 4 flammable materials are defined as either gases or materials that will flash to a gas at ambient temperature, such as LPG. The 10,000 pound criterion in the Valero standard applies to either the mass of a single Class 4 material or to the Class 4 components of a mixture.

43 Based on control system data and field measurements of the vessel diameters.
5.0 Near-Miss Analysis
Near-misses are extraordinary events that could reasonably have been expected to result in negative consequences, but actually did not. Examples of near-misses include releases of flammable vapors that dissipate without igniting, activation of safety protective and shutdown systems, and process conditions that exceed predefined control limits (CCPS, 1992). In this incident, two near-misses resulted from the exposure of nearby equipment to radiant heating by the fire. While no injuries or serious damage resulted, under slightly different circumstances the consequences could have been much more serious, even catastrophic.

5.1 Chlorine Release
5.1.1 Damage to Chlorine Containers
Three one-ton containers of highly toxic liquid chlorine, used in cooling tower water treatment, were located in a shed approximately 100 feet from the PDA unit (Figure 4). The fire exposed the containers to radiant heating, rupturing one (Figure 13) despite the melting of its fusible plugs, and causing the other two to vent chlorine through their melted plugs. Valero reported to the Texas Commission for Environmental Quality (TCEQ) that 5,332 pounds of chlorine were released (see Section 7.2). Fortunately, responders had pulled back from the area prior to the release and no injuries were attributed to chlorine exposure.

The cooling tower water treatment shed served the No. 2 Cooling Tower, directly to the north; however, the shed did not need to be located next to the PDA unit and pipe rack. Furthermore, the PHA for this system had not examined the hazards of locating the chlorine containers close to the PDA unit. Following the incident the refinery rebuilt the treatment system, using bleach as the biocide, on the north side of the cooling tower.

Chlorine was used at the McKee Refinery to prevent microbial growth in cooling water; however, its toxicity made it an inherently hazardous material to work with. The release of the contents of a single one-ton container of chlorine can create toxic effects up to three miles away, presenting a serious risk to workers and the public.

5.1.2 Inherently Safer Alternatives
In applying inherent safety principles, the preferred approach to control hazards is to eliminate them. However, if elimination is not feasible, replacing hazardous materials with less dangerous ones (substitution) should be examined (CCPS, 1996). This basic principle was described by noted process safety expert Trevor Kletz, who stated that “what you don’t have can’t leak” (1998).

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44 The NFPA rates chlorine’s health risk as a “4,” the most hazardous rating.
45 Fusible plugs are safety devices that use metal alloys that melt at comparatively low temperatures, in this case roughly 155°F (68°C) to vent containers exposed to excessive heating. The one-ton container that ruptured was likely exposed to an extremely high radiant heat flux, causing the container wall to weaken due to over-temperature and fail before its contents could be vented through the fusible plugs.
46 The EPA’s toxic endpoint for chlorine release modeling (the Emergency Planning Response Guideline-2 concentration) is 3 ppm. The National Institute for Occupational Safety and Health (NIOSH)-recommended exposure limit is 0.5 ppm.
47 Based on the CSB runs of the EPA’s “RMP Comp” software, v. 1.07, 2,000 pound release, RMP worst case, rural area (appropriate for the McKee Refinery’s location).
48 “A chemical manufacturing process is inherently safer if it reduces or eliminates the hazards associated with materials and operations used in the process, and this reduction or elimination is permanent and inseparable” (CCPS, 1996).
Safer materials for controlling biological growth in cooling towers are available, and Valero has identified replacing chlorine in cooling water treatment at all its refineries as a safety goal in its 2008-2012 Strategic Plan. The plan noted that 10 of its 18 refineries (as of May 2007) used ton container quantities of gaseous chlorine as a cooling water biocide. The McKee Refinery substituted sodium hypochlorite (bleach) for chlorine in its No. 2 Cooling Tower during PDA unit reconstruction. Bleach essentially stores chlorine in a form that presents a much lower inhalation hazard, an example of the inherently safer principal of attenuation (Kletz, 1998).49, 50

5.2 Butane Sphere Deluge Valves

5.2.1 Heat Damage to Butane Sphere

Four 10,000 barrel (420,000 gallon, 1590 m3) spherical tanks storing LPG were located northwest of the PDA unit (see Figure 4, page 19). At the time of the incident, the tank closest to the PDA unit contained approximately 3,600 barrels (151,000 gallons, 572 m3) of liquid butane under pressure, and was exposed to radiant heat from the fire. Figure 14 shows heat damage to the white protective coating on the tank’s exterior.

49 Kletz states, “The worst that can happen with hypochlorite is far less than the worst effects of chlorine, and on balance the change seems justified.”
50 Using bleach requires chlorine handling at the bleach production facility.

To be continued in the next issue of the Fusible Link.
## Meeting Dates/Programs 2010-2011

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MEETING NOTICE

Date: September 13, 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

Speaker: Dave Phelan of Technical Fire Services

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:

Vicki Serafin
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: ________________
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Richard Ravaola

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HELPFUL LINKS

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