



# THE BAKER RISK BULLETIN

The Newsletter of Baker Engineering and Risk Consultants, Inc.

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## GET READY FOR A MORE AGGRESSIVE OSHA

by James A. Lastowka, Esq., Partner  
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### “There’s a New Sheriff in Town”...

The Obama administration’s “new OSHA” has a simple message for U.S. industry. The message has been delivered loudly and clearly: “There is a new Sheriff in town.” And we all know what sheriffs do. They aggressively enforce the law. That is exactly what the new Occupational Safety and Health Administration (OSHA) intends to do.

President Obama was elected with the strong backing of organized labor. In return, the new president of the AFL-CIO, Richard Trumka, and other union officials have emphatically promised that organized labor will hold the Obama administration’s feet to the fire to make sure that the pro-labor commitments made during his campaign are delivered. One of these commitments is a quick reversal of what the Obama campaign and its union supporters claimed was eight years of the Bush administration OSHA “selling out to big business” to the detriment of worker safety and health. This sell-out allegedly was accomplished through an agenda of lax enforcement, cozy partnerships and the cessation of meaningful standards-setting activities. Through its OSHA appointments, the Obama administration has established that it will be delivering on its commitments to labor.

### THE NEW OSHA’S LEADERSHIP TEAM

The tone of an agency is set at the top. The leadership team appointed to head the new OSHA leaves no doubt about what the tone of the new OSHA will be.

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## PETROLEUM COKE DUST SAFETY RESEARCH

by John L. Panariello, Vice President

The combustibility of petroleum coke dust has been debated for years and it is apparent that the potential for coke dust to generate an explosion hazard is still not clearly understood. One reason for that confusion may be attributed to the various different grades of coke that are produced, some of which have high burn rates in closed vessel tests while others are relatively benign.

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*Typical Delayed Coking Unit and Coke Distribution Facilities*

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The new Secretary of Labor, Hilda Solis, is a former member of Congress from California. In a June 2009 speech at the American Society of Safety Engineers' annual conference, Solis said: "There is a new Sheriff in town.... Make no mistake about it, the Department of Labor is back in the enforcement business. We are serious, very serious." To demonstrate this, one of her first steps was to order an enforcement blitz by OSHA SWAT teams at construction sites across Texas to combat what she said was the state's "dubious distinction of having the most worker fatalities in the nation." Solis also announced that the U.S. Department of Labor's budget request includes funding for up to 130 new inspector positions.

The Deputy Assistant Secretary and current acting head of OSHA is Jordan Barab. Barab previously served as special assistant to the head of OSHA in the Clinton administration and in that position helped spearhead the promulgation of the controversial ergonomics standard that was issued by OSHA but subsequently repealed by Congress. Before his appointment, Barab was senior labor policy advisor for health and safety for the House Education and Labor Committee, a staff member of the U.S. Chemical Safety Board, a health and safety specialist for the AFL-CIO, and director of the safety and health program for the American Federation of State, County and Municipal Employees (AFSCME). In a recent speech at an AFSCME convention, he remarked: "I always tell people that I still bleed AFSCME green." In another speech, he told the attendees: "You are not alone. We have your back and your fight is our fight.... There's a new sheriff in town."

On July 28, 2009, President Obama nominated David Michaels, PhD, MPH, to be the head of OSHA. This nomination is subject to Senate confirmation. Michaels, an epidemiologist, currently is a research professor at the Department of Environmental and Occupational Health at the George Washington University School of Public Health and Health Services. Michaels is the author of the book *Doubt is Their Product: How Industry's Assault on Science Threatens Your Health*. Key goals of Michaels would be to jump-start OSHA's standards-setting process, with a focus on chemical exposure issues and ergonomics. Confirmation hearings on Michael's nomination should provide an early indicator of the battles that will be fought on the OSHA front during the Obama administration.

Deborah Berkowitz has been named chief of staff at OSHA. Berkowitz is the former health and safety director at the United Food and Commercial Workers' union, and she was very active for the union during OSHA's first round of ergonomics cases in the meatpacking industry in the 1980s and during the Clinton administration's ergonomics rulemaking.

## **TOP PRIORITIES FOR THE NEW OSHA**

The top priority of the new OSHA can be summarized in two words: strong enforcement. This will be accomplished in several ways:

- Implementing a "Severe Violators Inspection Program" that focuses on large employers whose histories of OSHA violations demonstrate, in OSHA's view, that they do not take their compliance obligations seriously and need to be targeted for very aggressive enforcement in order to get the message.
- Working more closely with the U.S. Department of Justice to increase the number of criminal prosecutions for workplace fatalities, injuries and illnesses.
- Supporting legislative OSHA reform efforts that include substantial increases in penalties, both criminal and civil.
- Increasing the number of inspectors; the number of inspections conducted; the number of citations issued, particularly for serious, repeat and willful violations; and the amount of penalties proposed for violations—a more aggressive enforcement approach signaled by OSHA's June 22, 2009 proposal of \$1,145,200 in penalties against a company for combustible dust and other alleged safety violations.

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- Focusing on specific enforcement issues through National Emphasis Programs (NEPs), including continuing the NEPs for process safety management compliance (PSM) at refineries and for combustible dust hazards, rolling out the NEP for PSM compliance at chemical facilities, and implementing its recently issued NEP for auditing compliance with OSHA's injury and illness recordkeeping requirements, which the new OSHA suspects is a seriously flawed system due to widespread confusion and "cheating."
- Decreasing what it believes was the Bush administration's over-reliance on partnerships, alliances and company participation in Voluntary Protection Programs.

## **WHAT COMPANIES MUST DO TO PREPARE FOR THE NEW OSHA**

Given that the direction of the new OSHA is so clear, companies have all the warning needed and the opportunity to ensure that their OSHA-compliance houses are in order before OSHA arrives at their doorsteps. Here is what must be done:

- Establish a Catastrophe Response and Management Plan. Workplace catastrophes present extremely large risks on a number of fronts. The way in which you manage those risks following workplace catastrophes in both the short and long terms are key to minimizing potentially substantial liabilities. You need a comprehensive, well-thought-out plan to manage the situation, including managing the multi-agency investigations that will follow, that can be triggered and effectively implemented on a moment's notice.
- Verify through compliance reviews that your OSHA-required safety and health programs are in place. Ensure that written programs, which may look good on paper and in binders, are in fact effectively implemented in your workplaces. Ensure that your OSHA-required injury and illness recordkeeping files are accurate and up-to-date. The new OSHA will be focused on looking behind the scenes and talking to employees to get the "real story" about their employers' safety and health efforts.
- Focus on your "key risks," meaning the specific risks at your workplace that are actually faced by your employees on a frequent basis and which present the most exposure to a risk of serious injuries or death. Focusing on your actual key risks in a consistent, demonstrable manner will go a long way towards minimizing your overall risk of a significant OSHA enforcement action.
- Ensure that your safety and health program demonstrates a "top down" as well as a "bottom up" commitment to worker safety and health. Without the demonstrated interest and commitment of your company executives as well as your front-line workers, the results of your safety and health efforts will not be maximized.
- Have a plan in place to manage OSHA inspections in a careful, thought-out manner to minimize the possibility that a significant enforcement action will result, as well as a plan that ensures that every OSHA citation that is issued is properly analyzed to determine not only its validity, but also its potential effect on your company's overall OSHA violation history and its other impacts to the company. Because of the potential negative impacts of OSHA citations, decisions as to whether to appeal or accept citations will be increasingly important.

Taking the time now to determine how your company measures up in these key areas will put you in a much better position to effectively anticipate, minimize and deal with the aggressive enforcement promised by the new OSHA. ✕

*This article was reprinted with permission of James A. Lastowka, a Partner with McDermott Will & Emery LLP of Washington, DC. McDermott's OSHA, MSHA & Catastrophe Response Group is recognized as one of the leading practices of its kind in the United States. The founding partners of McDermott's OSHA, MSHA & Catastrophe Response Group began practicing OSHA law in the 1970s, in the earliest days of the OSHA regulatory program. For more information, visit <http://www.mwe.com>.*

The table at right demonstrates the range of potential coke compositions. Raw petroleum coke (also known as “green coke”) produced in a delayed coker can have a relatively high content of volatile matter and sulfur, which can influence the combustibility of the coke dust. Conversely, the composition of the green coke after it has been calcined includes negligible quantities of volatile matter and sulfur and is almost pure carbon.

Composition of Coke from a Delayed Coker		
Component	Green Coke as Produced	Coke Calcined at 2,375° F (1,302° C)
Fixed carbon, wt %	80 – 95	98.0 – 99.5
Hydrogen, wt %	3.0 – 4.5	0.1
Nitrogen, wt %	0.1 – 0.5	
Sulfur, wt %	0.2 – 6.0	
Volatile matter, wt %	5 – 15	0.2 – 0.8
Moisture, wt %	0.5 – 10	0.1
Ash, wt %	0.1 – 1.0	0.02 – 0.7
Density, g/cc	1.2 – 1.6	1.9 – 2.1

In a 2008 Fact Sheet issued by the Occupational Safety and Health Administration (OSHA) on Combustible Dust Explosions, the agency made the following suggestion: “A dust explosion can be catastrophic and cause employee deaths, injuries, and destruction of entire buildings. In

many combustible dust accidents, employers and employees were unaware that a hazard even existed. It is important to determine if your company has this hazard, and if you do, you must take action now to prevent tragic consequences.”

There are various industry sources (e.g. NFPA 68, Bureau of Mines, National Electric Code, etc.) that list petroleum coke as a combustible dust, with some sources assigning the material to the same hazard class as coal dust. Additionally, while some companies have performed thorough laboratory testing (e.g.  $K_{st}$ ,  $P_{max}$ , MIE, etc.) on a limited number of coke samples, the explosibility of the coke has not been associated to a range of coke compositions.

Although the method of operation at a coke producer may limit the potential for dust accumulations and a dust explosion, the same may not be true for downstream companies (i.e. coke handlers and consumers). Some Material Safety Data Sheets (MSDSs) state that petroleum coke dust may be a potential explosion hazard and include brief handling precautions. Other MSDSs assert that petroleum coke dust may burn, but not readily ignite, and they do not offer any design or handling precautions.

## COKE DUST SAFETY JIP

To help address this technology gap, BakerRisk is organizing a joint industry program (JIP) to assess the combustibility of various grades of petroleum coke dust. The study will help interested companies:

- Understand and design for potential explosion hazards in their coke handling operations.
- Avoid costly over-designs for explosion hazards that do not exist.
- Correlate how feedstock changes and/or processing conditions contribute to the combustibility of the coke product.
- Avoid incomplete and/or inaccurate explosivity data on company-generated MSDSs.

Companies interested in participating in the coke dust testing JIP should contact John Panariello at [JPanariello@BakerRisk.com](mailto:JPanariello@BakerRisk.com) or Kelly Thomas at [KThomas@BakerRisk.com](mailto:KThomas@BakerRisk.com). ✕

# BAKERISK'S HACTOOL ENHANCES HAZARDOUS AREA CLASSIFICATION

by Roy Moses and Karen Wigal

OSHA regulation 29CFR 1910.307 requires facilities to document their electrically classified areas. This is typically done manually in the form of hazardous area classification drawings, which use rule sets established in API 500 and similar guidelines. Unfortunately, manually drawing hazardous area classification contours is time intensive, difficult to maintain, and even more difficult to check for inaccuracies.

BakerRisk has created a novel approach to electrical area classification that consists of identifying the base case electrical classification for a facility and integrating it with existing electrical equipment to identify any compliance gaps. Built on a foundation that applies NFPA and API electrical classification codes, BakerRisk's proprietary software tool for

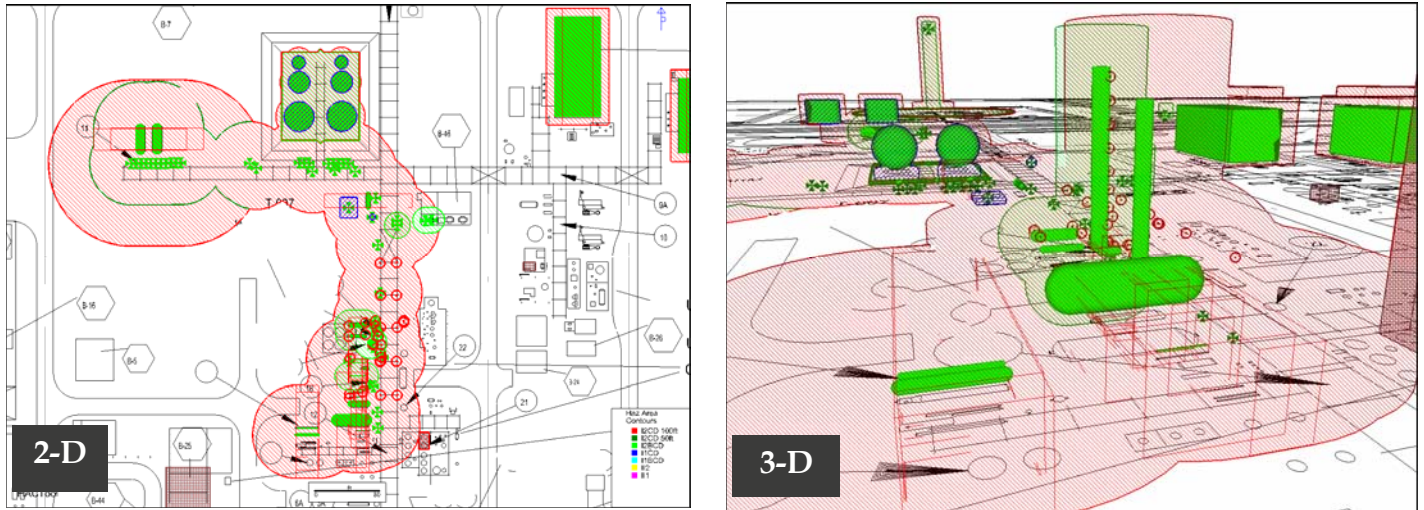


Figure 1. Hazardous Area Classification Drawings Generated by HACTool

Hazardous Area Classification called "HACTool," [patent pending], allows facilities to import existing site maps, process stream data, and equipment data to produce both 2-D and 3-D hazardous area classification drawings (see Figure 1).

## HACTool Area Classification

The HACTool is capable of determining the electrical equipment classification (Class I, II, or III) and the Group (A, B, C, or D) based on the stream properties, by utilizing basic stream data similar to that used in a facility siting study. For an electrical area classification, the stream properties of interest include flash point, auto ignition temperature (AIT), Maximum Experimental Safe Gap (MESG), Temperature Code "T-rating," and material volatility. Once entered into the HACTool, the stream data is then summarized in a table format for convenience. An example of a typical stream summary table is shown at right, which typically may involve 5,000+ process streams.

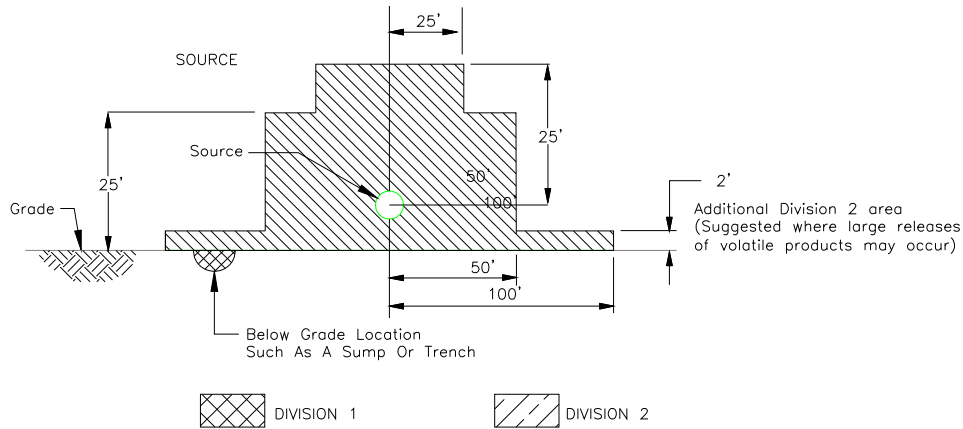
Example Stream Data

Stream Name	Hexane <500s	Natural Gas	Propane
Volatile			Volatile
Temperature (°F)	200	200	200
Pressure (psig)	50	50	50
Molecular Weight (lb/mole)	35	20	35
Mass Flow (lb/hr)	50	50	50
Molar Flow (lbmol/hr)	50	50	50
Std Gas Flow (MSCFH)	50	50	50
Actual Gas Flow (ACFM)	50	50	50
Std Ideal Liq Vol Flow (USGPM)	50	50	50
Actual Liquid Flow (USGPM)	50	50	50
Auto Ignition Temp (°F)	200	280	280
T-Rating	T3	T2A	T2A
MESG	0.93	1	0.97
Class	I	I	I
Group	D	D	D
Propane (mol fraction)			1
n-Hexane (mol fraction)	1		
Methane (mol fraction)		1	

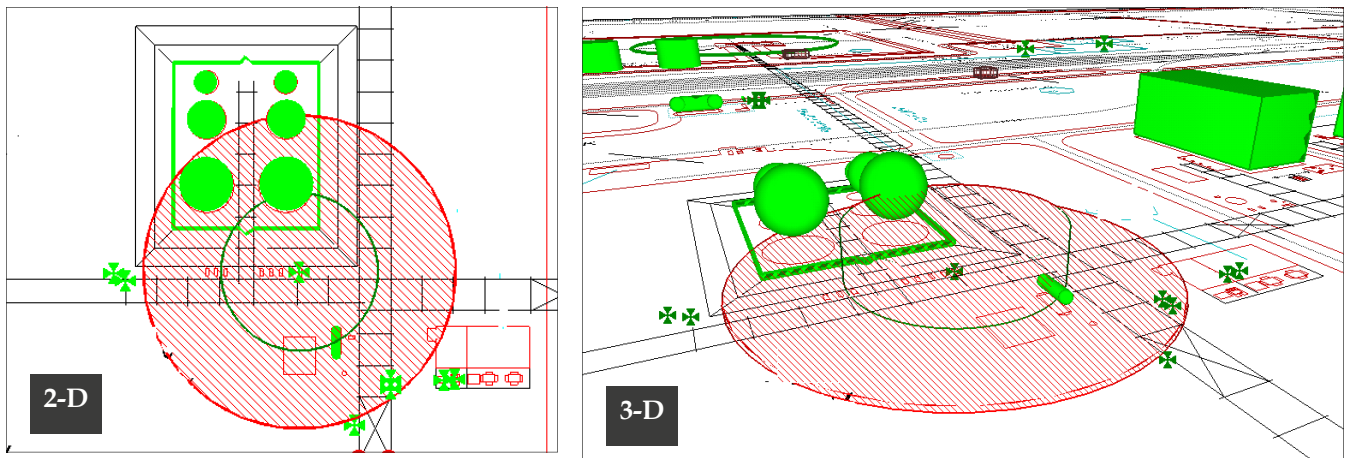
*(continued on page 6)*

While stream composition is instrumental in identifying the Class and Group of an area classification, process equipment is the main component for the determination of hazardous area extents. The HACTool calculates hazardous distances based on the guidance figures or point sources provided in API 500 to determine the extents for the different types of equipment.

Figure 2 is taken from API 500, which presents the extent of Division 1 and 2 areas for an adequately ventilated, heavier-than-air source. Figure 3 shows the 2-D (left) and 3-D (right) depiction from the HACTool based on the stream data and equipment type.



**Figure 2. Adequately Ventilated Process Location with Heavier-Than-Air Gas or Vapor Source Located Near Grade (from API 500, Figure 20)**



**Figure 3. HACTool's 2-D and 3-D Depiction of Adequately Ventilated Process Location With Heavier-Than-Air Gas or Vapor Source Located Near Grade**

### **Management of Change**

The changing of process streams and the addition, demolition, or mothballing of units can cause existing electrical classification drawings to become outdated, and in some cases, obsolete. When this occurs, demonstrating compliance with regulations and facility guidelines becomes increasingly difficult. Traditionally, the changing of process conditions and addition of new equipment could easily result in incorrectly classified electrical equipment due to the labor associated with updating manually produced drawings. The HACTool can assist with this management of change process by tracking and monitoring the impact of the changes. With the HACTool, once the equipment layout is defined, both 2-D drawings and 3-D models can be easily generated to demonstrate that the facility changes are in compliance with regulation and facility guidelines.

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### **Gap Analysis**

Another advantage of the HACTool is its ability to graphically identify electrical equipment as potential ignition sources. Once the electrical data is input into the HACTool, BakerRisk can conduct a Gap Analysis to identify electrical equipment that is incorrectly classified (Class, Div, and Group) for the area in which it is located. In addition, maintenance issues that could compromise the electrical equipment rating are documented and provided in a summary report.

The incorporation of electrical equipment into HACTool with the process area classification data allows facilities to quickly identify and evaluate the amount of electrical equipment affected in the event of a process stream change or the addition/mothballing of a unit. The ability to identify the affected equipment before such changes are made allows an estimation of the associated cost of replacing the equipment to meet the new area classification requirements.

Buildings can also be evaluated versus the NFPA 496 "Standard for Purged and Pressurized Enclosures for Electrical Equipment," 2003 Edition. By entering specific building information, the HACTool is able to run a building-specific gap analysis. This gap analysis allows the facility to identify building air intake stacks improperly located in classified areas and inadequate pressurization systems. This aids in identifying and prioritizing pressurization system repairs and/or stack location modification.

The HACTool has proven to be a cost-effective and efficient way of creating and maintaining hazardous area classification drawings. Another advantage of the HACTool is that it is compatible with other BakerRisk software used in facility siting studies to evaluate hazards and risks so that data from one type of study can be efficiently transferred to another (e.g. Risk Analysis↔HAC↔Siting Study).

For more information on how the BakerRisk HACTool can help with your next area classification project, please contact Roy Moses ([rmoses@BakerRisk.com](mailto:rmoses@BakerRisk.com)) in BakerRisk's Houston office at 281-822-3100. ✕

*Roy Moses and Karen Wigal are both Process Safety Consultants located in BakerRisk's Houston office*

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## **CCPS GUIDELINES BOOK COMPLETED**

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*by Quentin A. Baker, President*

BakerRisk has completed revision of the Center for Chemical Process Safety (CCPS) book *Guidelines to Vapor Cloud Explosion, Pressure Vessel Burst, BLEVE and Flash Fire Hazards*. The first edition of the *Guideline* was published in 1994. Since that time there have been considerable advances in research for these types of explosions and fires, and hazard prediction methods have improved.

The second edition is a major revision of the *Guideline* with the contents completely reorganized, totaling over 400 pages. Recent research results have been added, including test results. Blast and thermal hazard prediction methods were updated and new methodologies inserted. Sample problems are included for each prediction method. An extensive list of references is provided. The treatment of pressure vessel burst (PVB) was separated from boiling liquid expanding vapor explosions (BLEVE) and expanded, which resulted in PVB being placed in a dedicated chapter and a new name for the book as shown above.

The second edition is scheduled for printing in November 2010 and is expected to be available for purchase before the end of the year. The book can be purchased from AIChE at <http://www.aiche.org/CCPS/Publications/>



BAKER ENGINEERING AND RISK  
CONSULTANTS, INC.

### About BakerRisk

Baker Engineering and Risk Consultants, Inc. is one of the world's leading explosion analysis, structural design, and risk engineering companies. BakerRisk provides comprehensive consulting, engineering, laboratory and range testing services to government agencies and private companies who are involved with dangerous, highly hazardous, reactive, or explosive materials.

### Our Mission:

To provide integrated engineering, research, and risk assessment to aid our clients in managing hazards associated with explosive, flammable, reactive and toxic materials.

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Blast Effects & Explosion Testing • Dynamic Structural Analysis & Design • Risk Engineering • Process Safety • Incident Investigations • Reactive Chemicals Testing and Materials Engineering

## BAKER RISK EVENT SCHEDULE

Look for BakerRisk at these upcoming events:

### MARCH 21 - 25, 2010

AICHe Spring National Meeting & 6th Global Congress on Process Safety  
San Antonio, Texas (Grand Hyatt Hotel)

<http://www.aiche.org/Conferences/SpringMeeting/index.aspx>

### AICHe Attendees Note!!

As part of the 2010 AICHe Spring Meeting, BakerRisk will host a tour and shock tube test demonstration at our 160-acre Wilfred E. Baker Research Test Facility near San Antonio on Sunday afternoon, March 21. The tour and demonstration will be provided at no charge (compliments of BakerRisk) to the first 50 registrants. A tour bus will pickup and return registrants to the Grand Hyatt Hotel.

Look for more details to be announced soon on BakerRisk's website and the AICHe Spring Meeting website (<http://www.aiche.org>). Registration will be coordinated through AICHe. Contact Jeff Baker ([jbaker@bakerrisk.com](mailto:jbaker@bakerrisk.com)) at BakerRisk for more information.

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