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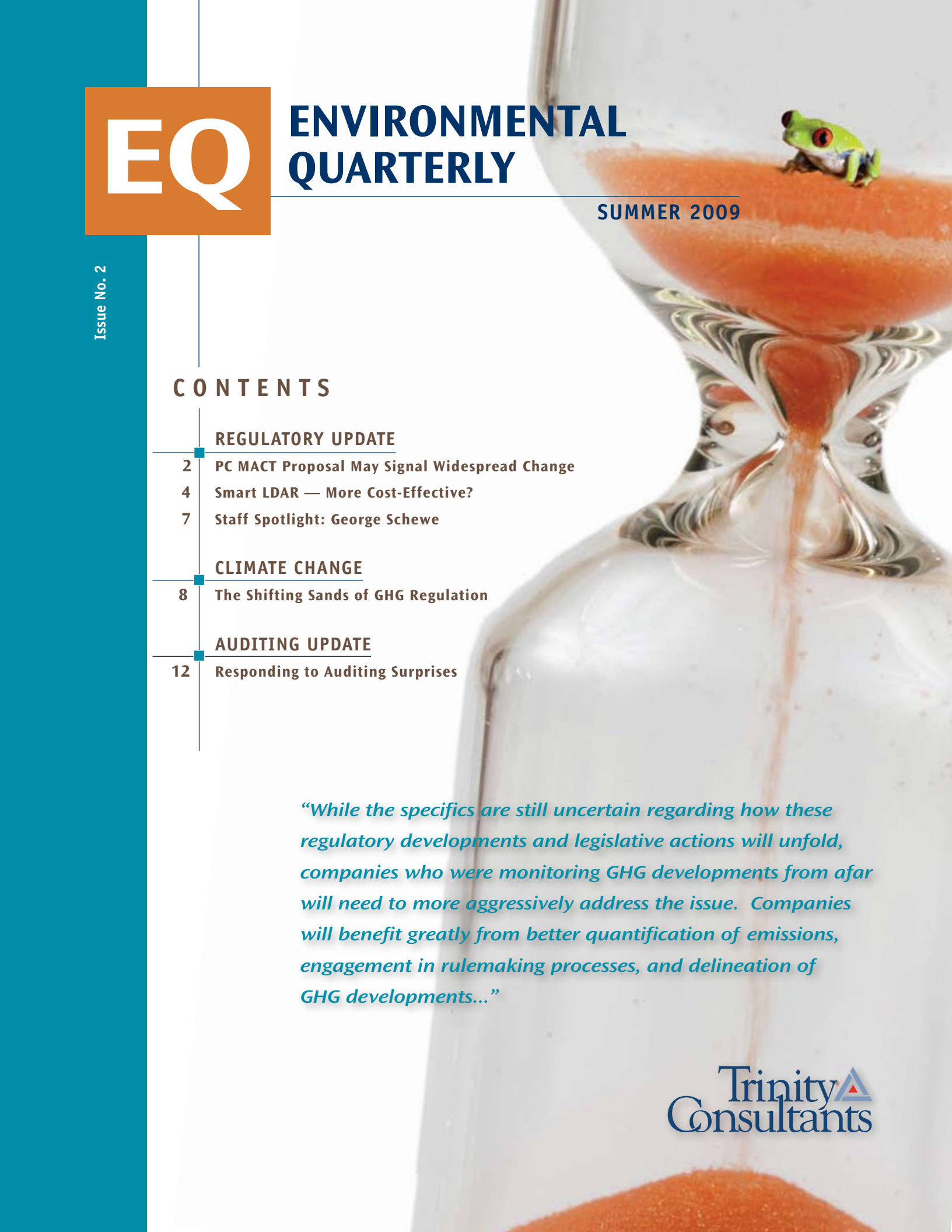

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Trinity Consultants

PC MACT Proposal May Signal Widespread Change

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On May 6, 2009, EPA proposed amendments to the National Emission Standards for Hazardous Air Pollutants from the Portland Cement Manufacturing Industry (PC MACT) in response to numerous petitions and court mandates. The proposed revisions present significant challenges to the portland cement industry by establishing a new lower maximum achievable control technology (MACT) floor that would require additional controls and monitoring not widely implemented on existing cement kilns. Should the methods utilized by EPA to amend the PC MACT become common in other MACT regulations, the challenges facing the cement industry could become ubiquitous among U.S. industrial facilities subject to MACT requirements.

Summary of Proposed Standards

The standards contained in the original PC MACT, the 2006 revisions, and the new 2009 proposed standards are summarized in Table 1. In the proposed rule, EPA established new MACT floors for new and existing sources of particulate matter (PM), total hydrocarbon (THC), mercury, and hydrochloric acid (HCl) emissions.

Procedures for Resetting the MACT Floor

EPA's methodology for resetting the MACT floor reflects several recent court rulings. In the original PC MACT, limits for mercury, HCl, and existing source THC were not established, as EPA determined that these emissions can be directly influenced by raw materials (or were determined to be of low risk in the case of HCl) and these pollutants were generally not actively controlled across the industry. However, the prior rulemaking approaches were rebutted in several court decisions that directed EPA in setting MACT floors, including the following:

- Sources with low HAP emissions, due to low levels of HAP in their raw materials, can be considered best performers in establishing the MACT floor [*Sierra Club v. EPA, D.C. Cir. 2007*]
- Floors for existing sources must reflect the average emission limitation achieved by the best performing 12 percent of existing sources, not levels EPA considers to be achievable by all sources [*Sierra Club v. EPA, D.C. Cir. 2007*]
- EPA cannot set floors of "no control." EPA must set floor standards for all HAP, including those not controlled by at-the-stack control devices [*Sierra Club v. EPA, D.C. Cir. 2007*]
- EPA cannot ignore non-technology factors that reduce HAP emissions [*Sierra Club v. EPA, D.C. Cir. 2007*]

In response to these court decisions/directives, EPA established a process to adopt a strict floor setting exercise in the proposed PC MACT rulemaking in which only the rate for the pollutant in question is used to determine the MACT floor, independent of emissions of other pollutants from the same kiln (i.e., the MACT floor was set based on pollutant specific basis – regardless of whether any one kiln could collectively meet the floor for all or related pollutants). The cement category has more than 100 sources and the floor for existing sources is the average of the top 12 percent of sources. In a stringent interpretation of this floor setting requirement, EPA used an average of the top 12 percent of sources even when the data population for a particular pollutant was less than 30 kilns. In the past, EPA used the average of the top 5 sources when data from less than 30 sources was available in setting a MACT floor. Under the revised approach used by EPA in this rule, the proposed existing source floor for THC is based on the average of the top 2 kilns and the existing source floor for HCl is based on the average of the top 4 kilns. Although this approach is more stringent, in its assessment of the data used to set the various floors, EPA concluded that the difference between the average of the top 5 sources and an average of the top 12 percent of sources is relatively small.

The proposed HCl MACT floor is an example where EPA fully utilized its regulatory discretion in setting emission standards. In past evaluations, EPA determined that no cement kiln, under worst operating conditions, would emit HCl at levels that would exceed acceptable health-based levels. Furthermore, modeling conducted by EPA shows that if a health-based standard was proposed, its value would be 23 ppmv, much higher than the proposed limit of 2 ppmv. EPA is not relying solely on health-based limits due to the substantial reductions in emissions of other pollutants, including SO_2 and other acid gases, PM, and ammonia, that will result from more stringent HCl control.

In general, this revised approach to setting MACT floor would likely present compliance challenges to any industry, but particularly for mercury, THC, and HCl emissions from cement kilns. Throughout the cement industry, emissions of these pollutants are rarely actively controlled and there is limited mitigation potential available through good operating practices. In other words, the emissions of these pollutants are directly related to their concentration in the kiln feed, which is fundamentally tied to the economic viability of a given cement plant. EPA chose not to establish kiln subcategories based on raw material HAP content, arguing specifically that in the case of mercury, there was not a distinct breakpoint for establishing separate subcategories based on the mercury content of lime feed. Therefore, the MACT floor is not established by sources with good operating practices, kiln technology, or controls currently demonstrated throughout the industry, but rather the HAP concentration of the raw materials readily available to their site. As a result, the only option for complying with these limits will be the installation of costly add-on controls under a "one limit fits all" proposal.

Compliance Costs

One downside of the "one limit fits all" MACT setting approach is that it does not account for case specific costs, including availability of raw materials, like a traditional

Table 1. Current and Proposed PC MACT Kiln Limits

Pollutant	PC MACT Version	Emission Limit	Ongoing Compliance Demonstration	EPA-Anticipated Controls	Notes
Existing Kiln or Existing In-line Kiln Raw Mill					
PM (filterable)[1]	1999 (Original)	0.3 lb/ton kiln feed	COMS or EPA Method 9 (daily)	ESP or Baghouse	Does not include condensables
	2006 (Amendments)				
	2009 (Proposed)	0.085 lb/ton clinker	BLDS, ESP Model	Baghouse	
THC (or OHAP)	1999 (Original)	None			
	2006 (Amendments)	None	Incorporated a good combustion practice - work practice standard		
	2009 (Proposed)	7 ppmv ,or 2 ppmv organic HAP	CEMS	ACI/RTO or Scrubber	
Hg	1999 (Original)	None			
	2006 (Amendments)	None	Incorporated a requirement to manage use of flyash with elevated Hg		
	2009 (Proposed)	43 lbs/MMton of clinker	CEMS	Baghouse w/ membrane bags	
HCl	1999 (Original)	None			
	2006 (Amendments)	None			
	2009 (Proposed)	2 ppmv	CEMS	Scrubber	
New Kiln or New In-line Kiln Raw Mill					
PM (filterable)[1]	1999 (Original)	0.3 lb/ton kiln feed	COMS or EPA Method 9 (daily)	ESP or Baghouse	Does not include condensables
	2006 (Amendments)				
	2009 (Proposed)	0.080 lb/ton clinker	BLDS, ESP Model	Baghouse	
THC (or OHAP)	1999 (Original)	50 ppmvd	CEMS	None	
	2006 (Amendments)	20 ppmvd or 98% reduction	CEMS	ACI, wet scrubber/RTO	For kilns that commenced construction after 12/05
	2009 (Proposed)	6 ppmv, or 1 ppmv organic HAP	CEMS	ACI/RTO or Scrubber	
Hg	1999 (Original)	None			
	2006 (Amendments)	41 mg/dscm, or implement controls		wet scrubber/RTO	
	2009 (Proposed)	14 lbs/MMton of clinker	CEMS	Baghouse w/ membrane bags	
HCl	1999 (Original)	None			
	2006 (Amendments)	None			
	2009 (Proposed)	0.1 ppmv	CEMS	Scrubber	CEMS not required for limestone wet scrubber

Table 1 Acronyms: THC -total hydrocarbons, BLDS - bag leak detection system, ACI - activated carbon injection, RTO - regenerative thermal oxidizer, ESP - electrostatic precipitator

best available control technology (BACT) analysis. For example, older, less-efficient plants that have low mercury and organics in their raw materials may bear less burden of MACT compliance compared to modern, well-controlled plants with greater compliance costs due to less optimal mercury or organic raw material sources. In the extreme case, EPA identified two cement kilns that utilize high mercury content raw materials and may not be able to meet the existing source mercury limit even if they apply best controls. For a new 1.3 million tpy kiln, EPA estimates the average cost of compliance with the proposed standards, including installation and operation of required control devices and CEMS devices, will be $17.6 million in capital cost with an annualized cost of $4.62 million. Given the similarities in emissions standards for new and existing sources in the proposed rule, the same controls will likely be required for both. The compliance costs for existing kilns may be even greater than for new kilns, since retrofitting existing equipment is typically more expensive than installing new equipment, and existing sources will not have *(Continued on page 15)*

[1] In the preamble to the proposed standard, EPA proposes to remove all opacity standards and to allow a PM CEMS in place of a BLDS, but has not yet proposed updated rule language to reflect this change.

Smart LDAR — More Cost-Effective?

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On December 19, 2008, EPA issued a final rule establishing a voluntary Alternative Work Practice (AWP) to detect leaks of volatile organic compounds (VOC) and hazardous air pollutants (HAP) from process equipment (FR Vol. 73, Number 246), thereby providing the regulated community additional flexibility in complying with leak detection and repair (LDAR) requirements. The AWP allows owners or operators of an affected facility to identify leaking equipment using an optical gas imaging instrument in lieu of a leak monitor as prescribed in Title 40, Code of Federal Regulations (40 CFR) Part 60, Appendix A (Method 21). The development of the AWP and its associated monitoring technologies are collectively referred to as "Smart LDAR."

What is Smart LDAR?

Beginning in the 1980s, EPA called for the implementation of LDAR programs for control of fugitive VOC emissions (i.e., emissions from piping components such as flanges, connectors, valves, pumps, etc.). Therefore, LDAR requirements were initially promulgated in the New Source Performance Standards (NSPS) under 40 CFR 60, Subpart VV. EPA went on to incorporate LDAR requirements in other NSPS and 40 CFR 61. These efforts were extended with the passage of the Clean Air Act Amendments of 1990, which resulted in the adoption of LDAR provisions into the Maximum Achievable Control Technology (MACT) rules under the National Emissions Standards for Hazardous Air Pollutants (NESHAP). More recently, the proposed mandatory Greenhouse Gas Reporting rule (40 CFR 98) contains fugitive monitoring provisions.

The current LDAR work practice requires the use of Method 21 to identify component leaks. Method 21 involves moving a gas sampling instrument probe around all leak interfaces (seals) and determining the highest VOC/HAP concentration. After determining the location of the highest concentration, the probe must remain at that location for two times the response time. The instrument readings are compared with levels established by EPA and/or the state air pollution regulatory agency to determine if the component leaks. If the measured VOC concentration at a component exceeds the leak definition (which typically varies from 500 parts per million by volume (ppmv) to 10,000 ppmv, depending on the type of component and specific subpart), the component must be repaired or replaced within a specified period of time. The repeated Method 21 measurement of emissions following such maintenance must be below the leak concentration level for the component to be considered repaired.

In 1997, the American Petroleum Institute (API) conducted a study of 11.5 million monitored refinery components to determine if there was a correlation between component type or application and its potential to leak. The study showed that over 90 percent of the controllable fugitive emissions were attributed to 0.13 percent of the components monitored, demonstrating that significant time and effort is spent monitoring components that, statistically, do not leak. Furthermore, after an LDAR program has been implemented at a site, the number of leaks detected during each subsequent monitoring period decreases because pre-existing leaks have been repaired and may not leak for extended periods of time. Although repair costs decrease as the number of leaks is reduced, the costs of conducting Method 21 monitoring is not always reduced in the same proportion. In some cases, the cost of conducting Method 21 monitoring may remain constant, resulting in a decrease in cost-effectiveness.

Conceptually, the costs associated with the current work practice of monitoring each component at a site individually could be significantly reduced by implementing a method that more efficiently locates the high leaking components without monitoring each piping component in the plant using Method 21. This concept, dubbed "Smart LDAR," could use newer technology to locate and repair the most significant leaking components more quickly and at less cost than the current work practice.

Technologies Evaluated

Remote sensing (i.e., the acquisition of data through the use of either recording or a real-time sensing device, such as imaging, that is not in direct physical contact with the object being monitored) and instantaneous detection capabilities of Smart LDAR technology can allow an operator to scan process areas containing tens to hundreds of components in real time. Significant leaks can be identified immediately, allowing

quicker repair and ensuring efficient use of resources. In the development of the AWP, EPA researched multiple remote sensing technologies to measure pollutant concentrations, including the following:

- Ultra-Violet Differential Optical Absorption Spectra (UV- DOAS)
- Open-Path Fourier Transform Infrared Spectroscopy (OP-FTIR)
- Rama-Spectroscopy
- Tunable Diode Laser (TDL)
- Differential Absorption Light Detection and Ranging (DIAL/LIDAR)
- Optical Gas Imaging

To date, the only technology that has been approved and implemented as an AWP is optical gas imaging. Due to issues such as excess expense, technical limitations of the number and type of chemical species detected, interference from non-target emissions, and required expertise for calibration and operation, the other technologies have not been approved as an AWP. However, LIDAR, which utilizes laser absorption and reflection to generate a differential signal that can be used to calculate the concentration of the target compound, is currently in use in both ground-level and airborne applications by EPA and a number of state agencies to create concentration contouring of various chemicals and to validate emission factors.

Two types of optical gas imaging cameras are available for use as an AWP, the basic operation of which are explained below:

- ***Active Optical Gas Imaging*** **-** utilizes a laser beam reflected (backscattered) by the background to detect the chemical present. The optical image is produced by the reflected light with a light wavelength strongly absorbed by the gas cloud. The image is displayed real-time on the screen of the gas imaging camera.

- ***Passive Optical Gas Imaging*** **-** a passive technology that records the difference in absorption of specific infrared (IR) wavelengths in the field of vision and produces the appearance of a cloud where the chemical is present. The technology uses different combinations of lenses, detectors and filters for detecting different pollutants. The optical lens of a passive gas imaging camera can be tuned to illuminate target compounds (a principle similar to that used in "night-vision" equipment) to detect leaks.

Optical gas imaging technology offers several advantages from the perspective of Smart LDAR implementation. It meets the Smart LDAR requirements of providing efficient real-time leak analysis while also being lightweight, compact, and robust, thereby allowing a single operator to easily transport the equipment for use under field conditions. In addition, since the cameras can be used to detect leaks from a distance, they provide a greater element of operator safety over the current work practice using Method 21.

The chief limitation of optical gas imaging is related to calibration of the camera. Each camera is calibrated based on the required detection limits of compounds that possess a specific range of absorption and reflection wavelengths. If a site is required to monitor pollutants whose ranges do not overlap, the camera must be recalibrated for the second group of pollutants or another camera used. Other issues that may be considered roadblocks to implementation include the requirement for daily instrument checks, the potential requirement by state agencies that operators must undergo accredited formal training, and the high initial equipment costs (currently available cameras carry a price tag of approximately $85,000.) However, these disadvantages may not necessarily preclude the implementation of optical gas imaging technology as an AWP, particularly for larger sites.

Smart LDAR Implementation

Passive optical gas imaging cameras are being widely used throughout industry for leak detection. State agencies are now using this technology in statewide fugitive emissions reduction initiatives (e.g., the Texas Commission on Environmental Quality's "Find-It-and Fix-It" program and aircraft overflights over industrial areas such as the Houston Ship Channel). Optical gas imaging cameras have been used to detect the presence of unburned hydrocarbons in flare plumes outside of the flame and to determine combustion efficiency in various combustion sources. Besides industrial applications, optical gas imaging was used by EPA and the Louisiana Department of Environmental Quality in detecting leaks and other sources of air pollutants, post Hurricane Katrina. The table on page 6 is a partial list of local, state, and federal agencies that currently operate optical gas imaging cameras for the purpose of performing various surveillance and compliance investigations.

In addition to being implemented into LDAR programs as an AWP, optical gas imaging cameras may be utilized in the future by industry and regulatory agencies for various other tasks, such as safety and risk mitigation applications, sulfur hexafluoride (SF_6) detection as part of the collaborative effort between EPA and the electric power industry to reduce greenhouse gas emissions (the SF_6 Emission Reduction Partnership), and the quantification of emissions, once the technology is further developed.

Considerations

There are several key points to consider before implementing an optical gas imaging camera for fugitive gas leak detection.

- The definition of a leak is any visual indication whether seen via camera or naked eye, which is a departure/ additional to existing work practice standard. For instance, visual indications of a leak from a gas/vapor or light liquid service valve are not addressed in current work practice standard. Visual indications of a leak from a valve in heavy liquid service would be considered a potential leak. The facility can then decide to eliminate

the potential leak or conduct Method 21 monitoring to determine if it meets the leak definition. Visual indications from a pump (except for pumps addressed under the Hazardous Organic NESHAP [HON] rule) are considered potential leaks; however, under AWP they would be considered leaks.

- When the AWP is used, owners/operators must also perform annual monitoring using the Method 21 instrument and provide all the Method 21 monitoring results to EPA via email. Therefore, owners or operators who are only required to conduct annual monitoring as part of their LDAR program would not benefit from implementing the AWP. Additionally, weekly visual inspections of affected pump/agitator components may still be required, as prescribed under the current LDAR program, if a site plans to adopt the AWP.
- Smart LDAR does not allow for decrease in monitoring frequency due to "good behavior," as does the current work practice. Thus, the cost savings realized due to decreased monitoring frequencies when using Method 21 do not apply to the AWP.
- After detecting leaks analogous to the existing work practice standard, owners or operators must re-check the repaired equipment for further leaks with the same gas imaging camera or they may use Method 21 to confirm that the leak has been repaired.
- Owners or operators must perform the specified daily calibration checks to ensure proper operation.
- Owners or operators should be aware of the high initial cost of the equipment and are advised to perform a cost-benefit analysis before purchasing and implementing optical gas imaging equipment. In general, the company would realize a greater benefit in the long run, due to a reduction in labor cost. Additionally, some companies have taken the approach of purchasing one camera for multiple sites to minimize the cost per site. Another option for managing cost is to contract the testing from a firm that specializes in air quality compliance, fugitive leak monitoring, and stack testing.

Local, State, and Federal Agencies Using Official Gas Imaging Cameras for Fugitive Leak Detection

Level	Agency
Federal	U.S. Environmental Protection Agency (EPA)
	U.S. Department of Interior - Mineral Management Service (MMS)
State	California - Bay Area Air Quality Management District (BAAQMD)
	California - South Coast Air Quality Management District (SCAQMD)
	Delaware - Department of Natural Resources and Environmental Control (DNREC)
	Illinois - Environmental Protection Agency (IEPA)
	Louisiana - Department of Environmental Quality (LDEQ)
	Montana - Department of Environmental Quality (MODEQ)
	New Jersey - Department of Environmental Protection (NJDEP)
	Texas - Commission on Environmental Quality (TCEQ)
Municipalities	City of Houston - Bureau of Air Quality Control (BAQC)
	City of Philadelphia - Air Management Services (AMS)

It is important to note that current optical gas imaging technology cannot quantify or speciate individual chemical compounds although there are efforts currently underway to adapt the technology to such applications. These enhancements include development of software that may interpret gross emission rate based on video imagery. Once the technology is fully realized, industry and agencies alike may be able to quickly and accurately determine compliance for other air emissions-related parameters, such control device performance and emissions limits, in real-time with the click of a button.

See You on the Road

Drop by the Trinity booth at any of these upcoming conferences. We look forward to seeing you!

Kansas Environmental Conference
August 18-20 *Wichita, KS*

MCIC - EHS Safety School
August 24-25 *Raleigh, NC*

NCASI Western Regional Meeting
September 1 *Portland, OR*

TCEQ Advanced Air Permitting Seminar
September 29-30 *Austin, TX*

Environmental Federation of Oklahoma's 17th Annual Meeting
October 1 *Tulsa, OK*

Iowa-Illinois Safety Council's 23rd Annual Environmental Conference & Expo
October 1 *Davenport, IA*

Atmospheric Scientist Tackles Complex Air Quality Issues

GEORGE SCHEWE, a Certified Consulting Meteorologist and Qualified Environmental Professional, joined Trinity's Covington, Kentucky office in 2008. A veteran of EPA with nearly three decades of consulting experience, George is well-versed in air quality regulatory requirements and a master in complex air dispersion modeling analyses. Here is George's take on his role and current environmental issues.

Q. George, how would you describe your role at Trinity?

A. That's an interesting question. Trinity is certainly well known for its air modeling prowess and I have worked for a number of years performing similarly challenging modeling work. My internal role here at Trinity is one of providing senior experience and mentoring due to the sheer number and variety of modeling scenarios in which I been involved over the years from my EPA experience to consulting. I like to share that experience however possible through instruction, project participation, project management, leadership roles in outside organizations, and through company pow-wows that focus on everything from the most sophisticated, new modeling techniques to the everyday task of interpreting the results. Externally, I continue to be focused on applying strategic modeling and regulatory analyses to assist clients in meeting their air quality challenges.

Q. What are the most pressing environmental challenges your clients seem to be facing in 2009?

A. In 2009, clients are facing a number of environmental challenges. First and foremost will be maintaining continued compliance while trimming environmental budgets and staff. Most companies want to maintain operations to the extent possible in spite of the economic downturn. Once the economy begins to recover, companies want to have their staff and resources intact, and their operations poised to respond. Another important challenge for companies in this new era is to have a plan for sustainability and low impact while leaning to green in terms of resource use, emissions, and overall impact on the environment. Energy and resource conservation were not high priorities until the last decade when we realized this approach saves money, saves resources, and makes sense. It's exciting to be working with clients on meeting these challenges.

Q. How are you supporting clients in addressing these issues?

A. One way we are trying to address client needs in this challenging economic environment is to provide alternatives for consideration in terms of facility actions, plans, and subsequent subjectivity to applicable regulations. Initial screening modeling that identifies relative impacts of various control strategies, facility layouts, operational changes, time-of-day operations, etc. can go a long way to reducing emissions, reducing impacts, minimizing modeling costs, and revealing culpable sources where emphasis can then be placed. I believe we can offer a quality product for a reduced cost to the client by using a strategic approach that includes initial discussions and meetings with the client and with regulatory agencies when possible to clarify how the modeling should proceed. This is consistent with our client service model always but is particularly important in today's environment.

Q. How do you anticipate the environmental field (issues) changing over the next decade?

A. I expect more regulations on everything but still a big emphasis on the big sources such as power plants. Who would have thought 20 years ago that lawn mowers, chain saws, and barbecue grills would be regulated, not to mention wood burning stoves? As we enter a new era in energy production—more wind turbines, solar, nuclear, and the swing toward sustainability and environmentally safe technologies, I anticipate more integration of industry and green technologies. Ultimately, I hope successful integration will lead to a cleaner environment supported by more sustainable technologies that are cost-effective for industry. ✥

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The Shifting Sands of GHG Regulation

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So far this year, there have been significant developments on U.S. climate change policy, including movement toward mandatory reporting and regulation of greenhouse gas (GHG) emissions at the federal level via either a cap-and-trade program or possibly existing Clean Air Act mechanisms. While the specifics are still uncertain regarding how these regulatory developments and legislative actions will unfold, companies who were monitoring GHG developments from afar will need to more aggressively address the issue. Companies will benefit greatly from better quantification of emissions, engagement in rulemaking processes, and delineation of GHG developments that should be of highest priority to corporate environmental managers including:

- EPA's proposed mandatory GHG reporting rule
- EPA's proposed GHG endangerment finding
- Emerging cap-and-trade legislation (e.g., 2009 American Clean Energy & Security Act, or the "Waxman-Markey" legislation).

EPA Mandatory GHG Reporting

On April 10, 2009, the U.S. EPA proposed federal greenhouse gas (GHG) reporting and related monitoring, recordkeeping, and verification requirements. The proposed Title 40 of the Code of Federal Regulations (40 CFR) Part 98 would cover stationary sources. The public comment period for the rule closed on June 9, 2009. EPA is under a requirement by Congress to finalize the rule by June 26, 2009; however, EPA stated that it is unlikely to meet the deadline. Recent reports have noted a potential issuance date of October or November 2009.

Unlike most voluntary GHG reporting registries which rely on corporate-level reporting, EPA has proposed facility-level reporting with some exceptions. Generally, the reporting threshold will either be 25,000 metric tons of carbon dioxide equivalent (CO_2e) in any calendar year, (starting in 2010) or capacity-based thresholds. Facilities may be subject to the rule if they contain one or more of the identified source categories (subparts B – PP). Tables identifying the source categories subject to the rule are provided below.

The proposed methodologies for calculating GHG emissions include direct measurement for facilities that already collect GHG emissions data via monitoring under 40 CFR Part 75 or Part 60 and facility-specific calculations for other source categories. For small facilities with only stationary combustion sources, EPA eased the burden of determining rule applicability by automatically excluding any facility that has an aggregate maximum rated heat input capacity of all stationary fuel combustion units of less than 30 MMBtu/hr and no other GHG emission sources on-site.

Calculation and monitoring methods are prescribed in the rule. The requirements for emissions calculation and monitoring are dependent on source category processes and fuels. In some cases, facilities must use a particular emission calculation methodology

Table 1: Source Categories Subject to Proposed GHG Reporting

Facilities that contain any of the source categories listed below in any calendar year starting in 2010, must report emissions for which calculation methodologies are provided.

• Electricity generating facilities that are subject to the Acid Rain Program, or that contain electric generating units that collectively emit 25,000 metric tons CO_2e or more per year
• Adipic acid production
• Aluminum production
• Ammonia manufacturing
• Cement production
• Electronics - Semiconductor, microelectricmechanical system (MEMS), and liquid crystal display (LCD) manufacturing production facilities with an annual production capacity that exceeds any of the following thresholds
  • Semiconductors: 1,080 m^2 silicon
  • MEMS: 1,020 m^2 silicon
  • LCD: 235,700 m^2 LCD
	• Electric power systems that include electrical equipment with a total nameplate capacity that exceeds 17,820 lbs (7,838 kg) of SF_6 or perfluorocarbons (PFCs)
	• HCFC-22 production
	• HFC-23 destruction processes that are not collocated with a HCFC-22 production facility and that destroy more than 2.14 metric tons of HFC-23 per year
	• Lime manufacturing
	• Nitric acid production
	• Petrochemical production
	• Petroleum refineries
		• Phosphoric acid production
		• Silicon carbide production
		• Soda ash production
		• Titanium dioxide production
		• Underground coal mines that are subject to quarterly or more frequent sampling by MSHA of ventilation systems
		• Municipal landfills that generate CH_4 in amounts equivalent to 25,000 metric tons CO_2e or more per year
		• Manure management systems that emit CH_4 and N_2O in amounts equivalent to 25,000 metric tons CO_2e or more per year

Source: Subpart A General Provisions Fact Sheet EPA # 430-F-09-006

Table 2: Sources Potentially Subject to Proposed GHG Reporting Based on CO_2e Emissions		
Any facility that does not contain any of the source categories listed in Table 1, would be required to determine whether it emits 25,000 metric tons of CO_2e or more in combined emissions from stationary fuel combustion, miscellaneous carbonate use, and the source categories listed in this table in any calendar year starting within 2010. If so, the facility must report emissions from all source categories at the facility for which calculation methodologies are provided in subparts B - JJ only of the proposed rule.		
• Electricity Generation • Electronics - Photovoltaic Manufacturing • Ethanol Production • Ferroalloy Production • Fluorinated Greenhouse Gas Production • Food Processing	• Glass Production • Hydrogen Production • Iron and Steel Production • Lead Production • Magnesium Production	• Oil and Natural Gas Systems • Pulp and Paper Manufacturing • Zinc Production • Industrial Landfills • Wastewater Treatment

Source: Subpart A General Provisions Fact Sheet EPA # 430-F-09-006

Table 3: Sources Potentially Subject to Proposed GHG Reporting Based on Heat Input Capacity and CO_2e Emissions		
Any facility that in any calendar year starting in 2010 has an aggregate maximum rated heat input capacity of the stationary fuel combustion units at the facility of 30 MMbtu/hr or greater and emits 25,000 metric tons CO_2e or more per year from all stationary fuel combustion sources, and which do not contain any source categories listed in Table 1 or Table 2, may submit an abbreviated emissions report according to §98.3(d) for 2010.		
Stationary Combustion Sources Include:		
• Boilers • Stationary Engines	• Process Heaters • Combustion Turbines	• Incinerators • Other Fuel Combustion Equipment

Source: Subpart A General Provisions Fact Sheet EPA # 430-F-09-006

Table 4: Fossil Fuel Suppliers Potentially Subject to Mandatory GHG Reporting		
Any facility that is a supplier of fossil fuels listed in this table in any calendar year starting in 2010, must report volume of fuel that is placed into the economy and emissions associated with complete oxidation of fuel. Suppliers include producers, importers, and exporters. If the facility is a supplier of industrial GHGs, supplying product that is equivalent to 25,000 metric tons of CO_2e listed in this table, the facility would report the annual volume of product placed into the economy and the emissions associated with the complete release of the product. The GHG emissions report must cover all applicable products for which calculation methodologies are provided in subparts KK and PP of the rule.		

• Any supplier of any of the following products:
  • Coal
  • Coal-based Liquid Fuels
  • Petroleum Products
• Industrial Greenhouse Gases
  • All producers of industrial greenhouse gases
	• Importers of industrial greenhouse gases with total bulk imports that exceed 25,000 metric tons CO_2e per year.
	• Exporters of industrial greenhouse gases with total bulk exports that exceed 25,000 metric tons CO_2e per year
	• Carbon Dioxide
	  • All producers of carbon dioxide
		• Importers of CO_2 or a combination of CO_2 and other industrial GHGs with total bulk imports that exceed 25,000 metric tons CO_2e per year
		• Exporters of CO_2 or a combination of CO_2 and other industrial GHGs with total bulk exports that exceed 25,000 metric tons CO_2e per year

Source: Subpart A General Provisions Fact Sheet EPA # 430-F-09-006

due to process type, unit size, and fuel burned. The rule may require facilities to review and update monitoring equipment and record-keeping practices to comply with the rule. It is important to note that these changes may be associated with high capital costs and increased labor burdens for some sectors.

As proposed, reporting would be required annually, with the first reports due March 31, 2011 for calendar year 2010 emissions, except that facilities already reporting quarterly for existing mandatory reporting programs such as the Acid Rain program will continue to report quarterly. For many facilities, data collection and monitoring will begin January 1, 2010, as currently proposed.

The proposed rule would require reporting of annual emissions of carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), sulfur hexafluoride (SF_6), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and other fluorinated greenhouse gases. Currently, third-party verification is not required, unlike some other voluntary and state-level GHG reporting programs. Like most EPA regulatory programs, reporters will self-certify emissions and related activity data and potentially face enforcement action for non-compliance. Facilities must keep detailed monitoring, reporting, and recordkeeping information and must keep detailed documentation on how company records are used to estimate emissions. The proposed mandatory reporting program was developed to provide comprehensive and accurate data that would inform future climate change policies. Therefore, we can assume that the reporting rule is an initial step toward mandatory GHG reduction regulation, including potential cap-and-trade regulation. For some facilities subject to the rule, this can mean potentially a significant financial liability related to the cost of carbon allowances and implementation of reduction projects, as well as financial opportunities associated with carbon offsets. As EPA moves toward promulgation of the mandatory GHG reporting rule, Trinity recommends the following steps for potentially affected facilities:

1. Monitor developments with EPA's proposed mandatory GHG reporting rule. Organizations should understand the rule and how it affects their operations.
2. If a facility has not yet prepared a GHG emissions inventory, this is certainly the time to start the inventory process. Develop or refine your GHG emissions inventory using methodologies provided in the proposed rule to the extent practicable. Conducting an inventory will allow you to evaluate your organization's potential exposure if carbon has a future cost (through a cap-and-trade scheme) in addition to the cost of potential reductions.
3. Conduct a gap analysis of current monitoring and recordkeeping procedures for comparison with those required in the proposed rule. Many of the subparts in the proposed rule include monitoring requirements that exceed current procedures. Estimate what internal and external resources will be required for rule compliance and incorporate these resource requirements into future budgets.
4. Start developing your internal systems for recordkeeping, monitoring, calibration, and reporting procedures. Keep in mind that you may have to maintain multiple inventories, depending on your voluntary, state, and regional GHG requirements.
5. Consider how to protect existing or early reductions through a voluntary reduction registry process such as the California Climate Action Registry. Understand that there may be confidentiality provisions within the rule; however, your facility's GHG emissions will be public information.

EPA's Proposed GHG Endangerment Finding

In 1999, EPA first received a petition from several environmental groups to regulate GHGs from new motor vehicles under the Clean Air Act (CAA). The Clinton administration did not act on this petition, and in 2003, the Bush administration denied the petition. The denial was based on the opinion that the CAA did not authorize EPA to regulate GHGs. Environmental groups and several states, led by the state of Massachusetts, challenged EPA's denial of the petition in federal court. Initially in 2005, the D.C. Circuit Court of Appeals supported the Bush administration's denial in a 2-1 decision, holding that Congress did not intend the CAA to control GHGs. However, the U.S. Supreme Court ultimately overturned the D.C. Circuit Court's decision in a closely split 5-4 decision on April 2, 2007. Key findings in that ruling (*Massachusetts v. EPA*) included the following:

- The plaintiffs have standing to sue EPA
- EPA has the authority to regulate GHGs under the CAA
- GHGs fit within the definition of air pollutant under the CAA

Proposed GHG Reporting Requirements	Proposed GHG Reporting Schedule *(Submit an annual GHG report by March 31 of each calendar year)*
Facility Must: • Collect emissions data • Calculate GHG emissions • Follow procedures for quality assurance, missing data, recordkeeping, and reporting	**Existing Facility:** A facility that started operation before January 1, 2010. Report emissions for calendar year 2010 and each subsequent calendar year.
	New Facility: A facility that starts operation on or after January 1, 2010. Report emissions for the first calendar year in which the facility operates, beginning with the first operating month and ending on December 31 of that year. Each subsequent annual report must cover emissions for the calendar year, beginning on January 1 and ending on December 31.
	Facility or Supplier: Facility/Supplier subject to this rule because of physical or operational change made after January 1, 2010. Report emissions for the first calendar year in which the change occurs, beginning with the first month of the change and ending on December 31 of that year.

Source: EPA Proposed Mandatory Reporting Rule, Docket ID No. EPA-HQ-OAR-2008-0508

With this decision, EPA was instructed to make an endangerment finding for GHGs under Section 202(a) of the CAA or provide reasonable explanation why it cannot make such a finding. Once an air pollutant is found to pose a danger to public health or welfare, rulemaking generally follows. EPA issued two key findings for GHGs from mobile sources in the proposed endangerment finding published in the Federal Register on April 24, 2009:

1. **Endangerment Finding:** Atmospheric concentrations of six categories of GHGs (CO_2, CH_4, N_2O, SF_6, HFCs, PFCs, and SF_6) endanger public health and welfare within the meaning of Section 202(a) of the CAA.

2. **Cause or Contribute Finding:** Combined emissions of carbon dioxide, methane, nitrous oxide, and hydrofluorocarbons from new motor vehicles and new motor vehicle engines contribute to this mix of GHGs in the atmosphere.

It is important to note that the proposed endangerment finding itself does not impose any specific requirements on industry or other entities at this point. However, this rulemaking has laid the groundwork for new GHG emissions standards for motor vehicles as well as potential stationary source rulemaking, depending on the path of cap-and-trade legislation.

While this endangerment finding pertains to mobile source regulation pursuant to Section 202 of the CAA, other sections of the CAA, including those affecting stationary emission sources, have similar endangerment language. Interestingly, EPA chose to make an endangerment finding for six categories of GHGs even though the *cause or contribute* finding for mobile sources only encompasses four of these categories. Thus, this endangerment finding for GHGs for mobile sources could easily lead to similar findings for sections of the CAA affecting stationary sources such as power plants, manufacturing facilities, etc., either directly by EPA or through further litigation and additional rulemaking.

Despite this significant action, the Obama administration and EPA Administrator Lisa Jackson have stated their preference for Congress to pass comprehensive GHG legislation using a market-based approach. Such legislation could preempt EPA from pursuing GHG regulation under the CAA. For example, the draft American Clean Energy Security Act of 2009 legislation includes language to preempt GHG regulation under some provisions of the CAA. Nonetheless, EPA could continue on a simultaneous path of CAA regulation if Congressional action on GHG regulation stalls or a court decision forces action sooner.

A timetable for issuing GHG regulations as a result of the endangerment finding is unclear, as evidenced by EPA Administrator Jackson's commitment that EPA would not engage in "rash decision making." Moreover, it is unclear as to what type of GHG regulation industrial sources might face as a result of an endangerment finding under the stationary source sections of the CAA. EPA's July 23, 2008 advance notice of proposed rulemaking (ANPR) for regulation of GHGs , identified three CAA pathways for regulating stationary sources: (1) national ambient air quality standards (NAAQS)/ new source review permitting; (2) new source performance standards (NSPS); or (3) maximum achievable control technology (MACT) standards. Clearly, EPA has not decided at this point which pathway to pursue. Some have argued that the rigidity of the CAA would cause an enormous amount of previously unregulated, smaller stationary sources to be regulated under a CAA regulatory scenario. However, recent Senate testimony from Administrator Jackson suggests that the agency would use discretion in regulating sources, as it has under other CAA-derived regulations. Regardless, the path of the endangerment finding must be watched closely by industry over the coming months, as it potentially gives EPA broad discretion and power to regulate stationary source and mobile source GHGs.

Developing Carbon Cap-and-Trade Legislation

While there is a potential pathway for GHG regulation for stationary sources through the previously discussed endangerment finding, a market-based cap has been noted by the Obama administration as the preferred method for GHG regulation. The American Clean Energy and Security Act (ACES) of 2009, containing draft cap-and-trade legislation, passed in the House Energy and Commerce Committee by a vote of 33-25. *(As of publication date, the bill has passed the House with a 219-212 vote, adopting over 300 additional pages of changes through a "Manager's Amendment.")*

The draft legislation has the potential to impact a wide number of sectors, including many of the sectors impacted by EPA's proposed mandatory GHG reporting rule. The cap-and-trade program will also require the following reductions from capped sources according to the recently passed draft legislation:

- 3% below 2005 levels by 2012
- 17% below 2005 levels by 2020
- 42% below 2005 levels by 2030
- 83% below 2005 levels by 2050

The largest cause for concern with the ACES proposal is the awarding of emissions allowances – by free allocation, auction, or a combination of free allocation and auction. On balance, the legislation currently allows for free allocation of approximately 85% of the allowances early in the program, moving to auctioning over time. The cost differential is significant, as some industry sectors will have a portion of their allowances awarded at no cost, while many industry sectors would go to auction for allowances and pay the market price in $/ton for GHGs emitted.
(Continued on page 14)

Responding to Audit Surprises

STEVE FREEMAN
MANAGER —EH&S AUDITING

An audit is a systematic and documented investigation to determine if prescribed processes are functioning as intended. We audit to find out whether processes are working properly, where they are not working properly, and how to address identified gaps. No matter how diligent the staff is in following procedures, there are nearly always revelations indicating needed corrections and opportunities for improvement. Whether an audit is conducted as part of a due diligence process, to evaluate management system effectiveness, or to assess routine EH&S compliance, the audit process allows us to reset the system back to where it should be.

Types of Audit Surprises

Since there is a high likelihood that audits will reveal unexpected problems, it is important to understand how to handle those surprises. Every situation is different in the specifics, however, negative findings generally occur in a few primary categories: legal violations, procedural discrepancies or corporate system violations. Legal violations will, of course, require immediate attention. In the case of a safety issue, it may be critical to isolate the problem immediately to reduce the possibility of injury. If there is an environmental compliance issue, it may be necessary to mitigate the situation. In situations of lesser urgency, it may be sufficient to simply stop the situation from continuing while an investigation is conducted to identify the root cause of the problem.

When investigating a potential legal issue, it is important to refrain from jumping to conclusions. A careful analysis is needed to determine if an actual violation exists. If the problem is a system or procedural violation, rather than a legal one, it still may be important to act quickly to prevent a financial loss. No matter which type of issue exists, it is critical that the situation be investigated thoroughly, the root causes discovered, and appropriate corrective actions taken. Below are a few real-world situations for illustration.

1. During a regulatory compliance audit at a chemical and components parts manufacturer, the auditor discovered that the company's wastewater discharge from a large parts washer associated with their painting operation was being sent to a municipal water treatment system. The company believed they were obeying the law because they were operating within the limits of their state- issued NPDES permit. They had made an earlier decision to stop discharging to the local creek and route their discharge directly to the city system instead. In making this change they failed to consider city sewer ordinances which had tighter limits than their permit. When the audit revealed the problem, the initial concern was that a violation of the city ordinance existed. A careful investigation revealed that although their system would have allowed for a legal violation, their records revealed that no actual violation had occurred. The audit found the problem before any violation had occurred and gave them the opportunity to take appropriate corrective action without any legal difficulties.

2. In a similar audit, a different company, that has an excellent reputation for safety, redesigned a room to include explosion proof electrical fixtures for the storage of highly flammable solvents. The audit revealed an improper repair of one electrical fixture in the room. The repair compromised the explosion proof design and created a major fire risk. Immediate action was needed to assure the safety of all involved. The audit made it possible to eliminate a serious fire hazard.

3. At a telecommunications company that designed its products and new facility without asbestos, an auditor was assured that there was no asbestos onsite. Nevertheless, the auditor discovered asbestos in the hazardous waste shed. The subsequent investigation revealed that the company's installers were cleaning up the waste they created at their clients' sites and were returning it to the company shed. This included the dust created from drilling through floor tile that contained asbestos. The environmental manager was previously unaware of the practice. The audit revealed a situation that required correction due to both safety and environmental concerns.

Identifying the Root Cause

All three of these situations required some form of corrective action but the causes varied considerably. A root cause analysis is an effective way to determine the true reasons for the problem, leading to corrective actions that are permanent rather than quick fixes. A simple technique for performing a root cause analysis is known as the "Five Why" approach. Don't just ask why a problem occurred but rather ask "Why?" five times consecutively. For example, consider the scenario above at the chemical company where the city sewer ordinance was not considered. The "Five Why" approach might look like the following:

Problem Statement- The wastewater was being sent to the POTW without considering the limits of the city sewer ordinance.

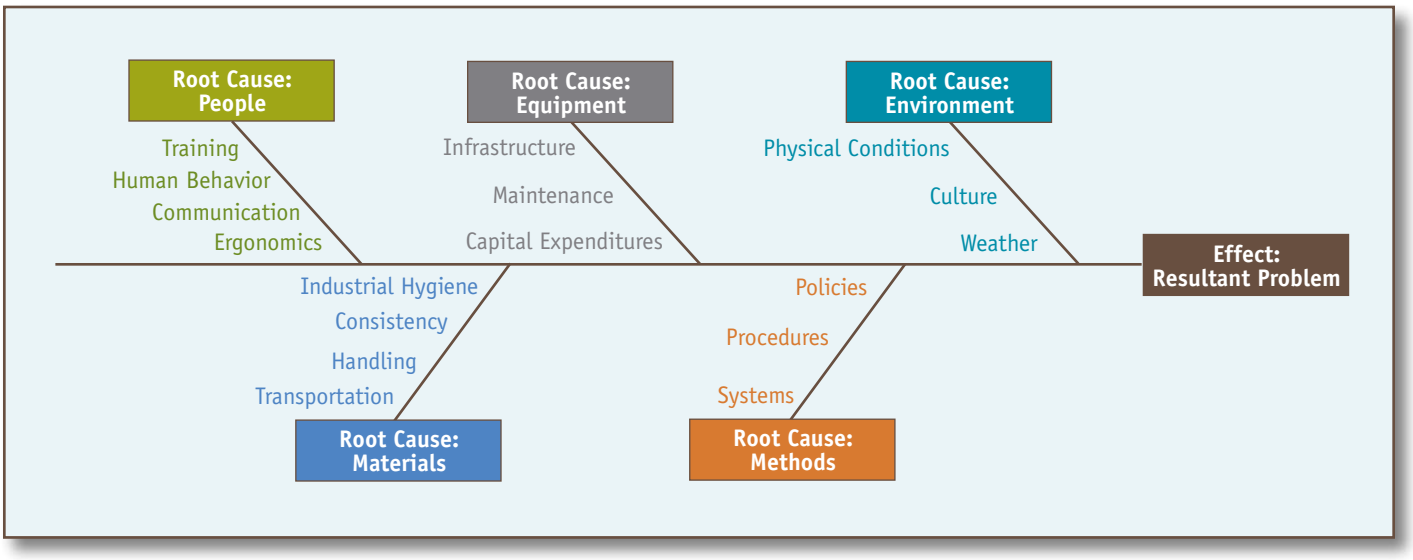
WHY #1 - We thought the State NPDES Permit covered the waste water discharges.

WHY #2 - We were unaware of the City Sewer Ordinance.

WHY #3 - We failed to research the legal implications when we made a change to the plant's handling of wastewater.

WHY #4 - We did not inform the plant environmental manager of the plant change.

Auditing Cause-and-Effect Diagram



WHY #5 - The plant environmental manager is not routinely copied on plant infrastructure changes.

If the staff stopped at WHY #1, they would have corrected the potential problem of a violation of the city ordinance but not addressed the root cause. As a result, there could have been a reoccurrence of the issue when a different plant infrastructure change occurred. The root problem was not the legal one but rather that the environmental manager was not being informed of changes that could affect plant compliance. The "Five Why" process revealed the root cause that will allow them to address the immediate problem and prevent the problem from reoccurring in the future. Of course, simple problems may not always need to have five levels of asking "Why?" and complex issues may require deeper investigation. The concept, however, is to repetitively ask "Why?" until the root cause is identified.

The strength of the "Five Why" approach is its simplicity. This encourages its use in a wide variety of situations. On the other hand, more complicated situations may require a more in-depth evaluation. A modified version of the "Five Why" approach is usually needed when multiple root causes are found. In these cases it is usually best to break down each root cause separately by dividing them into categories such as:

- **People -** training, human behavior, ergonomics, communications
- **Equipment -** infrastructure, maintenance, capital expenditures
- **Environment -** physical conditions, culture, weather
- **Materials -** industrial hygiene, consistency, handling, transportation
- **Methods -** policies, procedures, systems

Each category may contain a separate root cause to a problem. A Cause and Effect Diagram (Fishbone diagram) is often an excellent tool for analyzing the various root causes. In the simple example above there are indications of root causes in the training, communications, infrastructure and systems categories. The company had failed to train the Facility Engineer about the compliance consequences of rerouting wastewater discharges. There were communications issues among the Operations Management, Facilities department and the EH&S department. The infrastructure may have been in question due to improper labelling of the facility piping or out-of-date facility drawings. Finally the system of making facility changes without considering the EH&S implications indicates a weakness in the maintenance & capital improvements procedures. Each category's root cause could involve a different aspect of the problem's resolution.

It may be of value to next consider doing an FMEA (Failure Mode Effects Analysis) to explore all the possible means of the process failing and the methods of prevention. In complex cases, it may be desirable to use Scatter Diagrams and Correlation Analysis to determine trends and to find the central reality in the mass of seemingly inconsistent data. Statistical Process Control techniques may also be used to analyze and monitor processes when multiple root causes are having a variable effect on the outcome. In evaluating all of this, it is important to remember "Occam's Razor" which states that when multiple competing theories exist it is usually the simplest one that is correct. In other words, we should start with the simple and work toward the complex to ensure the potential benefit is greater than the risk.

Although surprises are common during audits, handling them with a thorough examination of the facts, a careful analysis of the requirements, and a diligent focus on root causes can lead to appropriate corrective actions. Of course, there was also an audit of a plastics manufacturer that "unearthed" a four foot snake living in a storage area. Now that was a surprise of a different nature!

The Shifting Sands of GHG Regulation *(Continued from page 11)*

The legislation proposes awarding a percentage of free allowances to certain sectors and according to the schedules indicated in the table below.

Among the most interesting items included in the draft legislation are the provisions regarding New Source Review (NSR) and Title V. The legislation states that NSR provisions will not apply to a major emitting facility that is initially permitted or modified after January 1, 2009 based on GHG emissions. In addition, stationary sources will not be required to apply for new Title V permits solely because of GHG emissions.

For coal-fired power plants, there are additional performance standards proposed under ACES. Affected units are coal-fired power plants that derive at least 30% of annual heat input from coal, pet coke, or any combination of those fuels. For a unit that is initially permitted on or after January 1, 2020, the unit is required to achieve a 65% reduction in emissions of CO_2, as measured on an annual basis. For units initially permitted after January 1, 2009 and before January 1, 2020, the unit must achieve a 50% reduction in emissions of CO_2 measured on an annual basis.[1] Compliance with this requirement is based on the earliest of either:

1) four years after EPA has published a report that there is generating unit equipment with carbon capture and sequestration technology that:
   (i) have a total of at least 4 GW of nameplate generating capacity of which at least 3 GW must be electric generating units and up to 1 GW may be industrial applications,
   (ii) include at least 2 electric generating units each with a nameplate generating capacity 250 MW or greater that capture, inject, and sequester CO_2 into geologic formations other than oil and gas fields, and
   (iii) are capturing and sequestering at least 12 million tons of CO_2 per year, on an aggregate annualized basis; or
2) January 1, 2025

Furthermore, new electric generating units that are subject to the above performance standards are not subject to any NSR requirements with respect to GHG emissions.

With regard to offsets, the draft legislation no longer contains a discount criterion for international offsets as compared to domestic offsets, at least for the first five years of the cap-and-trade scheme. The discount mechanism

Sample ACES Draft Allocation Percentages (*effective May 21, 2009, subject to revision*)

Sector/Entity	Percentage Allocated Annually*
Local rate-regulated electricity distribution companies (electricity consumers)	43.75% in 2012, gradually declining based on a set schedule to 7% in 2029
Merchant coal generators and generators with long-term power purchase agreements	5% of allowances with a phase out from 2026 to 2030
Local natural gas distribution companies (Natural gas consumers)	9% of allowances in 2016-2025, declining based on a set schedule to 1.8 percent in 2029
Energy intensive, trade vulnerable industries (to be determined, potentially cement, steel, etc.)**	2012-2013, up to 2% of allowances, 2014, up to 15% of allowances declining in accordance with the percentage decline of the emissions target
Carbon capture and sequestration deployment	2% of allowances for 2014 through 2017, 5% of allowances for 2018 through 2050
Energy efficiency and renewable energy	9.5% for vintage years 2012 through 2015, declining to 3.55% for 2022 through 2050
Clean energy innovation centers	1.5% from 2012 through 2050
Automakers (for clean vehicle technology)	3% for 2012 to 2017, declining to 1% in 2018 through 2025
Refiners (domestic fuel production)	2% for 2014 through 2026
Worker investment	0.5% for 2012-2021, 1.0% for 2022-2050
Domestic adaptation	0.9% for 2012 through 2021, increasing to 3.9% for 2027 to 2050
International adaptation	1.0% for 2012-2021 increasing to 4.0% for 2027-2050

* *Percentages are annual for the percent of emissions allowances established for that year*

** *Definition of energy-intensive industries is based on industries that have (1) an energy intensity of at least 5% calculated by (cost of purchased electricity + cost of fuel)/(value of sector's shipments) or (2) a greenhouse gas intensity of at least 5% calculated by 20x (direct GHG emissions+indirect GHG emissions)/(value of sector shipment.) Definition of trade-vulnerable is based on having a trade intensity of at least 15% calculated by (value of total imports and exports of the sector)/(value of shipments + value of imports of the sector).*

[1] Initially permitted means that the owner/operator has received a Clean Air Act preconstruction approval or permit, for the covered electric generating unit as a new (not modified) source but administrative review or appeal has not been exhausted. Subsequent modification of any such approval or permits, administrative court review, appeals, or challenges, etc. do not affect the date on which the unit is considered initially permitted.

(five international offsets for four U.S. allowances) would then be reinstituted. Most interestingly, there are requirements in the draft legislation that would allow crediting of early offset projects that are registered under government recognized programs (e.g., Regional Greenhouse Gas Initiative, Western Climate Initiative) if they were started after January 1, 2001 and for which a credit was issued under a regulatory or voluntary offset program that EPA determines (1) was established under state or tribal law or regulation prior to January 1, 2009, (2) has developed offset project standards, protocols, and methodologies through public consultation or peer review, (3) has made available to the public standards, methodologies and protocols that require that the reductions are permanent, additional, verifiable, and enforceable, (4) requires third party verification, (5) are registered in a publicly accessible registry, and (6) ensures credits are not issued for which the entity administering the program has served as the fund administrator for the reduction project.

Conclusion

Due to potential breadth and complexity of the requirements, organizations should continue to closely monitor GHG regulatory and legislative developments to gain a greater understanding of their liabilities. Whether ACES passes or wanes, the current administration is committed to regulating GHGs either through a market-based cap or potentially through existing CAA mechanisms.

Understanding the impacts of these new requirements is crucial as organizations plan for the future. Developing a comprehensive carbon management strategy is essential to ensuring that the organization is effectively and accurately assessing and mitigating carbon risk. ✥

PC MACT Proposal May Signal Widespread Change *(Continued from page 3)*

the option of selecting a site with lower mercury and organic content in the quarry limestone. Limestone is the largest raw material input (~80 %) to a kiln and, in many cases, is the largest contributor to Mercury emissions.

SSM Considerations

Another court decision addressed in the May 2009 proposal is the December 2008 ruling vacating the Start-up, Shutdown, and Malfunction (SSM) exemption for MACT requirements. Under this ruling, MACT emission standards now apply at all times, including during SSM events. Since the information used to develop the proposed PC MACT amendments was gathered well before the December 2008 SSM ruling, EPA acknowledges that its database has no information on emissions during SSM events. However, EPA relies on the recent SSM ruling to justify applying the MACT floor at all times, including during SSM events, since there is no data indicating that emissions during SSM differ from normal operations. EPA further states, "We believe that startup and shutdown are both somewhat controlled operating modes for cement kilns… so that emissions during these operating modes may not be significantly different from those during normal operation." EPA requests comments on emissions during periods of SSM and, if emissions are different during SSM events, recommendations for defining these periods and how standards may be applied.

Possible Implications for Other Industries

In addition to the immediate concerns this proposed rule presents to the cement industry, the methods utilized in the rulemaking could have far-reaching effects. First, EPA has not yet established a formal process for addressing the SSM vacature. While EPA may initiate procedures to set SSM specific limits in the future, the proposed PC MACT rule demonstrates that the onus will be on industry to provide evidence for separate emissions limits for SSM events and "normal" operation. However, since SSM events are no longer exempt from the established MACT floor standards, any emissions testing data showing that emissions are higher and require a separate MACT floor standard during SSM events would effectively demonstrate periods of non-compliance. Given this delicate situation, facilities should continue to track how EPA addresses the SSM vacature.

Furthermore, EPA's proposal to control levels for all pollutants from cement kilns could, if applied elsewhere, lead to more new limits for other MACT standards. The proposed limits for HCl from cement kilns, for which no negative health effects were determined, could set a precedent for EPA to require costly HAP controls in an effort to lower emissions of non-HAP pollutants that will also be mitigated by the HAP control device.

EPA's proposed action on the PC MACT could be duplicated in a re-assessment of the MACT floor for other source types. On January 14, 2009, the NRDC and the Sierra Club petitioned EPA, requesting a comprehensive assessment of its existing regulations under 40 CFR Part 61 and 63 to ensure that each standard fully complies with the Clean Air Act. Similar to past petitions against the PC MACT, this petition contests instances where EPA established a MACT floor of "no control" due to lack of currently demonstrated control measures or emissions below acceptable health based levels and asserts that EPA must establish new standards that reflect the actual emission levels achieved by the relevant best performing sources. For the 29 sources categories specifically named in the petition, the proposed PC MACT amendments raises the possibility of significant change to existing source requirements across U.S. industry. ✥

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