

## Economics, Politics, and the Environment Steer the Direction of the Shale Gas Boom

**N**orth America's vast reserves of natural gas in shale formations offer new hope for the energy independence of the United States and its neighbors. Just one month ago, Apache Corporation announced its discovery of what may be the world's largest shale gas basin, located under the remote, subarctic tundra of northeastern British Columbia. With a capacity of approximately 48 trillion cubic feet, this reservoir alone could account for about ten percent of North America's shale gas reserves.

Even before Apache's discovery, the U.S. Energy Information Administration had predicted that shale gas production would likely double during the next 25 years. This bonanza has sent gas prices to near-record lows and spawned a host of domestic capital projects and innovative energy solutions. Not surprisingly, the gas boom has been met with increased regulatory oversight, criticism from environmental activists, and widespread exploitation by political interests on both sides of the aisle.

Several types of industries seem to be flourishing from today's extremely low natural gas prices. Mid-stream energy companies are racing to expand gas infrastructure to keep pace with shale gas production; gas pipelines, processing plants, and storage facilities are being rapidly constructed to serve developing fields; new terminals are being built to deliver gas-derived products to overseas markets; and many existing import terminals are being revamped to become either bidirectional or export-only facilities. The chemicals industry is quickly moving to increase its capacity to produce products that use natural gas as the primary feedstock, with a number of plant expansions on the drawing boards or under construction along the Gulf Coast. Interestingly, some companies are reconsidering previously shelved projects for converting natural gas to liquid fuels



Source: U.S. Energy Information Administration based on data from various published studies. Canada and Mexico plays from ARI.  
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such as diesel. While the technology is costly, it now may be economically viable considering the significant disparity between the price of the feedstock (natural gas) and the product (diesel fuel). And, to meet increased electric power demands under their transformation to "post-coal" generating portfolios, many electric utilities are taking advantage of low gas prices by using natural gas-fired turbines to expand their base load and peaking generation capacity.

At first glance, lower gas prices would seem to mean lower profits for natural gas producers. However, shale gas producers are not sitting idly by watching their profits dwindle. Instead, many have been re-focusing their resources to bring in wells with high liquids (oil) production potential, and, in turn, higher profitability. A case in point is the activity in the Eagle Ford Shale, a vast, but largely untapped, shale oil formation in South Texas. With the basin's vast reserves, a large South Texas oil refiner has projected that the Eagle Ford could become the

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# FROM THE TRENCHES

## *Kudos to Us*

Even though I had gone scarcely a mile, my ankles thought it was taking an eternity to move across the roughly 50-degree slope as I approached the Rio Grande Pyramid in Colorado's Weminuche Wilderness. Walking on such a steep grade, having to make sure I didn't tumble hundreds of feet down to the valley below, my feet were having a rough day.

And then we reached "The Window," a notch seemingly cut with a scalpel out of the Pyramid's south ridge. While I was delighted to finally be on level ground, that soon became an afterthought as I found myself looking out on a seemingly endless sea of Rocky Mountain peaks. And as I sat there, enjoying one of the most spectacular views of my life, I reflected upon how lucky I am to live in a nation where the condition of the environment is such that I can enjoy these kinds of vistas. Or on a more prosaic, but no less significant level, I also recognized how fortunate I am to be able to drive to work each day and not be accosted by views of black smoke plumes. It's easy to forget that this isn't the norm for much of the rest of the world — one of my colleagues at Zephyr tells the story of traveling overnight from Delhi to the Taj Mahal, and how she had to wash black soot from her arms after her journey.

So, as I was enjoying the Weminuche vista, I found myself kind of proud to be an environmental professional. Do I think that my efforts at Zephyr are responsible for clean air in the Weminuche? Maybe not. But there's no denying that environmental professionals have played no small part in making our nation's environment one of the best in the world.

Don't get me wrong, I'm not an idealist and I know that far more powerful forces than environmental consciousness drive people's behavior. Gallup polls over the last few decades show that when concern about the economy goes up, concern about the environment goes down. Given the choice of a clean environment or a strong economy (as if the two were mutually exclusive) only about 40 percent of Americans today would choose the environment. In the late 1980s the environment won out 4 to 1.

For me personally, a good example of my not being an idealist is in my own backyard. A few years ago I installed a solar heating system for my pool. I could have picked an electric heater, but it would have cost about \$1,000 per month to run. Instead, I went with a system with an operating cost of \$0 — clean water comes out of the filter, goes up on the roof, bakes in hundreds of small rubber tubes, and then is returned to the pool.



Notice that in the explanation of why the solar heating system won out, I mentioned only money — ultimately it wasn't about saving the planet. At the same time, I still derived some satisfaction from knowing that my decision did not adversely affect the environment.

One of my friends contends it is a "conceit" to believe that environmental consultants do all that much to protect the environment. He holds that all environmental consultants really do is to help companies navigate complex environmental regulations such that both the company and the regulators are satisfied. And he maintains that the end result is the retention of jobs at existing facilities and the creation of jobs for new ones.

While I think there is some truth in what he says, I believe there's much more to what we do and accomplish than he acknowledges — the collection of scientists, engineers, attorneys, public policy experts, regulators, and others working in environmental professions in this country play an important role making our nation's environment as good as it is, whether or not their intentions are always altruistic.

Writing this piece, I polled my colleagues about the kinds of outdoor activities they enjoy. I heard stories, enthusiastically delivered, about backcountry horseback riding, rock climbing, backpacking, stargazing, and snorkeling — their unrecognized testaments to the value of their professional efforts in creating a modern, vibrant *and environmentally sustainable* society. And listening to the musings of one of Zephyr's most senior consultants, I was reminded that altruism is really at the heart of what brings out the best in us. On the first page of the brand new CRC *Handbook of Chemistry and Physics* he received as a pres-

*trenches* >>> *continued on page 6*

## *Uncertainty Surrounds the Greenhouse Gas Tailoring Rule, Especially in Texas*

Industry, states, and environmental groups are all keeping a close eye on the status of EPA's new Greenhouse Gas ("GHG") permitting rule, frequently referred to as the GHG Tailoring Rule. The Tailoring Rule, published in June 2010, "tailors" Prevention of Significant Deterioration ("PSD") and Title V permitting applicability criteria by setting much higher GHG emissions threshold criteria than specified in the Federal Clean Air Act, thus limiting the number of GHG sources potentially affected by the permitting programs.

The Tailoring Rule is being implemented in two phases — one, which began on January 2, and the second, which began on July 1. In the first phase, PSD and Title V permitting requirements for GHG emissions sources only applied to sources that are major for non-GHG regulated pollutants under the PSD and Title V programs. However, in the second phase, PSD permit review for GHGs applies to all new sources with the potential to emit GHGs in quantities more than 100,000 tons per year CO<sub>2</sub> equivalent ("CO<sub>2</sub>e"), and to modifications that increase CO<sub>2</sub>e emissions by more than 75,000 tons per year at existing sources whose CO<sub>2</sub>e potentials to emit are more than 100,000 tons per year. In its November 2010 guidance document "PSD and Title V Permitting Guidance for Greenhouse Gases," EPA addresses the permitting requirements under the Tailoring Rule, including the determination of BACT for GHG emissions.

Under the Tailoring Rule, EPA asked states to indicate by August 2, 2010 whether their laws provide the authority for the states to implement the requirements of the Tailoring Rule. Thirteen states replied "no," and in a strongly-worded letter to EPA on August 2, 2010, Texas responded that its laws do not provide the authority to implement the Tailoring Rule and that it will not seek to amend its laws to provide such authority.

To address states like Texas that would not have authority to implement the Tailoring Rule by January 2, EPA finalized a "Finding of Substantial Inadequacy and SIP Call" rule on December 1, 2010. In that rule, EPA said that it will work with states to revise their SIPs to implement PSD permitting for GHG emissions sources. As part of this ruling, EPA established timetables for revising SIPs in the 13 states still lacking authority to permit GHG emissions. Should a state not revise its SIP in a timely manner, EPA said that it would issue a Federal Implementation Plan ("FIP") to enable the state to permit GHG emissions sources.

About 25 suits have been filed to challenge the Tailoring Rule, including one filed by Texas. Related to that litigation, on August 19, 2010, Texas sent EPA a letter requesting that EPA stay the Tailoring Rule pending resolution of Texas' suit against EPA regarding the rule. However, on December 10, 2010, the U.S. Circuit Court of Appeals for the District of Columbia denied Texas' request to stay the Tailoring Rule.

According to EPA, in its December 1 "SIP Call" rule, in any state, such as Texas, that does not have authority to implement the Tailoring Rule and will not be able or willing to obtain such authority, PSD and Title V authority to construct and operate new or modified sources that are subject to the Tailoring Rule cannot occur until the FIP becomes effective. Of relevance to the Texas regulated community, on December 22, 2010, EPA sent a letter to TCEQ stating that, to ensure there will not be a gap in PSD permitting for GHG emissions in Texas, EPA would become the GHG permitting authority in Texas on January 2, 2011. How this will work as a practical matter, including how EPA will be able to be the GHG permitting authority in Texas with its limited resources, will remain to be seen.

Additional uncertainty relative to the Tailoring Rule will result from the significant shifts in Congress due to the elections in November 2010. Post election, many high-level members of Congress said that delaying or abolishing the Tailoring Rule (and other GHG rules) will be a top priority for them. While there were several efforts prior to the November elections to delay the Tailoring Rule (including efforts led by Senators Jay Rockefeller and Lisa Murkowski), similar efforts are likely to gain momentum now that Republicans control the U.S. House of Representatives and have a stronger presence in the U.S. Senate. The most likely means of accomplishing a delay will be through attaching language regarding such delay to an EPA spending bill.

As you would imagine, the result of the various challenges to the Tailoring Rule is uncertainty, especially in Texas. ✨

**Keith Courtney**  
**Jenn Foringer**  
*Winstead PC*

# News Briefs

## national news

### **EPA Region 6 Administrator Resigns**

On April 29, EPA Region 6 Administrator Al Armendariz submitted his resignation to EPA's chief, Lisa Jackson. The resignation was the result of remarks made by Mr. Armendariz at a May 2010 meeting in Dish, Texas — a town north of Dallas where concerns expressed by residents over the environmental impacts of hydraulic fracturing in the production of oil and gas helped put the issue on the national stage. Armendariz first issued an apology on April 25 after a video of his remarks at the meeting became public. However, public and Congressional outrage over the video ultimately forced his resignation. Sam Coleman, who joined EPA in 1989 and was previously Division Director for Superfund and Compliance and Enforcement, has been named as Acting Administrator. For more information, contact Ed Fiesinger at 281.668.7353 or [efiesinger@zephyrenv.com](mailto:efiesinger@zephyrenv.com).

### **EPA Issues Oil and Gas Emission Standards**

On April 17, EPA issued final New Source Performance Standards (NSPS) and National Emission Standards for Hazardous Air Pollutants (NESHAP) for the oil and gas industry. Completed in response to a Court mandate to review existing standards, the rulemaking resulted in a new NSPS Subpart OOOO, which regulates VOC emissions from new sources such as well completions, pneumatic controllers, storage tanks at well sites, and gas compressors. Affected sources must comply with the standards by various dates over the next 3 years, depending on the source category. The NESHAP action tightened major source air toxics requirements in Subparts HH and HHH for glycol dehydrators and equipment leaks. For more information, contact David Mahler at 410.312.7909 or [dmahler@zephyrenv.com](mailto:dmahler@zephyrenv.com).

### **BLM Releases Draft Regulations for Hydraulic Fracturing**

On May 11, the Bureau of Land Management (BLM) released draft regulations addressing oil and gas exploration and production activities on federal and tribal lands. According to BLM estimates, approximately 90 percent of the 3,400 wells drilled annually on public and tribal lands are hydraulically fractured. The proposed regulations include the requirements to publicly disclose the chemicals used in the hydraulic

fracturing process; to obtain preapproval of well stimulation operations; and to report how fluids used in stimulation activities are handled, how flow-back fluids are handled, and how water produced during and after fracturing operations are handled. For more information, contact Dan Mueller at 512.579.3844 or [dmueller@zephyrenv.com](mailto:dmueller@zephyrenv.com).

### **EPA Retains Current Secondary Air Quality Standards for NO<sub>2</sub> and SO<sub>2</sub>**

In March, EPA took final action to retain the current secondary National Ambient Air Quality Standards (NAAQS) for nitrogen dioxide (NO<sub>2</sub>) and sulfur dioxide (SO<sub>2</sub>). Unlike the primary NAAQS, which are intended to protect human health, the secondary NAAQS are intended to protect public welfare, including protection against decreased visibility and damage to the natural environment. Despite retaining the current secondary standards, EPA acknowledged that the existing secondary NAAQS do not provide adequate protection from harmful deposition-related effects of nitrogen oxides (NO<sub>x</sub>) and sulfur oxides (SO<sub>x</sub>). Both the EPA and the Clean Air Scientific Advisory Committee support the future development of a multi-pollutant standard to address acidifying deposition of NO<sub>x</sub> and SO<sub>x</sub> to help protect sensitive aquatic ecosystems. For more information, contact Lou Corio at 410.312.7912 or [lcorio@zephyrenv.com](mailto:lcorio@zephyrenv.com).

### **Fish and Wildlife Service Releases Wind Energy Development Guidelines**

In March, the U.S. Fish and Wildlife Service released new, voluntary guidelines for addressing wildlife conservation concerns in the development of wind energy projects. In particular, the guidelines describe a “tiered approach” for assessing potential adverse effects on species of concern (e.g., migratory birds, raptors, and bats) and their habitats in a “pre” and “post” construction process, and replace interim voluntary guidance published in 2003. For additional information, contact Clay V. Fischer at 512.879.6629 or [cfischer@zephyrenv.com](mailto:cfischer@zephyrenv.com).

### **EPA Proposes Changes to Hazardous Air Pollutant Standard for Engines**

On May 22, EPA proposed changes to the NESHAP for reciprocating internal combustion engines. Mainly

affecting older engines, the changes would establish a new category for “remote” existing engines that operate off shore or along pipelines, allow emergency engines to be used for peak power shaving under certain conditions, and replace some emission standards with management practices or equipment standards for some engines at area (minor) sources. For more information, contact Kevin Ellis at 512.879.6647 or [kellis@zephyrenv.com](mailto:kellis@zephyrenv.com).

### **EPA Designates Areas Not Meeting 2008 Ozone Air Quality Standard**

On April 30, EPA announced the designation of 46 areas throughout the U.S. as not attaining the current 8-hour air quality standard for ozone, promulgated in March 2008, followed by an additional nonattainment designation (for the Chicago Metropolitan Area) on May 31. Originally, the area designations were scheduled to be made on March 12, 2010; however, EPA extended the deadline by one year to allow for reconsideration of the standard. EPA was sued by Wild Earth Guardians after that deadline passed, and a resulting consent decree mandated a final rule designating areas for the 2008 ozone NAAQS by May 31, 2012. For more information, contact Roger Brower at 410.312.7907 or [rbrower@zephyrenv.com](mailto:rbrower@zephyrenv.com).

### **OSHA Revises Hazard Communications Rule**

On March 26, the Occupational Safety and Health Administration (OSHA) revised its Hazard Communication Standard, aligning it with the United Nations’ system for classifying and labeling chemicals. As a result, labeling used by chemical manufacturers and importers will have to include harmonized signal words, pictograms, and hazard statements for each hazard class and category; and safety data sheets (SDS) will have to be published in a specified 16-section format. Employers are required to train workers by December 1, 2013 on the new label elements and SDS format. The revised rule, which applies to chemical manufacturers, importers, distributors, and employers, requires compliance by June 1, 2015 with all modified provisions of this final rule, except that distributors will have until December 1, 2015 to comply with labeling requirements for shipping containers labeled by the chemical manufacturer. For more information, contact Molly McKenna at 512.579.3837 or [mmckenna@zephyrenv.com](mailto:mmckenna@zephyrenv.com).

### **EPA Finalizes Changes to the Cross State Air Pollution Rule**

On June 12, EPA finalized changes to the Cross State Air Pollution Rule (CSAPR), addressing public comments on the proposed changes and revising the emissions budgets for 13 states, including Texas and Louisiana. Even though CSAPR has been stayed by the courts, EPA made these changes in anticipation of the stay being lifted. On April 13, oral arguments were heard by the U.S. Court of Appeals in Washington, D.C. regarding legal challenges to CSAPR. For more information, contact Ed Fiesinger at 281.668.7353 or [efiesinger@zephyrenv.com](mailto:efiesinger@zephyrenv.com).

### **EPA Revises Regional Haze Rules**

On May 30, EPA revised its regional haze rules to allow states participating in the CSAPR’s trading programs to use these programs, in lieu of source-specific Best Available Retrofit Technology (BART), to meet certain EPA regional haze program requirements. In addition, EPA issued limited disapproval of regional haze plans for 14 states (Alabama, Georgia, Indiana, Iowa, Louisiana, Michigan, Mississippi, Missouri, North Carolina, Ohio, Pennsylvania, South Carolina, Virginia, and Texas) because the states, which are not subject to CSAPR, had instead relied on the Clean Air Interstate Rule (CAIR) to satisfy BART requirements. Furthermore, EPA issued final federal implementation plans for 12 states (Georgia, Indiana, Iowa, Kentucky, Michigan, Missouri, Ohio, Pennsylvania, South Carolina, Tennessee, Virginia, and West Virginia) to replace reliance on CAIR with reliance on CSAPR. For more information, contact Bill Jones at 410.312.7910 or [bjones@zephyrenv.com](mailto:bjones@zephyrenv.com).

### **EPA to Propose Tighter Fine Particle Air Quality Standards**

On June 15, EPA announced that it will be proposing to lower the current annual air quality standard of 15 micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ) for fine particles ( $\text{PM}_{2.5}$ ) to a level within the range of 12 to 13  $\mu\text{g}/\text{m}^3$  and to add a secondary standard for  $\text{PM}_{2.5}$  based on prevention of visibility impairment. Alleging that EPA failed to review the standards for fine particles in a timely manner, various groups sued EPA in federal court, and, on June 2, the court ruled that EPA would have to take action on the standard by June 14. EPA is required to review the National Ambient Air Quality Standards for each criteria air pollutant every five years to assure that they continue to protect public health with an adequate margin of safety. For more information, contact Ed Fiesinger at 281.668.7353 or [efiesinger@zephyrenv.com](mailto:efiesinger@zephyrenv.com).

### **EPA Solicits Feedback on Greenhouse Gas Information Burdens**

On May 14, EPA announced that it is soliciting public comment regarding manpower and financial burdens imposed by federal greenhouse gas (GHG) reporting. Specifically, EPA is requesting comments and information which will enable it to evaluate whether the information collected is necessary and/or useful; to evaluate the accuracy of the agency’s prior estimates of burdens; to enhance the quality and utility of information collected; and to minimize information collection and reporting burdens where possible, particularly on smaller businesses. For more information, contact Michele Foss at 281.668.7342 or [mfoss@zephyrenv.com](mailto:mfoss@zephyrenv.com).

### **OSHA Alerts Hydraulic Fracturing Workers to Dangers of Silica Exposure**

On June 21, OSHA issued a hazard alert with regard to the need for workers in hydraulic fracturing operations to have appropriate

protections from exposure to silica. In the absence of the use of personal protective equipment by workers, OSHA warns that the inhalation of silica may cause an increased risk for the development of silicosis and lung cancer. For more information, contact Molly McKenna at 512.579.3837 or [mmckenna@zephyrenv.com](mailto:mmckenna@zephyrenv.com).

#### **EPA to Revise Portland Cement Air Emissions Rules**

On June 22, EPA proposed to change the NESHAP and NSPS for the Portland cement manufacturing industry to raise particulate matter emission limits for new and existing kilns, revise the methodology for demonstrating compliance with these limits, and to extend the compliance deadline for existing kilns by two years. Other proposed changes include revisions to the work practice standards for clinker storage piles, an alternative emissions limit for organic air toxics, and the use of periodic performance tests, in lieu of continuous monitoring, for demonstrating compliance with hydrogen chloride emissions limits. For more information, contact Lynne Spector at 410.312.7906 or [lspector@zephyrenv.com](mailto:lspector@zephyrenv.com).

## **state news**

#### **Senior Management Changes Announced for EPA Region 6 and the TCEQ**

On May 29, TCEQ Executive Director Zak Covar announced senior management changes as part of the Agency's transition from a process-based structure to a media-centered organization. The Air Quality Division, headed by David Brymer, will move from the Chief Engineer's Office to the Office of Air; Susana Hildebrand, Chief Engineer, will report to the Executive Director and focus on national regulatory developments that impact Texas; and the Toxicology Division, under Dr. Michael Honeycutt, will report to the Executive Office. On May 30, EPA Region 6 Acting Regional Administrator Sam Coleman announced the following changes at the regional office's Senior Staff level — Lynda Carroll will serve as Deputy Regional Administrator until a new Regional Administrator is appointed or until the end of September 2012; Carl Edlund will consider serving as Superfund Director, remaining as head of the Multimedia Planning and Permitting Division until a replacement is found; Ronnie Crossland will serve as acting Assistant Regional Administrator for Management until Sam Becker returns; and David Garcia will serve as acting Deputy Assistant Regional Administrator. For more information, contact Ed Fiesinger at 281.668.7353 or [efiesinger@zephyrenv.com](mailto:efiesinger@zephyrenv.com).

#### **TCEQ Proposes Removal of Counties from Scope of Barnett Shale Oil and Gas Permits**

On May 30, the TCEQ proposed to remove Archer, Bosque, Clay, Comanche, Coryell, Eastland, Shackelford, and Stephens Counties from the list of the 23 counties addressed under the scope of the Agency's permit by rule and standard permit for oil and gas production activities in the Barnett Shale formation.

As a result of its evaluation of the effectiveness of these Barnett Shale-specific oil and gas air permitting mechanisms since their inception in April of 2011, the TCEQ has concluded that the relatively restrictive limitations of the Barnett Shale rules are not needed to protect air quality in areas with relatively low density of oil and gas facilities near population centers and should not be imposed in the air quality authorizations for oil and gas operations in such counties. For more information, contact Eric Quiat at 512.579.3823 or [equiat@zephyrenv.com](mailto:equiat@zephyrenv.com).

#### **EPA Determines Houston Area Did Not Meet One-hour Ozone Standard**

On June 19, EPA determined that the Houston/Galveston/Brazoria ozone nonattainment area did not achieve the one-hour ozone air quality standard by the applicable date of November 15, 2007. As a result of this action, EPA will be reinstating and implementing the one-hour anti-backsliding requirements of the Clean Air Act, and is requiring that Texas revise its air quality plans to address Clean Air Act Section 185 penalty fees for nonattainment. For more information, contact Ed Fiesinger at 281.668.7353 or [efiesinger@zephyrenv.com](mailto:efiesinger@zephyrenv.com).

#### **EPA Proposes to Approve Texas Plantwide Applicability Limits Rules**

On June 20, EPA proposed to approve the Texas Plantwide Applicability Limit (PAL) program for providing air permitting flexibility through the use of umbrella caps on plantwide emissions of pollutants. The TCEQ PAL rules, originally submitted to EPA for approval in 2006, were initially disapproved by EPA in 2010 due to concerns that they did not limit the use of a PAL to an existing major source, address PAL re-openings, provide that use of a non-PAL monitoring system rendered the PAL invalid, specify that the emission cap accounted for all the emissions of a pollutant, address the calculation of baseline actual emissions, and include specific definitions of the various acceptable monitoring systems. Texas addressed these concerns to EPA's satisfaction in 2011 and 2012 revisions to its Chapter 116 rules. For more information, contact Ed Fiesinger at 281.668.7353 or [efiesinger@zephyrenv.com](mailto:efiesinger@zephyrenv.com).

#### **trenches >>> continued from page 2**

ent upon his graduation from college in the founding year of the Environmental Protection Agency — mixed in with the usual note of congratulation — is a charge from his parents to use his freshly-acquired knowledge to “protect the environment from the actions of God's careless children.” Because he and environmental professionals like him have taken this to heart, Americans today have the opportunity to enjoy the natural beauty our country has to offer. And even the most wretched places on this planet have better hope for clean water to drink and clean air to breathe. So, here's to us. ✨

**Bill Jones**  
Senior Project Manager

## Mining CO<sub>2</sub> from the Sky

In a recent column, I said that “American ingenuity is alive and well.” In that instance, I was talking about how the advances in oil and gas extraction technology are reshaping our energy future.

As an engineer, I’m always delighted when our human ingenuity helps us to overcome the problems of the day. In that vein, I would like to feature in this column the technological and engineering advances that one of Zephyr’s clients, Skyonic, is bringing to the marketplace.

Most of us are familiar with the concept of capturing carbon dioxide from a flue gas and sequestering it in a geological formation. This process, frequently referred to as CCS, is definitely a step forward in the control of greenhouse gases and a process that can be used to repressurize underprocessing oil formations. But, what happens when there isn’t a convenient and feasible place to sequester all of this CO<sub>2</sub>? And what if the oil producers would like to have it, but there’s no pipeline to take it to them? This is where our client, Skyonic, enters the stage — they have developed their SkyMine® process to reclaim carbon dioxide and other pollutants from flue gas streams *and to concurrently manufacture useful products from the CO<sub>2</sub>* — locally, and profitably. Here’s how Skyonic describes it:

“Our technology removes CO<sub>2</sub> from industrial waste streams through co-generation of saleable carbonate and/or bicarbonate materials. In addition to capturing and mineralizing CO<sub>2</sub>, the SkyMine® process cleans SO<sub>x</sub> and NO<sub>2</sub> from the flue gas, and removes heavy metals such as mercury. Existing power plants and industrial plants can be retrofitted with SkyMine®. SkyMine® was recently listed as an advanced combustion control technology for fossil fuel power plants as part of the EPA’s Commercial Demonstration Permit Program. The program was outlined in the proposed revisions to the New Source Performance Standards (NSPS) published in the *Federal Register* on May 3, 2011 in conjunction with the National Emission Standards for Hazardous Air Pollutants (NESHAP or the “utility air toxics rule”). Successful implementation of the SkyMine® technology establishes pathways for mitigating CO<sub>2</sub> in areas where geologic storage, the predominant competing CO<sub>2</sub> sequestration technology, is not an optimal solution.”



We at Zephyr have enjoyed having a front-row seat as Skyonic has introduced this process to market. We assisted them with the preparation of an environmental assessment to assist in securing some government funding, and they are now preparing the first commercial carbon capture and utilization plant in the country. Officials said the plant will demonstrate the viability of capturing and reusing carbon dioxide as a profitable business-scale venture. Construction is scheduled to begin in mid-September on the facility, which will be on the site of the Capitol Aggregates Ltd. cement plant in San Antonio. In essence, the company’s SkyMine® technology converts the carbon dioxide released by the flues of industrial facilities into baking soda, hydrochloric acid, and other chemicals that can then be sold. The process also filters sulfur oxides, nitrogen dioxide, mercury, and other heavy metals from the flue streams.

Skyonic’s CEO, Joe Jones, said “carbon-capture technology uses a patented chemistry process that enables power-generation and industrial manufacturing plants to cost-effectively produce energy and products in a cleaner way. When the San Antonio facility begins operating in 2014, it will capture 83,000 short tons of carbon dioxide per year from the cement plant’s flues.”

All of us at Zephyr congratulate Skyonic on achieving this important milestone, and we look forward to seeing the results of the full-scale deployment of their process in action. ☀

**Joe Zupan**  
President

Zephyr is a full-service environmental, health, and safety firm offering consulting, training, and data systems services to clients worldwide. We specialize in air and water quality, waste management and cleanup issues, incident management, natural resources, and workplace and community safety.

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sole source of its crude oil for the next few years, completely offsetting the need to buy foreign crude.

Not surprisingly, the political landscape of oil and gas development has changed significantly with the rise of shale gas — elected officials are increasingly being forced to change long-held positions in attempts to balance the environmental concerns about hydraulic fracturing voiced by their constituents against the even greater pressures to stimulate a struggling economy. This tension between competing economic and environmental interests, was, perhaps, no more clearly illustrated than in the drama played out recently involving the forced resignation of an EPA regional administrator for his public comments about hydraulic fracturing techniques (see *News Briefs* in this issue of *Currents*).

Environmental advocacy groups have not been immune to shifts in the geo-political landscape of oil and gas development. For example, the Sierra Club, which had previously held up natural gas as an example of a clean fuel in its campaign to shut down coal-fired power plants, is now beginning to oppose many “gas-centric” projects, such as new natural gas-fired generating units, based on its preference for renewable energy sources to fossil fuels.

The production of shale gas continues to face environmental regulatory challenges. While gas producers are preparing the first year of annual greenhouse gas reports and pursuing environmental permits required for new sites (to keep pace with aggressive drilling

schedules), they are also facing new state and federal fracturing fluid disclosure requirements. In fact, at the federal level, the greatest attention is being focused on the perceived needs of the public to better understand hydraulic fracturing fluids and how fracturing might contaminate drinking water supplies. Meanwhile, a number of states are requiring the disclosure of hydraulic fracturing fluid chemicals, the EPA plans to propose new wastewater discharge standards for shale gas operations, and the Bureau of Land Management (BLM) has proposed that integrity testing be required for wells drilled on BLM land.

If the price of natural gas stabilizes at low levels, at least for the foreseeable future, we can expect continuing capital deployment to projects that will use shale gas production as feedstock. One particularly beneficial aspect of this for the U.S. economy is that shifting cost structures are resulting in more chemical manufacturing projects being moved back to the United States, sometimes called “on-shoring” (contrary to all the years of “off-shoring” to cheaper labor markets). As the success of domestic shale gas grows, public and political interests are likely to continue to shape and influence the regulation of shale gas development. Now more than ever, the industry faces the challenge of implementing and upgrading processes and systems to operate successfully in this new era of environmental regulation. ✨

**Eric Quiat**  
Project Engineer