

# elements



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Getting Down to  
**Business**



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350 million standard cubic feet of gas is pumped through slug catchers into MarkWest's Houston complex for processing each day.

## Growing with our Clients

Welcome to our latest edition of *Elements*. The publication has taken on a new form and it feels right for where CEC is today. We're growing.

You may have noticed our expanding national footprint or heard about several recent strategic hires who bring a wealth of direct industry experience to CEC. There is a common thread among all of this growth: our clients. In keeping with one of our primary areas of focus – Personal Business Relationships – the primary focus of *Elements* will be on how we build, maintain and take the relationships we have with our clients to the next level.

**Kenneth R. Miller, P.E.**  
President and CEO

### Elements in your Email

To opt in to a digital version of *Elements*, email [elements@cecinc.com](mailto:elements@cecinc.com).

*MarkWest has the capacity to store two million gallons of bulk propane liquid on site.*

# Getting Down to Business

*MarkWest Takes the Lead in the Marcellus Shale Play*

**MarkWest's Liberty Segment in the Marcellus play**—which will ultimately include several facilities in southwestern Pennsylvania, eastern Ohio and northern West Virginia—currently provides fully-integrated natural gas midstream services including gathering, processing, fractionation, storage, and marketing operations.

**CEC partnered with MarkWest** to provide professional services for projects in the Liberty Segment beginning in 2008 when MarkWest laid its operational foundation in the region. At the time, the Liberty Segment was processing roughly 40 million cubic feet per day. By the end of 2013, the processing capacity will have increased to more than 1.7 billion cubic feet per day. (That's enough to fill 1,700 40-foot tanker trucks. When lined up, they would span more than 226 football fields or nearly 13 miles.)

**CEC's involvement** began with the development of the first site in the Liberty Segment—the Houston facility, located

*MarkWest, a leading provider of midstream services in the natural gas industry, has experienced substantial growth since its inception. The majority of their recent growth is associated with the development of natural gas supplies in emerging plays like the Marcellus Shale, where MarkWest is now the largest processor of natural gas.*



*Each of four storage pad areas is designed to hold a different bulk liquid and is tailored to the site's unique topography.*

in Washington County, Pennsylvania. CEC provided grading plans, geotechnical investigations, wetland and stream delineations, surveying, and erosion and sedimentation control (E&S) plans and permitting, opening the door for MarkWest to prepare for planned expansions and plant diversification in sync with the growth of the natural gas industry in the region.

**One such diversification** was a major milestone for MarkWest's Liberty Segment. The commencement of fractionation operations at Houston in the fall of 2011 meant that valuable, marketable products like butane and propane could be separated from the natural gas on site instead of sending the natural gas hours away for separation elsewhere. Once the fractionation unit was up and running, however, these products were in need of a more reliable distribution network to get them to market. At the time, distribution could only be done through truck loading and hauling. As volumes increased, so too did the demand for a more efficient, cost-effective transportation system, one

*continued on pg. 2*

*“CEC helps us move things forward. That’s a partnership, in my mind.”*

# Right On TRACK

*MarkWest quietly launched rail operations in its Liberty Segment, taking a significant amount of traffic off the road. Once a day, 30–50 tankers bringing purified natural gas liquids to market roll along a 4.5-mile stretch shared by walkers and bicyclists.*

*To fit a narrow footprint, CEC had to be creative with the geotechnical engineering component. A variety of earth retention structures were designed and built, and geogrid-reinforced slopes were made steeper to avoid stream and wetland impacts or, in some cases, to accommodate the necessary grade of the rail.*

*The trail was born of an agreement with the Montour Trail Council, a local nonprofit that manages a 46-mile trail system. MarkWest offered to build the new trail while situating their railroad next to it—an investment benefitting MarkWest’s customers, the community and the environment. ■*

*continued from pg. 1*

that could also reduce the impact on local road networks from heavy truck traffic. The answer? Rail.

**On August 10 of this year**, the company started loading and moving rail cars in and out of a rail yard built in Westland, two miles from the Houston plant. The large rail yard can store 200 cars and load 12 at a time, with plans to load 24 in the future. Cars then traverse a 4.5-mile stretch of new rail to the Wheeling & Lake Erie main line for broad distribution. “It was a monumental day for MarkWest in the Marcellus play,” said Joe Lex, a senior project manager whose focus is on all Houston operations. “To be a major midstream company, you have to be able to move large volumes of liquid, and the new rail facility allows us to do that.” Purified products now get to market faster and more efficiently—to Canada, the East Coast, overseas, and eventually to the South.

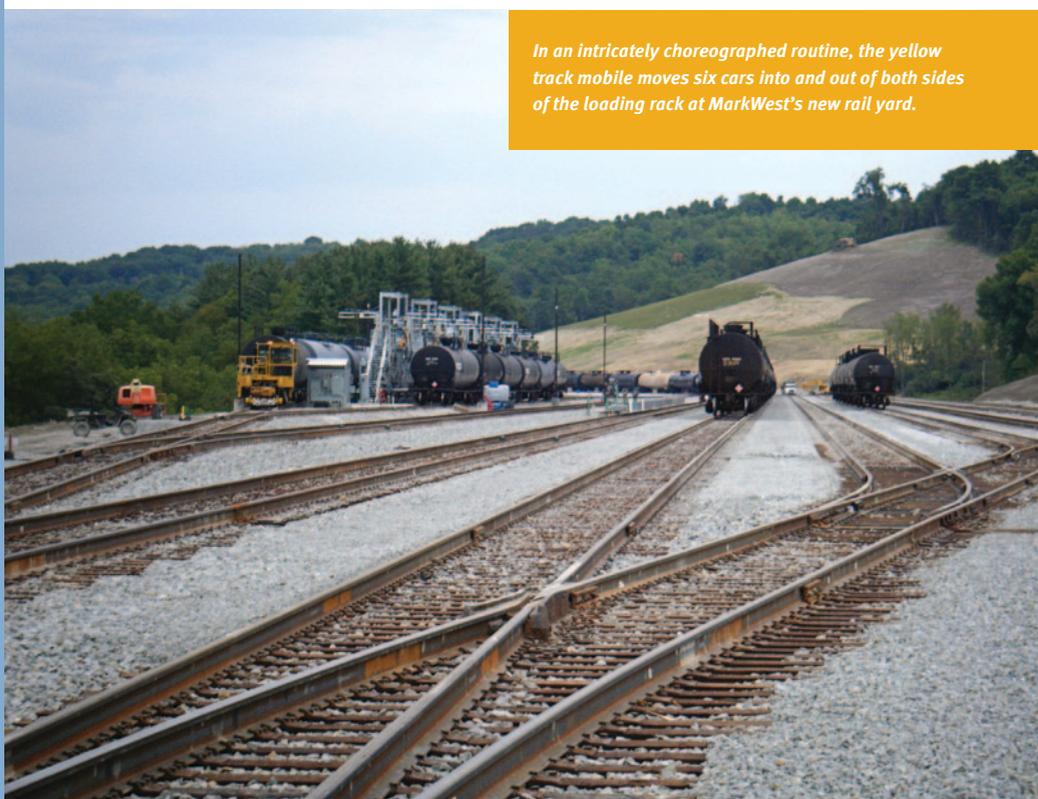
**The Houston facility** is now the largest natural gas liquids fractionation, storage, and marketing complex in the northeast United States, and it enables MarkWest to accommodate the full midstream process in this region. But MarkWest was looking to do more than accommodate. New developments in the Liberty Segment

will add three large deethanizer units to strip ethane out of the raw natural gas. By mid-2013, when new regulations take effect, the Houston site already will have one unit up and running, removing ethane before the natural gas enters distribution.

“By increasing the capabilities of the Houston site, MarkWest is able to pass through time and cost savings to our customers,” says Robert McHale, MarkWest’s Environmental Compliance Coordinator.

**CEC’s goals** were simply to enable MarkWest to get down to business in the Marcellus Shale and to do whatever it takes to keep MarkWest competitive. “We look to CEC as a partner in finding the best sites and the best way to utilize the land we have at Houston or at greenfields we’re currently developing in Pennsylvania, West Virginia and Ohio,” said Lex. “Previously, there was not always a great deal of thought about where to put a plant, but now CEC helps us to really optimize the siting of a facility. CEC helps us move things forward. That’s a partnership, in my mind.” ■

*In an intricately choreographed routine, the yellow track mobile moves six cars into and out of both sides of the loading rack at MarkWest’s new rail yard.*



The Allegheny County office building green roof one year after planting. Four intensities of green roof construction are being evaluated.

# The Sweet Spot

DATA FROM GREEN ROOFS SHOWS WHERE FUNCTION MEETS FINANCIALS

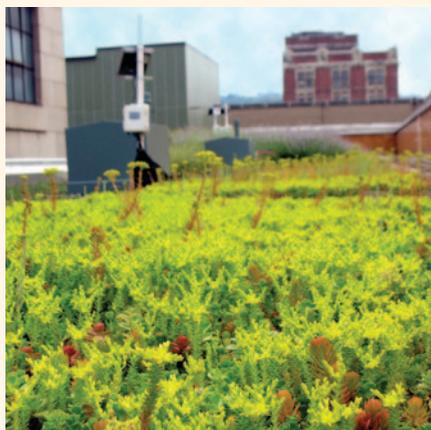
**Incorporating green or sustainable elements** is no longer a fad or simply a PR campaign. Building owners are seizing opportunities to turn up-front investments into long-term cost savings. To that end, it is important to assess efficacy so that investments can be validated.

**CEC has designed and installed** several green roof and green infrastructure monitoring projects. “The purpose of monitoring a green roof is to demonstrate that it works and to quantify how well,” says John Buck, an Ecological Services project manager. “It’s not just about green cache; it’s about improved long-term operating and maintenance costs.”

**Sometimes validation comes** sooner than planned. After the green roof was installed at the Allegheny County office building in downtown Pittsburgh, Pennsylvania, building operators compared pre-installation (2009) and post-installation (2010) annual electric costs and discovered electric utility costs were \$90,000 less within the first year, despite the fact that 2010 had the hottest summer on record at the time.

**Buck believes** the incorporation and monitoring of green infrastructure will only increase. In a growing number of urban settings, property owners will be required to pay a utility fee for stormwater entering

*If you’ve ever seen a newly-planted green roof, you can understand that, while beautiful from the start, things will only improve with time. As it blossoms, a green roof has the potential to make a lasting impact on the environment and, equally as important, on the bottom line.*



combined sewage systems. Pittsburgh is one of several cities working towards including such a fee. “My gut guess is that stormwater utilities will soon be common,” says Buck. Ultimately, urban property owners who incorporate green infrastructure

will be rewarded with reduced stormwater utility costs and will also enjoy the ancillary benefits of added park-like settings and reduced cooling and heating bills.

**Another CEC project** was the design and installation of a 48,500-sq. ft. green roof monitoring system that tracks stormwater management performance at Rockwell Automation headquarters in Milwaukee. The Milwaukee Metropolitan Sewerage District provided grant support to Rockwell Automation for the monitoring system, knowing the system would return dividends by reducing combined sewer volume.

**According to Buck,** Milwaukee is ahead of the curve in wastewater management practices. For green infrastructure to be widely adopted, decision-makers must be more comfortable with its efficacy. The data CEC is able to collect and analyze provides compelling evidence. Direct measurements show that green roofs are making a difference in the quantity and intensity of stormwater runoff.

**The beauty of the data,** however, is two-fold: Yes, it allows for informed decisions about including green infrastructure, but it also allows CEC to help clients maximize efficiency and savings. By comparing several styles or “intensities” of green roof construction, CEC can determine how to get the desired results at the best cost, guiding clients to a financial and functional sweet spot in green roof design. ■

# And One For Green Measure

## If Roofs Could Talk...

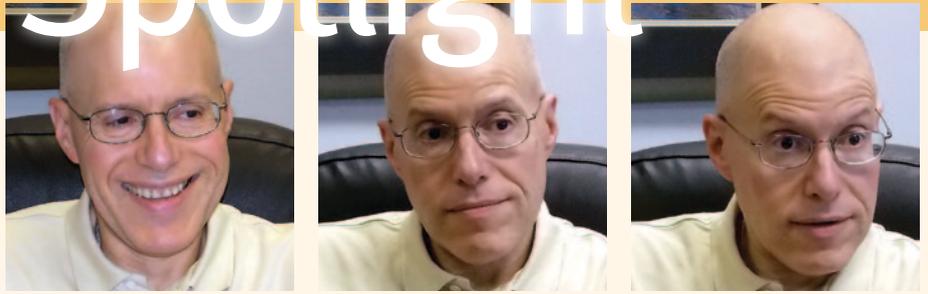
Installed data loggers on green roofs incorporate sensors that measure temperature, water discharge rate and quantity, and soil moisture. These networks of sensors and data loggers are used to measure temperatures outside, within and on the surface of the soil, on roof membranes, on the ceiling inside the building and in the air space below the ceiling. From these data, the heat flux through green roofs and conventional roofs can be calculated and compared. CEC also uses a network of rain gauges and soil moisture sensors combined with direct measurements of roof drainage to determine how much of the rainwater has been absorbed by the roof.

CEC's GIS team has designed a rich web application based on real-time data from the sensors and loggers that provides a month-by-month summary of performance metrics. The self-updating interpretive application summarizes weather, soil moisture, water infiltration, temperature, and discharge rate and quality. The real-time data is accessible at any time using an internet connection for use by clients and facility managers or for educational displays.

View an on-line example at <http://gis-prod.cecinc.com/alleghenycounty/> ■



# Spotlight



## Steve Menoff on Waste Diversion and Conversion

**Q** Steve, what is your role with CEC's Solid Waste Industry Consulting Group?

**A** I work with Randy Bodnar to lead the Industry Consulting Group (ICG) for solid waste, one of several ICGs that strategically focus on understanding the business challenges and drivers of a specific industry segment while collaborating with clients to meet and anticipate their service needs. We work with CEC office directors and solid waste leads to develop a business plan and provide strategic services to grow our waste practice.

**Q** I understand that you serve on the National Solid Waste Management Association (NSWMA) Board of Governors. What are some of the topics the NSWMA is addressing?

**A** I've served since 1995 as the Chairman of the NSWMA Landfill Institute. That role allows me to participate on the Board of Governors.

NSWMA is the solid waste industry's private sector trade association focusing on advocacy issues that impact the solid waste industry and on technical, operational and safety issues integral to the industry. Some of these issues have been interstate waste, flow control, technical standards for landfills, and landfill gas management and air emissions compliance.

**Q** How is the waste industry changing, and what are the industry's more pressing challenges?

**A** Over the past 15-20 years, there has been a developing social and political agenda to increase waste diversion, recycling and beneficial utilization as opposed to waste being directly landfilled or incinerated. We've seen a dramatic increase over that time period. According to EPA, in 2010, more than 34% of the waste stream was diverted from direct disposal, up from 16% in 1990.

**+** CEC jumped 32 places from #192 to #160 on *Engineering News-Record's* Top 500 Design Firms rankings in 2012.

**+** CEC also climbed from #145 to #134 on *ENR's* 2012 Top 200 Environmental Firms list.

2012  
ENGINEERING  
NEWS-RECORD  
UP 32

## SERVING THE COMMUNITY GOOD DEEDS

CEC's Greg Gerke, a biologist in the Indianapolis office, recognized an opportunity that would help Camp Buffalo, a local Boy Scout camp in northern Indiana, add depth to its wildlife conservation program.

**Greg fostered a relationship** between the camp and one of CEC's clients who wanted to mitigate impacts to a wetland. The result was the creation of a 14.2-acre wetland along the banks of the Tippecanoe River. Greg's connection helped expand the potential eco-educational opportunities for Scouts and the community.

## Q How is CEC positioning to help its solid waste clients with the challenges they are facing?

A major demand we see from our clients is for landfill gas and air compliance services. On the landfill gas side, there is a need for collection and control systems engineering, design and permitting, as well as construction related services. Additionally, there are needs to provide operations and maintenance support related to these landfill gas systems. And finally, utilizing the collected landfill gas to generate energy is important to many of our clients.

CEC strategically added several key professionals with strong resumes and extensive industry experience, allowing us to offer expanded engineering, permitting, compliance, operations and maintenance services related to landfill gas and air emissions management.

## Q Who are the new key professionals and what is their industry experience?

A Significantly, Bill Held, who previously managed the landfill gas to energy program at Republic Services. With CEC, Bill continues this same work for Republic, as well as other waste companies and energy development firms; Ken Kruszynski was one of the original landfill gas engineers at Waste Management. Ken has an impressive resume in all aspects of

landfill gas management and is recognized as a leader in landfill gas engineering; Bill Dillon has extensive experience in landfill gas collection system operations and maintenance, landfill gas flare start-up and operations, and leachate evaporator start-up and operations; and Russ Anderson, who adds expertise and depth through broad experience in landfill gas engineering, field services and construction.

## Q What does the future look like for the solid waste industry?

A Many newer waste conversion technologies, which utilize waste materials for various energy sources or beneficial reuse, are technically viable, but market economics tend not to support them at this point. Most have not operated at full-scale commercial capacity and are much more expensive than landfill disposal. Initially, I think we'll see them implemented commercially in areas such as New England, where there is a limited amount of airspace capacity and higher disposal fees, or the West Coast, where social and political factors typically play a strong role. As these technologies are more widely implemented, CEC will continue collaborating with clients, helping them to successfully transition from managers of waste to providers of resources and energy. ■

Previously, campers had limited means to study and observe wildlife. Now, a walking path with foot bridges extends the entire length of the wetland, and an observation blind was constructed by the scouts to allow campers to view wildlife without detection. Ospreys were spotted circling overhead, highlighting the success of the wetland.

The new wetland serves as a centerpiece for Camp Buffalo and its nature conservation projects. It even inspired the Boy Scouts of America Sagamore Council to create a new achievement patch—the Environmental Award of Merit. The patch recognizes service and study towards wildlife conservation: removing invasive plant species, building nesting boxes for wildlife, or researching the water quality benefits of wetlands.

"I'm thrilled that CEC was able to create an outdoor learning facility for the Boy Scouts in this community while providing the dual benefit of service to our client," Gerke said. ■



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CEC sponsors a Photo-of-the-Month contest encouraging employees to submit pictures from their work sites. The winning photo is published on CEC's internal website and Facebook page.





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A CEC ecologist identified this spring salamander during macro-invertebrate and salamander surveys in southern Ohio.