

elements



Inside

One is
Silver
and the
other is **Gold**



Inside

1



2



4

Q&A

4



4

OIL & GAS AWARDS

- 1 **ONE IS SILVER AND THE OTHER IS GOLD**
Commitment to a Long-term Client
- 2 **THE TRAILBLAZERS**
Awards for Innovation
- 4 **SPOTLIGHT**
Interview with CEC's Four Founders
- 4 **WELLNESS INITIATIVE**
CECFit for the Future
- 4 **IN THE NEWS**
Recent Recognition

On the Cover:

FirstEnergy's 965-acre Little Blue Run disposal impoundment is contained behind a dam constructed of more than 9 million cubic yards of rock fill and measuring 2,200 feet wide at the crest and 400 feet tall.

It's not about history; it's about the future.

There hasn't been much talk or reflection regarding our 25th anniversary; reaching that milestone is something that Jim Roberts, Jim Nairn, Greg Quatchak and I planned for and expected. Our focus is, and always has been, on what's out there for us to accomplish in the future. When I think about the future of CEC, I see such limitless opportunity in front of us to build an even stronger company because of the capabilities of our employees. You can employ any business philosophy you want, but if you don't have the right people, you won't be successful. It has become clear over the years that our employees not only care for our clients, they also care for each other and enjoy working together.

Four people can only have so much influence on an organization of our size. Our progress is the product of what our people accomplish together every day. That's why CEC has been successful, and that's what we'll continue to focus on and recognize the importance of moving forward.

Kenneth R. Miller, P.E.
President and CEO
July 17, 2014

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Civil & Environmental Consultants, Inc.

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To expand disposal volume and service life of the LBR impoundment, more than 8.5 miles of synthetic geotubes were constructed above the original grades to contain nearly 4 million cubic feet of CCRs annually.

One is Silver and the other is Gold

Shortly after starting a new job in 1973, Jim Nairn was sent to pick up samples of coal combustion residuals (CCRs) from a coal-fired power plant. Little did he know at the time that these samples were being tested for Ohio Edison's proposed Little Blue Run (LBR) disposal impoundment, which would eventually become the largest CCR disposal facility in the United States. It also would be the start of a business relationship that has lasted more than four decades.

Years later, when Jim Nairn joined with Jim Roberts, Ken Miller and Greg Quatchak to found Civil & Environmental Consultants, Inc., Ohio Edison (now FirstEnergy) was continuing to rely on this evolving and trusted relationship.

Today, FirstEnergy's LBR disposal impoundment encompasses 965 acres within a 1,700-acre permit area along the Ohio River in Greene Township, Pennsylvania, and Hancock County, West Virginia. LBR is used for the disposal of CCRs from FirstEnergy's 2,490-Megawatt (MW) Bruce Mansfield coal-fired power station, the largest power station in Pennsylvania. The station's three generating units produce enough electricity to power 1.5 million homes.

Now in its 25th year, CEC remains steadfastly committed to serving clients like FirstEnergy.



Test plots were used to evaluate performance of various species of perennial grasses and forbs for soil-less revegetation of the CCRs.

At the Ready

For nearly 25 years, CEC has provided a wide range of services relating to the assessment, permitting, design and operation of the LBR impoundment, and also has investigated and mitigated environmental concerns, and designed and managed both an extensive environmental monitoring system and numerous air quality and meteorological monitoring stations in and around the facility. All told, nearly 350 monitoring points are sampled and analyzed at frequencies ranging from once per week to once per quarter.

Metamorphosis

In 2012, when the Pennsylvania DEP requested a major permit modification proposing a permanent site closure plan, CEC designed and evaluated 15 closure scenarios, field testing the constructability of the most promising alternatives. To evaluate the impact each scenario would have on groundwater flow and quality surrounding the facility, CEC prepared a digital groundwater model to evaluate these conditions for up to 250 years after closure. The final closure permit submission was made in March of 2013, and the closure plan, which calls for capping the entire 965-acre facility with a geomembrane liner and soil cover, was approved one year later. Closure is slated to begin in 2017.

Continuity

Over the years, technologies advanced, objectives changed, regulations evolved, and new people and ideas came into play. "Through it all, CEC has been fortunate to have had the opportunity to continuously provide engineering and environmental services to FirstEnergy for several decades," said Nairn. "We are indebted to FirstEnergy for their loyalty and confidence in our organization and look forward to the prospect of continuing our long-lived relationship." ■

The Trailblazers

One of the chief ways intelligence presses forward is through innovation, which is recognized as an important contributor to growth—individual growth, industry growth and company growth. Innovation, in turn, depends on the creative individuals who dream up new ideas, processes and technologies and make them a reality.

The CEC Awards for Innovation were developed with two equally important objectives in mind:

To identify and recognize excellence in developing value-creating new products and services;

To provide a learning vehicle for all CEC employees while affirming our firm's Core Values of Safety, Integrity, Collaboration, Personal and Professional Development, and Service Excellence.

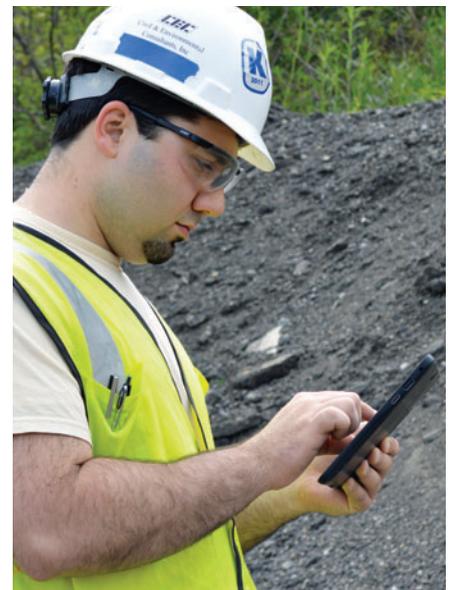
CEC will champion innovations that make an impact on clients, systems and service offerings. The individual or group of individuals who create value on behalf of CEC and its clients will be recognized and presented with an award during the Annual Planning Meeting held in Pittsburgh each year.

“Three clear examples stood out in 2013 as trailblazers to launch the new CEC Awards for Innovation program.” -Ken Miller

Paper Cut

Paperwork. It eats up valuable time, which translates to project costs for clients. It's even more frustrating, for both the consultant and the client, when it is duplicative or repetitive. But for those who refuse to accept the status quo, there is always a better way. That's why **Chris Dohner** and **Barry VanLaarhoven**, out of CEC's Boston office, decided to look critically at one process with which they were all too familiar: Geosynthetics Construction Quality Assurance (CQA) reporting.

In the past, information collected by field technicians during the deployment of geomembrane panels has been handwritten on paper forms. The information has then been transferred to electronic forms to be included in the Construction Quality Certification Report. Information gathered includes, but is not limited to: geosynthetic receipt logs, geomembrane deployment logs, trial seam reports, geomembrane panel field seaming logs, geomembrane destructive testing logs and geomembrane



Initial performance data for the tablet application showed a 370% increase in efficiency.

repair logs—among other field observations related to the material installation.

For Dohner and VanLaarhoven, the “better way” was to develop a tablet application that saves time by automatically populating and generating multiple field forms from data gathered on site during deployment. The application eliminates repetitive data entry and “catch-up” time back at the office for filling out the proper forms in a timely manner. It also reduces the potential for errors across multiple iterations and provides more standardization and consistency. And because the field documentation is saved and linked to a server, an operations or project manager back in the office can instantly review data and field sketches to address issues or questions in real time.

The application can be used for a number of closure operations employed by the power, manufacturing and solid waste industries.

.....
“We must always think outside the box; it’s effectively a part of every solution we create.” -Leon Wright

Streamlining Stream Design

“I know how the industry creates stream restoration designs, and I knew we could improve that process,” said **Nate Ober**, a geomorphologist in CEC’s Bridgeport, West Virginia, office. Ober collaborated with CEC’s CADD department to harness the capabilities of the AutoCAD® Civil 3D® Corridors tool and also to create a way to enhance those capabilities.

The standard Corridors tool creates a design that looks more like a box than a stream, but CEC’s custom subassembly application creates the facet slopes of a more natural channel—the different grades, point bars, runs, riffles and glides. “Most designers don’t go to the trouble of modeling something to that level of detail,” said Ober. “We programmed our new tool to model all of a stream’s different undulations and have them all transition together smoothly. Everything is dynamically linked, so if one



Precise 3D designs matched to GPS coordinates tell construction equipment exactly what to do.

element is moved or altered, the entire design rebuilds itself automatically.”

CEC’s program streamlines the process and provides an accurate 3D representation. The advantages include “design on the fly” capabilities with quick iterations and precision construction grades in the field via a tablet. “We’re providing more value through innovation and our proprietary software,” said Ober.

Contractors now receive “virtual” designs matched to GPS coordinates that inform the construction process with accurate grading plans and quantities, cut/fill optimization and balancing.

Research, Reclassify, Recover

A solid waste client had just spent a significant amount of time and money on treatment plant upgrades to address an extremely complex landfill leachate problem. Following an in-depth investigation, **Leon Wright**, out of CEC’s Nashville office, concluded that the previous upgrade approaches to solve the leachate treatment plant issues were not nearly adequate. “We had to deliver a straightforward, hard-hitting message: ‘Additional upgrades are required.’”

“Ultimately, it was a dual issue,” he said. “The client had a major treatment capacity problem *and* also had sunk a great deal of money into an inadequate solution. Not



The upgrade plan will enhance the existing Moving Bed Biofilm Reactor (MBBR) process.

only did we have to tell them that they were looking at more money, we also couldn’t even start work until we truly had a thorough understanding.” A collaborative idea between Wright and his client soon developed.

Wright designed a biological treatment system upgrade plan to expand the Moving Bed Biofilm Reactor (MBBR) process and address influent variability, while converting and reclassifying the leachate treatment facility as a Centralized Wastewater Treatment Facility (CWT). After all of the upgrades are completed, the CWT will be able to receive and treat off-site liquid wastes, generating revenues for the client. ■

Wellness Initiative:

CECFIT FOR THE FUTURE

Due to ongoing changes in our nation's health care system, CEC Management recognized that a firm-wide commitment to employee wellness needed to be made. "Part of that commitment," said Greg Quatchak, CEC founding principal, "was finding ways to educate our staff and their families on how to better manage their care and make healthy lifestyle choices." The new CECFit program emerged.

Now, a Wellness Committee with members from each CEC office strives to provide beneficial information and create engaging physical activities.

Lunch and Learn programs and weekly email blasts focus on topics such as chiropractic care, stress management and food selection, while firm participation in national efforts like the American Cancer Society's "Great American Smokeout" helps to provide staff and their families with useful tools and support.

CEC-coordinated events such as "Walk at Lunch Days" and the recent "Make Fitness Fun" challenge, which saw 197 individuals each complete 700 minutes of physical activity in eight weeks, have been well-received. In fact, more than 60 percent of staff took advantage of voluntary biometric screenings and health assessments in 2014.

"Our employees have overwhelmingly embraced the CECFit program as a firm benefit." – Greg Quatchak ■



CEC Sayre employees ran to support Guthrie Sports Medicine's community concussion awareness and education program.

Spotlight

Elements sits down for some Q & A with CEC's Four Founders

Q What other career could you have imagined for yourself and why?

A **JR:** I got into civil engineering because I like "yellow iron." So maybe I would have owned a construction company? Seeing a construction site for the first time and the equipment lifting, pushing, moving, shoving, digging—I thought it was just fascinating. I was a lieutenant in the Army Corps of Engineers and a platoon leader in Vietnam. We had a construction division, so I had dump trucks, dozers, a front-end loader and drills. Running a dozer looks so easy when you're good at it, but you can literally dig yourself into a hole rather quickly.

Q Share an example of what you consider to be a great CEC moment.

A **GQ:** Every year when we hold our annual strategic planning meeting, I see the talent we have in our organization—the unique skills of all these folks—and it really gives me a feeling of pride. I always reflect on all that we've accomplished, and having more than 650 employees and

offices in so many cities. I had no doubts that we would succeed and be a dominant firm in Pittsburgh, but I couldn't have imagined it would get this big. It's a great feeling.

Q Why did it require the four of you to start CEC?

A **KM:** It didn't require four, but four made it better. I think the reason why four worked is because everybody brought a little something different: a bit of a different administrative focus, a different client base, different capabilities. I can't tell you exactly what everyone brought, however, because then the secret would be out! For me, I really just wanted to create a workplace I enjoyed going to every day.

Q What was one of the more difficult challenges CEC faced?

A **JN:** Early on, one client was occupying a significant portion of our workforce as we helped them to get out of a bad situation and find a way to continue to operate. We were still small and only had a few leaders

IN THE NEWS

ENGINEERING COMPANY OF THE YEAR

CEC was named Engineering Company of the Year at the 2013 Northeast Oil & Gas Awards. The Oil & Gas Awards are a platform for the industry to demonstrate and celebrate the advances made in environmental stewardship, efficiency, innovation, corporate social responsibility, and health and safety. ■



ENGINEERING EXCELLENCE

CEC received an Honor Award at the 2014 Engineering Excellence Awards banquet, presented by the American Council of Engineering Companies of Tennessee. CEC's Marion County Park Shoreline Stabilization project was submitted at the request of the Tennessee Department of Transportation. ■





Ken Miller



Jim Nairn



Greg Quatchak



Jim Roberts

in the company, and those leaders had to be in two places at one time: running the company and also in the field making high-level decisions. CEC and the client came through with flying colors.

Q What advice would you give a young person or young entrepreneur?

A **KM:** Every problem is different and there's no one philosophy that works every day. Just be willing to work harder than everybody else. If you are bright and you work hard, you will come out on top. If you actually start thinking "Boy, this is tough," you're going to get too caught up in "Boy, this is tough." Stay focused on the job, solve problems and continue; it's just what you're supposed to do.

JN: My advice is hard work. If you want to be successful, it's not something that you're going to be able to do in an eight-hour day. You must keep up with regulations, trends and best practices and identify changes that are in store

to take advantage of the opportunities. But while you do need to take your job seriously, please don't take yourself too seriously.

GQ: For a young person entering college or leaving high school, I would encourage him or her to give strong consideration to STEM education. The possibilities for your career will be limitless. Embrace your technical knowledge, but don't forget about the interpersonal skills. It's still a people-oriented business. Go beyond the smartphone and all of the technology that will be available at your fingertips and stay engaged with people.

JR: To a young entrepreneur, I would say think about it long and hard, think about what it will take, and make sure your family is on board with this decision because it is a significant commitment of time and energy. Think about building the right team because the challenges are difficult. Think about your strengths and weaknesses and build a team that addresses your weaknesses. ■



The project team accepts Engineering News-Record's Global Best Projects award for a Green Project.

CSL NAMED A WINNER

The Center for Sustainable Landscapes (CSL) at Phipps Conservatory and Botanical Gardens in Pittsburgh, Pennsylvania, was named a winner in *Engineering News-Record's* Global Best Projects competition. The CSL was selected as the winner in the Green Project category. ■

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Back Cover:

PHOTO CONTEST WINNER
MICHAEL CICCONE / CEC PITTSBURGH

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 drilling rig excavates through limestone bedrock during construction of a new 200,000-sq. ft. global headquarters building in Pittsburgh, Pennsylvania. Drilling produced a significant amount of lime dust and usable lime, which was incorporated into wet fill to advance drying.