WORLD-CLASS SPILL RESPONSE

Enbridge, Burns & McDonnell Team Up to Restore Kalamazoo River

also inside Cellulosic Biorefining Groundwater Treatment Transmission Line Encroachments
Crises Prove Consultants’ Worth

The year 2010 has been a year of environmental disasters impacting our economy, natural resources, food chain and wildlife. These incidents, such as the Gulf oil spill and the spills in Michigan and Illinois, will have lasting impacts on the way we meet our energy needs and on the way we live.

In thinking about our response to disasters involving our clients (such as the response recounted in our cover story on pages 9-12), I’m proud of what we have accomplished. We stood by our clients. We were responsive. We provided environmental services using cutting-edge techniques. We listened — not only to our clients, but also to the U.S. Environmental Protection Agency, other agencies and stakeholders involved in cleanup efforts. We were an integral part of their teams. We worked side by side in developing alternatives for success.

These are fundamental consulting skills. We apply these skills, along with knowledge gained by experience and training, in all the services we provide: emergency response, remediation, environmental construction, regulatory compliance and permitting, environmental assessments, risk assessment, site closure and many more.

The mission of our Environmental Group is to provide excellent solutions to environmental and engineering issues and make our clients successful. Our approach is to understand our client’s mission and become a valued member of their team. When we fulfill that mission and approach in the broadest sense, we also make the world a better place. My thanks to all of you who continue to choose Burns & McDonnell as your partner in success.
What's Sustainable?

Sustainability permeates everything we do today — at work, at home, on our commutes. At Burns & McDonnell, we understand that sustainability is important to you, our clients and partners. That's why we're making it easier for you to find how sustainability impacts every topic we write about in BenchMark. Look for the leaf icon throughout the publication to see how our work is contributing to sustainability on all fronts.

ZeaChem's Cellulosic Biorefining Process

5 Making the Right Call
Wes Hardin Takes Technological Innovation Directly to Project Management

Development of the proprietary OneTouchPM® tool was a solution to client needs.

7 Renewable Refining
ZeaChem's Cellulosic Biorefining Demonstration Plant Tests Biofuel Commercialization

This promising biorefining technology has captured the attention of the U.S. Department of Energy.

9 World-Class Spill Response
Burns & McDonnell Teams with Enbridge to Maximize Efficiency and Effectiveness in Cleanup

The OneTouchPM® tool becomes communication method of choice for emergency responders.

15 Two Decades, One Plan
Groundwater Treatment Plant Passes 20 Years of Operations

Containment effort at former Conservation Chemical site helps forge a long-term partnership.

[In Addition]

3 Start Up
Tech Q&A
How It Works
Safety Corner
News in Brief

17 Need to Know
Wetland Banking: A New Way of Winning

13 Project Roundup
Cleaner Energy in Wyoming
Reaping the Rewards of Design-Build
Expanded Capacity, Regulatory Compliance
Construction Challenges Go Underground

18 Offline
Crossing the Line: Encroachments Can Mean Big Problems for Utilities
Technical Q&A: Solar Technology

Q: How do I select the right photovoltaic solar technology for my utility-scale facility?

A: When designing large-scale photovoltaic (PV) solar generation facilities, the decisions you make up-front are vital to optimizing your results and boosting your bottom line. It is essential in the early stages to look at the overall picture and select individual components based on how they will work together to maximize energy output.

PV module selection is the core to block design and impacts string sizing, row sizing and spacing, and energy density. For example, the DC/AC ratio can be increased to boost annual energy output, but it will increase capital costs and provide diminishing energy returns due to inverter clipping. Likewise, row spacing can be minimized to increase energy density but will increase shading potential and reduce maintainability.

Location is also a consideration when selecting PV technologies. Thin-film modules are generally more efficient at converting diffuse light to electrical energy than polycrystalline or monocrystalline modules.

Maximizing the output of a PV system requires a holistic approach, taking into consideration how numerous factors—from location to technology to design factors—will affect your energy production.

For more information, contact Matt Brinkman, 480-337-6507.

Matt Brinkman, PE, is the manager of the Burns & McDonnell Energy Group in the Phoenix office.

How It Works
Public Involvement on Transmission Line Projects

Expansions or upgrades to a utility’s transmission lines are never easy. It can mean anger and hostility toward the utility company from abutting landowners who might be impacted and thousands of hours and potentially millions of dollars spent by the company to secure its rights-of-way.

Central Maine Power (CMP) took a proactive approach with public involvement on its Maine Power Reliability Program (MPRP), a $1.4 billion overhaul to its bulk power transmission system.

"In the past, utilities would just go out and build a project, but you can’t do that anymore," says Chris Marshall, public involvement specialist at Burns & McDonnell. "We have to make sure the neighboring landowners are aware of what’s going on and are taken care of.”

CMP announced the upcoming project with a direct mail campaign, a step required by law. The mailers offered information on how each abutting landowner and the general public might be impacted by the project.

The team then met with each town’s elected officials to explain the project and obtain appropriate permits. CMP also hosted five public meetings where residents and business owners could ask questions, view route maps, learn about the project’s environmental impact and see renderings.

"Usually people were concerned about the project, but they did sit down to hear out the plan," Marshall says. "Some are still unsupportive, but at least feel we’ve been honest about what’s coming up.”

To further open communication lines between CMP and area residents as the project moves forward, field representatives are available to visit homeowners unable to attend the meeting. These representatives answer questions from abutting landowners and report potential issues back to the client, helping avoid delays.

Additional mailers and home visits will explain how homeowners might be affected as the MPRP project moves closer to their area.

"The key is working for prevention rather than reaction to make sure everything runs smoothly," Marshall says.

For more information, contact Chris Marshall, 207-253-4040.
Safety Corner
New Safety & Health Director Targets Education to Improve Safety

After several years in the field monitoring job sites as a safety and health manager for Burns & McDonnell, Jamie Butler, the firm’s new director of Corporate Safety & Health, knows what it takes to keep job sites and employees safe.

“It’s transforming the culture from good safety practices to a world-class safety culture,” Butler says. “We improve the feeling of ownership each employee has so they can execute safe practices.”

The same experience that gave Butler a foundation for understanding and recognizing safety and health best practices also taught him that achieving and maintaining a zero recordable rate is challenging. Burns & McDonnell continues to expand the breadth of safety factors tracked, and new employees and contractors must be trained to meet Burns & McDonnell’s safety standards.

“In order to continuously enhance our safety performance, we have to train everyone to make a conscious decision to be safe,” Butler says.

Employees’ knowledge of safe practices and how to execute safety initiatives builds confidence in workers’ ability to perform safely and keep projects from being slowed or shut down because of safety incidents. The goal is always to trend down in the number of safety incidents that occur and engage everyone in proper safety practices.

“Nothing is impossible, but the right approach to safety is not a cut-and-dried process,” Butler says. “Each individual involved has to be convinced that it’s the right way to do work.”

For more information, contact Jamie Butler, 816-823-7081.

News in Brief

Completed Project Improves Safety at Nuclear Plant
Burns & McDonnell recently completed implementation of a non-safety auxiliary feedwater pump at Ameren Missouri’s Callaway Plant in Fulton, Mo. This modification provides the Callaway Plant staff with critical options for responding to certain accident scenarios. In order to meet quarterly Mitigating Systems Performance Index compilation deadlines, the project needed to be completed in less than 30 days. Burns & McDonnell provided conceptual design to establish critical system design parameters, all supporting technical evaluations, the design change package including plant documentation updates, and a post-modification test plan for performance validation. The new pump performed as designed, and the installation was completed without incident.

U.S. 75 Expansion for TxDOT
To reduce congestion on the primary north-south freeway for commuters in the northern suburbs of Dallas, the Texas Department of Transportation (TxDOT) is expanding U.S. 75 from four to eight lanes and adding three-lane frontage roads in either direction. TxDOT selected Burns & McDonnell to prepare plans, specifications and estimates to reconstruct 2.35 miles of U.S. 75 north of McKinney, Texas. The newly expanded freeway in fast-growing Collin County, Texas, will feature grade-separated interchanges at Bloomdale Road and FM 543 and will bridge over the East Fork of the Trinity River and Honey Creek. Burns & McDonnell will follow an accelerated design schedule, so construction can be completed by 2013.

Court Approves Consent Decree for Overflow Control Program
The consent decree authorizing the City of Kansas City, Mo.’s combined and sanitary sewer overflow control program was approved Sept. 27 in federal district court. The 25-year, $2.5 billion plan, written by Burns & McDonnell, incorporates numerous green design elements providing substantial ancillary benefits to Kansas City residents beyond sewer overflow control, such as cleaner air, cooler ambient air temperatures, recreational and aesthetic amenities, and economic opportunities. This is the longest time frame granted to a municipality by the court and the U.S. Environmental Protection Agency for such a program.

For more information about Burns & McDonnell, visit www.burnsmcd.com/news.
MAKING THE RIGHT CALL

Wes Hardin Takes Technological Innovation Directly to Project Management
Wes Hardin is used to making tough calls. From his first job as an umpire to coaching football to running his own company, he has proven that he’s a take-charge kind of guy. Since joining Burns & McDonnell in 2004, Hardin has taken on a new moniker — innovator. As national product manager for OneTouchPM®, the company’s integrated, 3-D program management tool, he has led the effort to develop the product, designed to simplify project management for all stakeholders.

Changing Paths

Although Hardin’s background is in engineering — he earned a bachelor’s degree in electrical engineering from the University of Missouri-Columbia and began his career as an engineer at Kansas City Power & Light — he always had an itch to start his own company. With a master’s degree in business administration emphasizing entrepreneurship from the University of Missouri-Kansas City’s Bloch School of Business, he seized an opportunity in 1996 to form, with a partner, Danara Technical Group, a large-scale scanning and data integration business.

There, Hardin found his niche. He developed his talent for leveraging the latest technology to convert legacy data into modern GIS and CAD applications. That expertise led him to Burns & McDonnell and the genesis of OneTouchPM.

In a nutshell, OneTouchPM organizes all of a project’s data into a single, user-friendly interface. “We accomplish this by linking into any and all source applications associated with a project and translating the data into a common format,” Hardin says. “Work products can be shared with everyone in near real-time and in a common platform, allowing easy communication across disciplines.”

Using Google Earth Enterprise, OneTouchPM creates a geospatially accurate platform that anyone with a web connection can access. For example, users working an electrical transmission line project can select a component, such as a transmission tower, and with one click find out what type of structure it is, when it will be constructed or whose property it is on.

The Birth of OneTouchPM

Hardin’s initial concept began as an effort to help manage schedules on Northeast Utilities’ $1.4 billion Middletown|Norwalk Bulk Transmission Project. Burns & McDonnell was the program manager for construction of the 69-mile, 345-kV transmission line through heavily populated southwest Connecticut.

Hardin discovered the project needed a way to effectively track public information and concerns. Data was being collected but was not readily accessible to project staff in the field.

Hardin and Brett Williams, the associate vice president who heads the Burns & McDonnell New England office, collaborated to define the desired output.

Hardin developed his talent for leveraging the latest technology to convert legacy data into modern GIS and CAD applications. That expertise led him to Burns & McDonnell and the genesis of OneTouchPM.

“We rolled out the first version of OneTouchPM in a few weeks, and our volume of field issues went from 15 to 20 events per week to two or three practically overnight,” Williams says. “Our project managers began making additional requests to track material and deliveries, environmental hot spots and real-time schedule progress. Wes worked tirelessly to enhance the capabilities of OneTouchPM to meet our needs.”

In the end, the tool was instrumental in reducing construction delays and saving costs. The project was completed a full year ahead of schedule.

Beyond Transmission

OneTouchPM has been adapted for other uses, including tracking rainfall in the Everglades and assisting with cleanup of an oil spill in Michigan. Hardin worked with Enbridge, an energy distribution company, to implement OneTouchPM.

“The use of OneTouchPM during our response enabled Enbridge personnel who were not in Michigan to come up to speed on the project conditions and provide informed knowledgeable input without traveling to the site,” says Tom Fridel, general manager of Enbridge’s Chicago region. “It provided a real-time evaluation of what was occurring no matter where you were located, which was extremely valuable and cost saving. In addition, we now have a time-based archive of all the cleanup efforts and site data.”

Taking OneTouchPM beyond its initial purpose was Hardin’s call in response to Burns & McDonnell client needs. It’s the entrepreneur in him.

“Wes is the driving force behind OneTouchPM,” says Jeff Greig, vice president of the Business & Technology Services Group at Burns & McDonnell. “The power of what he created is the visualization. You no longer have to search through pages and pages of project information; it’s all available in a visual dashboard format.”

Contact Wes Hardin at 816-822-4361.

For more information on OneTouchPM in action, read our cover story on page 9. For other stories about how the tool helps projects run smoothly, visit www.burnsmcd.com/onetouchpm.
Renewable Refining

ZeaChem’s Cellulosic Biorefining Demonstration Plant Tests Biofuel Commercialization

Biorefining allows manufacturers to create sustainable, renewable, high-value end products from biomass, or renewable feedstock. These end products — with applications in gasoline, diesel and jet engine fuel, specialty chemicals, chemical intermediates, biodegradable plastics, pharmaceuticals, and other consumer products — could eventually displace a number of petroleum-based fuels and chemicals in the marketplace.

Biorefining company ZeaChem is on the leading edge of cellulosic conversion technology. It has developed a unique process to manufacture ethanol, other fuels and chemicals from cellulose harvested from hybrid poplar trees and other renewable materials. ZeaChem describes its patented process as “offer(ing) the highest yield at the lowest cost with the lowest carbon footprint of any known biorefining method.” The sustainability and economics of ZeaChem’s biorefining technology has not only captured the attention of private investors and energy giant Valero, another Burns & McDonnell client, but also the U.S. Department of Energy (DOE), which recently awarded ZeaChem a $25 million grant as part of the American Recovery and Reinvestment Act (ARRA) program to accelerate the development of renewable fuels from biomass.

Unlike the traditional corn-to-ethanol process, ZeaChem’s cellulosic biorefining technology produces no carbon dioxide during fermentation. This is accomplished by using an acetogen derived from the digestive system of common termites to convert sugars into acetic acid. During esterification, this weak acid is processed into ethyl acetate, which can then be converted into ethanol or a number of related chemical intermediates.

Scaling Up for a Demonstration Plant

Established in 2002, Lakewood, Colo.-based ZeaChem began with founders Dan Verser and Tim Eggen’s new cellulosic biorefining technology and a business plan for commercialization. Today ZeaChem has 30 employees, half of whom work in the ZeaChem Research & Development facility in Menlo Park, Calif. where ZeaChem scientists and engineers conduct laboratory-scale research to prove the theoretical chemical viability of each step in the manufacturing process. ZeaChem also performed pilot plant trials at the Hazen Research Institute in Golden, Colo. Currently, ZeaChem is scaling up its process from pilot scale to demonstration plant scale, which will examine the commercial feasibility of the cellulosic biorefining process. Valero stated that ZeaChem’s “proposed project is critical to answer scaling and integration questions” relative to cellulosic biorefining.

After completing the initial conceptual design of its demonstration plant, ZeaChem asked engineering firms to bid on the detailed design and construction management needed to finish its 250,000 gallon-per-year plant in Boardman, Ore. ZeaChem selected Burns & McDonnell to provide engineer-procure-construct (EPC) services for the independent core processing unit and, later, the front- and back-end processing units. The front-end involves processing, pre-treatment and hydrolyzation of cellulosic biomass; the back-end converts ethyl acetate into ethanol or other products.

ZeaChem appreciates the value in Burns & McDonnell’s single-source expertise, comprehensive project coordination and favorable pricing structure — a guaranteed maximum price and cost-sharing for under-runs. The DOE and other funding providers view this pricing structure as an effective cost-containment measure.

"It gives the entities providing ZeaChem financial support comfort to know that they are committing a defined amount of capital for this scope of work," says George Stegner, project manager at ZeaChem.
“We need the strength, breadth and depth of a firm like Burns & McDonnell to execute this project. Even though we have seasoned employees, we can’t do it ourselves.”

As a start-up biorefining company, ZeaChem faces other unique challenges in implementing a demonstration plant. To find the right design solution for each of ZeaChem’s challenges, Burns & McDonnell paired its engineering and construction professionals with those in corresponding disciplines at ZeaChem. Burns & McDonnell has also been working closely with ZeaChem to incorporate the latest data from its laboratory research into the design of the demonstration plant, which is expected to pay dividends in enhancing system performance.

ZeaChem’s cellulosic biorefining demonstration plant will convert 10 dry tons of cellulosic feedstock into ethanol daily. Compared to conventional gasoline refining, corn ethanol production reduces greenhouse gas emissions by approximately 24 percent, and ZeaChem process reduces emissions up to 98 percent. ZeaChem and its investors are paying for the core structure, while its DOE ARRA grant is funding the front- and back-end processing units.

Evaluating Biomass
In addition to flexibility in end products, ZeaChem’s patented biorefining process can accept a variety of biomass feedstocks. Due to the low cost, hybrid poplar trees will initially be ZeaChem’s primary feedstock. Poplar trees, rich in cellulosic biomass, grow abundantly in the United States and can be harvested every three years — ideal renewable feedstock characteristics. ZeaChem contracted with GreenWood Resources to supply hybrid poplar trees from a 28,000-acre tree farm near the plant, which reduces transportation costs and associated emissions. ZeaChem will also test other renewable, cellulosic feedstock such as corn cobs, corn stover, woody biomass and herbaceous grasses to verify that its technology can be implemented nationwide.

Fulfilling Special Considerations
Since private investors and a DOE ARRA grant are funding ZeaChem’s demonstration plant, there are two separate sets of requirements each portion of the project must meet. As a single-source EPC contractor, Burns & McDonnell helps ZeaChem manage its preferred subcontractors and follow two separate sets of rules, while coordinating all portions of design and construction. Through Burns & McDonnell’s EPC approach, ZeaChem benefits from an expedited design and construction timeline, which is key to meeting cost and schedule targets required of a DOE ARRA grant recipient project.

Preliminary planning and design began in June 2009, detailed design commenced in October 2009, and groundbreaking followed in June 2010. With an accelerated construction schedule, the demonstration plant will be completed by late 2011.

“We’re grateful for the validation that comes from recognition in the industry as one of the top solutions for alternative fuels and chemicals,” Stegner says. “Many people are rooting for us; now we just have to execute. We are confident that Burns & McDonnell can help us do that.”

For more information, contact Ron Jones, 314-682-1571.
On July 26, 2010, a 30-inch pipeline carrying crude oil from Griffith, Ind., to Sarnia, Ontario, ruptured. Line 6B, part of the Lakehead Pipeline — the world’s longest petroleum pipeline, owned by Enbridge Energy Partners, L.P. (U.S.) and Enbridge, Inc. (Canada) — spilled an estimated 19,500 barrels of oil near the town of Marshall, Mich.

After heavy rains, Talmadge Creek and the Kalamazoo River were near flood-stage. The oil quickly found its way to the swollen creek and was carried to the rushing waters of the Kalamazoo River. The oil continued down the Kalamazoo River approximately 35 miles to the Morrow Lake delta.

The spill needed to be contained. If it overtopped the dam at Morrow Lake, it was just 80 more river miles to Lake Michigan.

Call to Battle
As the federal agency in charge of the spill response, the U.S. Environmental Protection Agency (EPA) took a leadership role in the unified command and mobilized an Incident Management Team of federal, state and local agencies.

As cleanup began, Enbridge engineering supervisor Vince Kolbuck called Trevor McIntyre, a Burns & McDonnell engineer he had worked with on another project. Burns & McDonnell environmental professionals from multiple offices, armed with the company’s OneTouchPM® proprietary software tool, quickly built a dedicated team to help Enbridge respond to the spill. Mike Świeca, a seasoned environmental remediation manager and former EPA emergency responder, would lead the spill response during the day shift, and Trevor Gustafson, an experienced responder, filled that role at night.

Round-the-Clock Support
Świeca and McIntyre attended the command post meeting at 7 a.m. the next morning. By this time more than 50 contractors were on site attacking the release. Enbridge’s goal was to contain the oil no matter what it took — and make sure oil didn’t reach Morrow Lake. The plan was to double the amount of resources on the river and the amount of boom in the river by week’s end.

The more than 38-mile site stretching from the rupture point to the Morrow Lake Dam was divided into five sections with multiple control points in each section. Enbridge needed an ongoing, accurate picture of what was happening throughout the linear site. Recognizing the EPA’s reporting requirements and the logistics of managing resources on the river, Burns & McDonnell professionals were teamed with Enbridge supervisors to assist with managing the resources of the massive spill response.

“My guys on the front lines didn’t realize how valuable you Burns (& McDonnell) guys would be,” Kolbuck later told Świeca. “They couldn’t do it without you. Thanks.”

Massive Response
The strategy for containing and removing the spilled oil involved identifying control points along the river where boom could be stretched to direct and trap the oil. Once held, the oil could then be skimmed or siphoned from the

Facing page, top left: Burns & McDonnell engineers prepare to build a 10-acre temporary decontamination facility along the Kalamazoo River. Top right: Crews conduct flushing activities to remove oil from the water in the Battle Creek Mill Pond area. Center: In the days following the release, oil and water top the Ceresco Dam on the Kalamazoo River. The same region is shown cleaned and restored on the cover of this Benchmark issue. Lower left: Containment and sorbent boom surround an island in the Kalamazoo River. Lower right: Workers clean up the river shoreline.
“OneTouchPM is a powerful tool that housed all relevant data. Its best quality is ease of use. ... Anyone could navigate through the OneTouchPM system without being a GIS specialist.”

Incident Command System

In accordance with the Federal Emergency Management Agency’s National Response Plan, the Incident Command System (ICS) was used for command, control and coordination of the emergency response in Marshall.

Burns & McDonnell worked with all involved agencies and as an extension of the Enbridge staff. The Burns & McDonnell team’s knowledge and proficiency with the ICS helped Enbridge accurately meet many deadlines.

A primary component of the ICS is the Incident Action Plan (IAP). The IAP establishes measurable strategic objectives during each operational period. Burns & McDonnell professionals served in key positions during the Marshall response to assist Enbridge in preparing and implementing the IAP.

“Id like to reiterate the extremely high level of customer service we’ve received from Burns & Mac personnel,” wrote Jonathon Thiessen, situation unit leader for Enbridge. “Their ability to deliver on EPA’s requests in a timely manner has built credibility and facilitated the transfer of responsibility to Enbridge through this transition phase.”
All information gathered at the site, including more than 140,000 geo-referenced date- and time-stamped photos, the number of people responding each day, the number of feet of boom deployed and the quantity of oil recovered all became part of the wirelessly accessible, continually updated database, along with communications about safety and methodology and volumes of other information. This allows future users of the system to recreate what happened at any location on any date throughout the spill area.

"Burns & Mac provided a critical role in our response to the Marshall release," says Mike Moeller, Enbridge response operations chief. "Their field personnel were professional and their experience with linear projects proved invaluable to gathering, organizing and presenting daily data. OneTouchPM is a powerful tool that housed all relevant data. Its best quality is ease of use. We had a system set up in the forward command post to use during discussions and decision-making conversations. Anyone could navigate through the OneTouchPM system without being a GIS specialist."

Total Team Effort
As the response efforts on the river continued to grow, requests continued to come in for the Burns & McDonnell team, which provided 24-hour, seven-days-a-week incident command, field supervisory and documentation support throughout the clean-up area. Burns & McDonnell supported the response in other areas, such as material management in the supply yards, wastewater treatment, and procurement and orientation of subcontractors. It also designed and managed construction of earthen containment berms and a large decontamination pad for oil-covered equipment.

High Praise
"Without the help and dedication from companies such as (Burns & McDonnell), we would not have been able to accomplish what we did in such a short time frame," wrote Enbridge President and Chief Executive Officer Patrick Daniel.

For more information, contact Mark Knaack, 816-822-3306.

Faster SCAT

The Burns & McDonnell team used OneTouchPM mobile to help speed up the Shoreline Contamination Assessment Teams (SCAT) natural resource damage assessment and floodplain assessments along the banks of the river.

For the assessments, teams made up of a representative from the EPA, the Michigan Department of Natural Resources and Environment, the Fish and Wildlife Service, and Enbridge contractor Cardno Entrix minutely examined the area along the 30-mile stretch of river shore, taking detailed notes on the type of vegetation, noting the position and amounts of oil, and indicating the recommended cleanup method for each area of concern identified — all with pencil and paper.

Service at Warp Speed
"As the cleanup progressed, it became clear that the speed of the SCAT team was becoming a limiting factor to the speed of the cleanup," says Mark Knaack, Burns & McDonnell situation unit leader on the ICS team. "Working very quickly, our information management team created a new Google Mobile application customized to the needs and specifications of the SCAT and floodplain assessment teams."

Tool Triples Productivity
Equipped with GPS-enabled laptops displaying a custom background map with site-specific control-point markers, the teams of trustees could see their locations in the field on the interface, mark the GPS coordinates, take a photograph, and instantly update the database with the image and notes as to the cleanup method required.

Each SCAT team's progress updates were immediately available throughout the site and back at the Unified Command Center, allowing Enbridge operations to immediately respond in the field to any cleanup recommendations made by the trustees.

"The use of the mobile app combined with OneTouchPM tripled the productivity of the SCAT teams and greatly reduced the time between the initial assessment and final signoff of each area of concern," Knaack says.

After using the mobile SCAT application, SCAT leader Denise Kay of Cardno Entrix commented that the use of the new tool "revolutionized how SCAT will be performed from now on."

OneTouchPM provides a dashboard of information for managers, including real-time updates from field staff.
Cleaner Energy in Wyoming

Emissions of nitrous oxides — commonly known as smog — are down 20 percent to 30 percent at one of the nation’s largest coal-based power stations. By the end of 2011, they will be down even more, thanks to an environmental control system designed and supplied by Burns & McDonnell. The 1,710-megawatt Laramie River Station produces enough electricity to power about 1.4 million homes. The station is an integral part of a generating family that produces electricity for rural electric customers in nine states across two electrical grids. The station’s operator, Basin Electric Power Cooperative, is two-thirds of the way through a three-year, $20 million program to improve the efficiency and reduce emissions from its three massive boilers. “By making modifications to the furnace, we were able to modify the combustion process to elongate the fireball in the boiler and lower its flame temperature,” explains Jeff DeWitt, Burns & McDonnell project manager. “These changes help inhibit nitrous oxides from forming in the first place.” This overfire air system has been installed on two of the plant’s three boiler units. Design for the third is complete, with construction set for spring 2011.

For more information, contact Jeff DeWitt, 303-474-2256.

Reaping the Rewards of Design-Build

Design-build delivered the solution for the city of Riverton, Wyo. The Public Works Department knew it needed changes in its preliminary treatment system — or headworks — and biosolids handling. It also knew construction bids would be limited under design-bid-build by competition from the natural resources development industry. Burns & McDonnell, teamed with general contractor Garney Wyoming, completed a solids dewatering facility and comprehensive headworks improvements under the first municipal wastewater design-build contract in the state. “The design-build team took the uncertainty out of the project, using available local labor in combination with regional sources,” says Bill Urbigkit, public works director. A high-solids centrifuge replaced the sludge drying beds, and headworks upgrades included replacing the bar screen and grit classifier and adding a screenings washer/compactor and grit conveyance system. “The project became operational two months early and 10 percent below budget,” says Darin Brickman, Burns & McDonnell project manager. “The team produced a facility that shows the advantages of alternate project delivery.”

For more information, contact Darin Brickman, 303-474-2244.
Expanded Capacity, Regulatory Compliance

Integrating new systems in an operating refinery requires detail, finesse and creativity. Murphy Oil needed to ensure compliance with U.S. Environmental Protection Agency rules on sulfur and benzene in fuels. Under an engineer-procure-construct contract, Burns & McDonnell converted an existing hydrotreater to produce ultra-low sulfur diesel, revamped a kerosene hydrotreater to produce ultra-low sulfur kerosene, and installed a new naphtha splitter. To optimize space and reduce turnaround time, the pipe rack was installed above the existing hydrotreater. To support construction through winter, the work area was enclosed with a temporary, heated shelter, shielding workers from below-zero temperatures, biting winds, snow and ice, says Gerald Potter, Burns & McDonnell project manager. “This was a key element enabling project completion ahead of schedule.” Future operational flexibility was built into systems, and the refinery can now process light cycle oil on site, creating new revenue streams. The project met all regulatory requirements and increased capacity. “The team used creative and innovative thinking to turn over a successfully operating system under budget,” Potter says.

Construction Challenges Go Underground

The Red Line subway station at Grand and State streets in Chicago continues to operate while the station undergoes a complete renovation. Updates to the 1940s station will accommodate increased capacity and meet Americans with Disabilities Act standards. Maintaining street and station access throughout the project is difficult, but working around the 100-year-old Rock Bottom Brewery building presented the biggest challenge. “To accommodate additional capacity, expansion was required under the building’s foundation,” says project manager Tom McCay. “The entire east foundation was supported independently above the station’s expansion area.” An intricate earth retention system maintained 40 feet of earth below the roadway and supported the popular restaurant. Micropiles in the basement were supported by bedrock and tied into the retention system with lateral needle beams for temporary support. Major utilities were moved before construction, and others required protection and support. Improvements will modernize the facility and increase convenience and safety. The third and final phase of the $67 million renovation is on track to be completed in fall 2011.

For more information, contact Tom McCay, 630-514-5603.
In 1990, a partnership formed to implement a plan for a groundwater extraction and treatment system to capture groundwater contamination from an industrial disposal site within the U.S. Environmental Protection Agency’s (EPA) Region VII. Twenty years later, that same team continues to operate the system according to plan, remediating the National Priority List site using pump-and-treat technology.

**Background**

The environmental regulations initiated in the 1970s and ‘80s launched many efforts to clean up industrial sites around the country, including the former home of the Conservation Chemical Co. along Front Street adjacent to the Missouri River in northeast Kansas City, Mo. From 1960 to 1976, a mix of hazardous and industrial wastes were treated and disposed of in six unlined basins. Leachate from the basins contaminated the groundwater beneath the site. The Missouri Department of Natural Resources closed the site in 1976, and the top portion of the basins were stabilized and covered. The EPA began a remedial investigation in 1979, and the U.S. District Court signed a consent decree in 1988 outlining a containment plan. The Front Street Remedial Action Corp. (FSRAC) was formed at that time by four firms from among more than 200 waste generators: AK Steel, FMC, Alcatel Lucent and IBM.

The consent decree selected pump-and-treat groundwater remediation from more than 20 other methods studied, making it the first such system to be implemented in EPA Region VII. Burns & McDonnell, which had been the technical consultant for then-parent company AK Steel, was added to the team to prepare the conceptual design for a system to pump groundwater, treat it to remove metals and organic chemicals, and discharge it to the Missouri River. FSRAC was tasked with funding the design and construction of the containment system and its operation.

**Challenges**

The Conservation Chemical site is small, with the six basins covering approximately 7 acres. As a result of site space constraints, including a levee and adjacent industrial businesses, the treatment plant would require a small footprint for the systems removing the more than 20 contaminant types identified.

“The proximity of the river and area geology also meant the contamination was unconfined on the site,” says Jeff Keller, Burns & McDonnell operations manager for the project since 2000.
The treated water is used for every plant water need except potable water and then held in a storage tank before metered discharge to the Missouri River. Effluent analysis has demonstrated since startup that the processes have successfully met the limits established for more than two decades, despite the complex mix of chemicals that must be treated.

Solutions

The chain of liquid treatment processes were designed and sequenced within the plant to maximize effectiveness while minimizing plant size. The 11,000-square-foot facility has a mezzanine to elevate some systems, and the layout maximizes efficiencies.

“'To draw the groundwater from below the site into the remedial wells to be pumped and treated, instead of migrating to the river, eight paired piezometer wells precisely measure the flow of groundwater from the area beneath and around the site into the two wells, drawing groundwater from depths of 90 to 100 feet,’ Keller says.

The challenge to design and operate a facility that would pump and treat groundwater 24 hours a day for decades required vision and creative solutions, given that only one of the FSRAC members had local headquarters. ‘Burns & McDonnell was contracted to provide all necessary operations and maintenance services at the plant through our Facility Operations Services,’ says Burns & McDonnell Associate Vice President Pete Zanoni, who has been part of the project since 1990. Jim Henson, who provided construction and startup oversight, has supervised the treatment plant operations ever since.”

Results

“It’s been an excellent working relationship over the years,” says Tom Morris, IBM environmental engineer and president of the FSRAC board. “There has always been a high level of attention to this project from the Burns & Mac management team, and when we ask for something, we know it’s going to be done right. Our group has 100 percent confidence in Burns & Mac’s ability.”

The plant’s performance has been exemplary. In 20 years, the contaminant levels in the groundwater beneath the site have been knocked down significantly, while effluent samples taken from the plant outfall have always met required levels. “It also survived the Midwest floods of 1993, with only minimal downtime, despite the wells and surrounding property being submerged for 90 days,” Zanoni says. “The plant site is elevated to the 500-year flood level, and rising waters came within three feet of plant infrastructure. But aside from minor damage to fences, trees and monitoring wells, everything stayed in place.”

For more information, contact Pete Zanoni, 816-822-3241.
An alternative approach to wetlands mitigation can benefit landowners and project developers — and better preserve high-quality wetlands habitat.

**Alternative Embraced**

Swamps and other wetlands were once considered the lowest form of real estate. Today, their value is recognized: Wetlands not only provide valuable habitat, they cleanse groundwater, help stabilize shorelines and provide a buffer against flooding. Wetlands are protected under the Clean Water Act. If impacts to wetlands can’t be avoided in the course of project development, they must be replaced by wetlands of equal value as determined by federal and state agencies with jurisdiction in the area.

"In the past, wetland mitigation was typically a tit-for-tat approach that created small, isolated wetlands in exchange for amounts lost," says Randy Root, Burns & McDonnell senior wetland scientist. "Wetland banking is an approach that has been around for several years. Developing wetland banks tends to provide a larger functional wetland complex for the future. In the past few years, the Corps of Engineers has begun to consider it the preferred alternative."

**Higher-Quality Wetlands**

A wetland banking instrument is a document that details the need for a bank within the market area and the types of wetlands; the amount of wetland and/or stream credits to be generated; an accounting system, reporting system and financial assurances; a site development plan; and a monitoring and maintenance plan. Because wetland banking involves creation of large, contiguous wetlands that are legally required to be managed as wetlands in perpetuity, it’s more desirable for conservation purposes than creating smaller, less valuable wetlands that may or may not succeed as wetlands in the long term.

**Permitting Flexibility**

"Wetland banking allows more flexibility in terms of permitting," Root says. "In the past, a developer needing a permit would have to delay a project while compensatory wetland sites were located, approved and developed. In addition, the developer was responsible for five years of maintenance and monitoring. Using a wetland bank can streamline the permitting process. The developer can purchase credits from a mitigation bank with Corps of Engineers approval. Having successful wetlands replacement available can save time and money in the long run."

**Not Just Anywhere**

Landowners wishing to develop wetlands need to be aware that not just any site qualifies. Wetlands need to have saturated or even inundated soil. Sites where wetland hydrology has been manipulated by ditching or drainage tile are good candidates for restoration. Restoring wetland hydrology is critical to the success of a wetland mitigation site. Other attributes that define a wetland include the presence of hydric soil — usually found at the site of a former wetland. For example, land near streams, creeks or rivers may be suitable for wetland development. The presence of hydric soils and wetland hydrology allows the establishment of wetland vegetation.

In addition to site feasibility, landowners should consider marketability of the wetland bank before investing in wetlands development. A wetland specialist can assist in assessing the value of the wetlands that may be re-established based on type, quantity and location. A wetlands specialist can also represent the owner in preparing the banking instrument for approval by the Corps of Engineers and Interagency Regulatory Team (IRT).

**Stamp of Approval**

Information that the Corps of Engineers and the IRT will consider includes an analysis of the watershed, the wetlands that have been lost, the existing conditions and habitat, the future developments planned, and the proposed design for the re-established wetlands. In addition to the land itself, the investment required includes funding to be put in place for ongoing management of the wetland bank.

"It’s a lot of work before you even begin the wetlands construction," Root says. "But landowners are finding that it’s well worth the up-front cost. And they have the satisfaction of leaving a legacy that’s invaluable."

For more information, contact Randy Root, 816-822-3961.
As utilities have struggled over the past two decades to keep up with rising costs and increased demand, less focus was placed on monitoring rights-of-way for encroachments. As a result, incipient encroachments began appearing and eventually grew into significant issues with everything from vegetable gardens and sheds to swimming pools and even a house crossing into the rights-of-way.

"Most utilities have encroachment processes, but it’s easy to cut funding for that because there’s no immediate impact," says Wayne Young, senior right-of-way specialist at Burns & McDonnell.

CMP isn’t alone. As utility companies begin planning transmission line upgrades and expansions, retroactively defending their rights-of-way boundaries is costing time and money as staff traverses transmission line routes, identifies encroachments, communicates with abutting landowners and mitigates issues.

"Many utilities didn’t realize they’d have a big mess by choosing to forego encroachment monitoring," says Chuck Bell, manager of land acquisition at Burns & McDonnell. "But they’re starting to understand encroachment issues could add time and cost to their land acquisition efforts."

**Unrealized Dangers**

Time and cost aren’t the only problems and may not be the worst. Abutting landowners’ encroachments can result in security, liability and reliability risks. Furthermore, the North American Electric Reliability Corp. (NERC) and the Federal Energy Regulatory Commission (FERC) outline strict regulations with which utilities must comply. Non-compliance can lead to expensive fines on top of the cost to correct encroachments — especially if the encroachment results in a serious malady, such as a blackout.

"Utilities are held to the standard that they should know what’s happening on their land," Bell says. "If they don’t make themselves aware of what’s being built on their rights-of-way and address it, they could be held liable for any injury or harm resulting from that encroachment."

That leads to what is arguably the most difficult problem for utilities — public relations. Although most companies have encroachment request processes — for landowners to request permission to use a right-of-way and address it, they could be held liable for any injury or harm resulting from that encroachment.

"You’re dealing with calling out people who don’t like being told they made a mistake, and sometimes you’re dealing with telling someone their house has to be torn down," Young says. "It’s painful. It’s not easy doing this."

**Prevention Is Key**

The cost of preventing encroachments is generally less than the cost to mitigate encroachments, loss of rights or acquiring land rights. It’s virtually impossible to keep the rights-of-way completely clear at all times, but establishing and maintaining a records system that engages field workers to report issues will keep encroachments to a minimum. Prevention communication will help avoid safety, liability, reliability and compliance issues, as well as maintain a positive atmosphere for information sharing.

"If utilities work to keep their rights-of-way clear to begin with and communicate to abutting landowners and municipal officials why they need to respect the property lines or how they can request to use the land, this problem would largely go away," Bell says.

For more information, contact Chuck Bell, 816-349-6615, or Wayne Young, 816-822-4226.

Although not a Central Maine Power right-of-way, this photo depicts examples of encroachments, such as fences and sheds, that can cause safety, liability and reliability issues for utilities planning transmission line projects.

An environmental emergency waits for no one. When an accident occurs, Burns & McDonnell environmental specialists respond immediately to your call. Our experience in the federal Incident Command System enables us to work effectively with regulatory agencies and contractors to minimize damage and maximize cleanup efficiency.

Our OneTouchPM® management tool tracks developments in real time, enabling you to put the right resources in the right place — at the right time.

www.burnsmcd.com