

Bench | Mark

Burns & McDonnell

2005 No. 3



Burns & Mac Delivers

All Kinds of WOW!

Lighting the Way

Giving Cities the Information
They Need

The Central Mission

Guiding Anti-terrorism Operations

Beyond the Scope



Greg Graves
President and CEO
Burns & McDonnell

The Biggest Wow of All

As a 107-year-old engineering firm, Burns & McDonnell has had its share of “wow!” projects.

The most obvious jobs are enormous in scope or benefit. Our design of Stormwater Treatment Area 3-4 for the South Florida Water Management District earned the American Council of Engineering Companies’ Grand Conceptor Award, and is already helping to restore the Everglades ecosystem. Our ConocoPhillips clean fuels project was awarded a Design-Build Institute of America national award of excellence. We are also working on the largest earthen dam project in America in Lake Fort Smith, Ark.

There are other examples of Burns & Mac projects that are large in scale. But the sheer size of our projects is not the only measurement of WOW! Burns & Mac WOW! projects also represent safety achievements and technology advancements. And projects that cause people to say: “Wow, I didn’t know Burns & Mac did that.”

This issue of *Bench Mark* focuses on several of our WOW! projects. In this issue, you will read about projects with remarkable safety records, new markets where we are making our mark, and new facilities whose importance extends well beyond U.S. borders.

Their common link is what we consider the biggest WOW! of all: a really happy client. Long after the project is done, that is what we consider our legacy.

Burns & McDonnell

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Printed on Recycled Paper

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Q&A

Meteorological analysis provides more than a weekly weather forecast

Q: How can weather analysis benefit my project?

A: Before a project begins, there are benefits to examining weather trends. Weather analysis can help justify the need for a project. For example, the frequency of heavy ice storms can make the benefits of underground transmission lines outweigh the costs. A meteorologist's climatological study can help utilities qualify for federal grants to help pay for underground lines.

Climatological studies can also help in developing realistic construction schedules. First, a study can help determine how many weather-related work delays to expect. When project managers know how many days of heavy rain or snow may occur, they can plan for those delays and set a schedule accordingly. By establishing a "bad" weather threshold at the outset, there will be little question whether a weather event should disrupt construction.

Second, when there is a weather-related delay, a climatological study can verify the severity of the weather event. If a delivery is late because of snowy roads, a weather record showing significant snowfall can support the delay.

For more information, contact Mark Saito, (816) 822-3914.



Mark Saito is a senior meteorologist in the Environmental Studies & Permitting Group.

How it Works Ethanol: From Feedstock to Fuel

It's not just corn anymore.

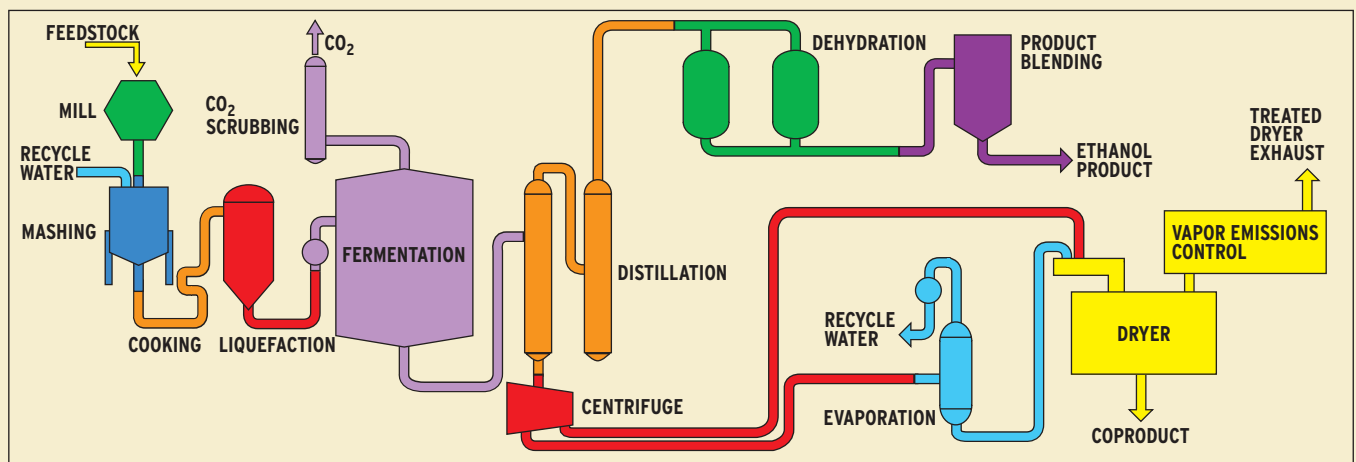
Feedstock alternatives can reduce input costs for the production of ethanol and give ethanol producers more choices based on local market conditions. Sorghum, wheat, barley, molasses and cheese whey are potential replacements for corn.

"As the market for ethanol expands in the U.S., more avenues are opening up to give producers cost-effective choices for production," says Meleesa Younggren, biofuels business development manager.

The ethanol production process is similar with different inputs. (See diagram below.) First, the raw feedstock mixes with water and is cooked with steam. Enzymes are added for fermentation. The resulting alcohol/water mixture goes to a distillation tower, where the alcohol is separated. It is further refined to produce 99.5% pure ethanol.

"A major benefit of ethanol production is the potential for valuable coproducts, such as carbon dioxide and distillers grain for animal feed," Younggren says. "Even the water is recycled in the process."

For more information, contact Meleesa Younggren, (816) 822-4373.



CSI: St. Louis

The new St. Louis Police Forensic Laboratory marries state-of-the-art technology with a 1940s-era exterior façade.

Burns & McDonnell provided design services for the 40,000-square-foot project, which started with a feasibility study to expand an older facility in 1999. When expansion wasn't possible, moves to another renovated building or a new site were considered. Construction on the \$8.5 million facility, located across from the downtown City Hall, began in 2003. The 1940s appearance complements the exterior of the adjacent police headquarters building.

Ken Francis, project manager in the St. Louis office, says the three-story lab was designed to meet certification criteria for the American Society of Crime Lab Directors.

"The facility has a complex heating/ventilation/air conditioning system to accommodate the type of work done there," Francis says. "We also tried to capture a lot of natural light for the administrative areas. To do that, we actually sloped the ceiling up at the windows."



Features of the laboratory, unveiled at an April 1 ribbon-cutting:

- DNA testing
- Trace
- Firearms
- Computer
- Property custody
- Drug chemistry
- Serology
- Photo lab
- Evidence receipt
- Administration

BMcD News in Brief

Seminole Electric Plant

Burns & McDonnell in June signed a contract with Seminole Electric Cooperative Inc. to provide design and construction management services for a new 750-megawatt coal-fired generating unit. Unit 3 will be added at Seminole Generating Station in Palatka, Fla. Construction on the \$1.2 billion project is set to begin in October 2008, with a goal of completion by May 2012.

Coal-Fired Symposium

New coal-fired plant development and permitting, air quality control system retrofits, natural gas pricing, plant financing and environmental issues headlined the topics at the 2005 Coal-Fired Symposium May 4-5 at the Burns & McDonnell World Headquarters in Kansas City, Mo. The sixth-annual event drew more than 100 clients and major equipment suppliers for presentations designed to educate the industry on the potential of coal-fired generation in today's power market. Other topics covered were biomass cofiring, generation input costs, hybrid cooling, gasification and constructability.

Tri-State Tollway

The Burns & McDonnell Chicago office has signed on to provide construction section engineer services on a 10-mile stretch of the Tri-State Tollway. The project, with a total construction cost of \$105 million, includes reconstruction of retaining walls, embankments and four bridges between the Cal-Sag Channel and 111th Street. As the prime consultant, Burns & McDonnell will also assist in expediting the project with the design consultants to meet the project's tight deadline.

Engineering Excellence Award

The Texas Council of Engineering Companies honored the Burns & McDonnell Aviation & Architecture and Construction Design-Build groups with the 2005 Silver Engineering Excellence Award. The first-of-its-kind cooling, heat and power packaged plant for Austin Energy uses the waste heat from a 4.5-megawatt natural gas-fired combustion turbine to produce more than 2,500 tons of chilled water from the world's largest heat recovery absorption chiller. *See related story, Page 10.*

For more information about Burns & McDonnell, visit the "In the News" section of our website at www.burnsmcd.com



The Central Mission



The Joint Intelligence Center (JIC) is the first phase of an overall upgrade of Central Command facilities. Burns & McDonnell is designing a highly specialized complex for JIC's important function.

U.S. Central Command (USCENTCOM) is a Geographic Combatant Command responsible for planning and conducting U.S. military activity in the Central Region area of responsibility. The Central Region consists of 27 countries in the Middle East, Southwest and Central Asia, the Horn of Africa and the island nation of Seychelles.

From a complex of buildings at MacDill Air Force Base, Fla., USCENTCOM officials guide antiterrorism operations and monitor and conduct military operations in Iraq and Afghanistan.

It's an awesome responsibility requiring facilities to meet the tremendous challenge.

Burns & McDonnell is helping Central Command carry out its vital mission.

All for One

Central Command took on a major role in the global war on terrorism after the Sept. 11, 2001, attacks. Facilities at MacDill in Tampa simply could not keep pace with the expanding mission and attendant increase in personnel. Currently, joint and coalition forces work in numerous facilities throughout the base. Because of parking constraints, some personnel walk more than a mile to get to functions in other buildings.

The Joint Intelligence Center (JIC) is the first phase of an overall upgrade of Central Command facilities, and the first to receive funding from Congress. The JIC will consolidate intelligence operations into one four-story, 270,000-square-foot building. Inside, military and civilian intelligence professionals will collect, process, generate and store classified intelligence data. The building is expected to be complete in 2008.

Burns & McDonnell, under contract with the Corps of Engineers Mobile District, is designing a highly specialized complex for JIC's

important function. Spaces include a 275-person conference room for classified briefings and eight dedicated video teleconferencing rooms. Other facilities include a large area for imagery support operations, and an operations center with media wall where data feeds and intelligence from around the world can be viewed. About 16,000 square feet of server space will accommodate JIC's computer needs.

To improve parking, Burns & McDonnell, working with Walker Parking Consultants, is designing a 900-space parking garage. BMcD specialists will also design a central utility and water plant. Other BMcD specialists are contributing to the project in the areas of geotechnical analysis, cabling design, interior design and architecture.

In the Beginning

Prior to design, BMcD architects and interior designers interviewed more than three dozen JIC civilian and military personnel to begin to understand their specific needs to perform their job duties. What they learned is that workers needed a flexible space, not only for daily operations, but to respond to changes in USCENTCOM's mission.

"Personnel needs are dictated more than anything by world events," says Kent Yaros, BMcD architect. "We needed to give them a space flexible enough to adapt to those changes."

The BMcD design incorporates universal workstations and less-compartmentalized departments to facilitate the ebb and flow of the workforce.

In the new building, JIC personnel will also have expanded workspaces and one amenity that most of us take for granted — windows.

"Some personnel are currently working in windowless offices," Yaros says. "We're designing them a space that gives them windows while not compromising their need for security."

Raised ceilings will give workspaces a more open look. The use of bright colors will offset dark areas where staff conduct their work. Gifts from heads of state will grace one room; other exhibits will display the history and mission of JIC and Central Command.

"We want the JIC workers to have a workspace that rejuvenates them," says BMcD interior designer Barb Haman.

Cable Connections

JIC will contain more than 200 miles of cable. The design meets the goals of efficiency, security and flexibility.

Routing communication cabling under raised floors will make it easier to move people — and network connections — as missions change. Equipment racks in the local area network (LAN) rooms will be water cooled, an efficient way to dissipate intense heat built up by hard-working CPUs. Highly secure fiber-optic cable will connect workstations to the LAN room.

"The design of the new JIC is definitely a case of form following function to meet the demands of a highly secure, flexible workspace," says Eric Kraus, project manager.

For more information, contact Eric Kraus, (816) 822-3839.

TEA FOR TWO

Studies help Unilever determine the best options for duplicating Lipton line at a second plant



A wrong decision when ramping up for national distribution of a new beverage product could brew up a heap of trouble.

That's why Unilever, manufacturer of leading food, home and personal care items, brought in Burns & McDonnell to help evaluate options for increasing production capacity of Lipton Brewed Iced Tea (LBIT).

"Burns & McDonnell gathers and analyzes all pertinent information and develops scenarios for decisions regarding increasing capacity at various sites," says Mike Winnett, project manager in the BMcD Process & Industrial Group. "We evaluate all the variables, such as distribution costs, labor costs, equipment and plant capital investments required."

Once the site is chosen based on the initial study, the work expands to include a full project description, process flow diagrams, specific plant layout, and estimated design and construction costs.

"All this was completed for the Lipton project so Unilever can make the best business decisions, based on a process that gives them a sound evaluation and a solid capital cost estimate," Winnett says.

The Product's Potential

Unilever's Lipton, a name synonymous with tea, developed the LBIT product to bridge the gap between sales potential and actual sales of brewed iced tea in foodservice. Operators often struggle with the inability to control the taste of iced tea brewed by multiple employees. It's difficult to provide the consistency demanded by customers day in and day out.

The LBIT system is designed to provide that consistency. A countertop urn with a spigot dispenses freshly made single servings from an under-counter source. A 3-pound divided bag contains enough tea extract and tea aroma to make 37 gallons of LBIT when mixed with water. The bags attach to hoses with standard soda fountain fittings, meaning employees don't have to learn new

"Our in-depth understanding of the process helps Unilever make business decisions with their joint venture partner about the manufacturing and distribution strategy for this growing product."

technology. The bags are delivered to restaurants and distributors in a cardboard box, which the industry calls bag-in-box (BIB).

The Evaluation Process

Burns & McDonnell has conducted two studies — known as Front End Loading (FEL) studies — for Lipton. The first, an FEL-2, was completed in 2002 to help determine the relative cost differentials between potential sites in Dallas; central Mexico; Independence, Mo.; Suffolk, Va.; and Montreal. Suffolk rose to the top as the best site to add capacity.

Unilever again called on Burns & McDonnell in 2005, this time for an FEL-3. That study provided a plus/minus 10 percent capital cost estimate for integrating the LBIT line into its Lipton instant and decaffeinated tea operations in Suffolk.

Unfortunately, costs in key areas — such as labor and steel — have risen. Required, expensive equipment comes from Australia and Germany. Since 2002, the Australian dollar and German mark/euro have increased in value by more than 60 percent. That, combined with other global economic factors, has nearly doubled equipment costs. Burns & McDonnell has completed value engineering studies to identify potential project savings amounting to 15 percent of the total cost.

Flexibility in Design

Burns & McDonnell has an inside track in understanding the complexities of the process: a knowledgeable team that includes process experts in tea extraction.

“Our in-depth understanding of the process helps Unilever make business decisions with their joint venture partner about the manufacturing and distribution strategy for this growing product,” says Jim Hays, business development director.

Flexibility is key to accommodating a complex, fast-track design and construction schedule that includes internationally sourced equipment. The solutions have to be innovative and adjustable, and bring down costs for clients.

“The study has to balance what the customer wants with what is practical,” Winnett says. “Facility layouts are always tight, and integrating this new operation with an existing process will be difficult. But with the FEL-3, Unilever should have a sound foundation to make the right business decisions and properly plan the project.”

For more information, contact Jim Hays, (816) 822-3813.



The bag-in-box filler at work in Unilever's Independence, Mo., plant.



Australian tea extraction equipment represents a significant part of the cost of duplicating the Independence production line in Suffolk, Va.





Burns & Mac Delivers

All Kinds of



WOW

Some engineering feats –
the Hoover Dam,
the Holland Tunnel – are
known for their size.

Burns & McDonnell designs
and builds projects
on a massive scale.

But size is just one way
to “wow” clients.



Lake Fort Smith

Biggest Dam Project Going

Big projects fascinate — powerful machines carving out dirt and rock, cranes hoisting massive components, the structure slowly taking shape. The new Lake Fort Smith Dam, permitted and designed by Burns & McDonnell for the city of Fort Smith, Ark., is that kind of project.

How big is it? The dam nearly doubles the existing reservoir's 418-acre surface area by combining two existing reservoirs. An intake tower 225 feet high will draw water for two supply lines 4 feet in diameter, each capable of delivering 70 million gallons per day. A new 180-foot embankment will more than double the dam's existing height.

Just the fact that the dam is being built is amazing. As environmental regulations have multiplied, new, large-scale water supply projects have become rare in the U.S., despite looming water shortages.

Full-Service Capability Keeps Project Moving

"When the city of Fort Smith looked ahead, it realized that existing water supplies couldn't keep up with population growth," says BMcD project manager Russ Titus. "Expanding the existing Lake Fort Smith reservoir in nearby Mountainburg, Ark., offered the best solution."

Burns & McDonnell environmental specialists guided Fort Smith through the extensive permitting process. BMcD geologists, hydrologists and engineers, along with subconsultants, worked out designs for the earthen dam, temporary pumping station, intake tower, outlet works, and principal and auxiliary spillways.

When evidence of prehistoric settlement was uncovered on the site, BMcD archaeologists set up digs to explore and record the findings, allowing construction to proceed. As the archaeological work continues, Burns & McDonnell also continues to assist Fort Smith with construction oversight and public information efforts.

For more information, contact Russ Titus, (816) 822-3216.

Restoring the Everglades

Burns & McDonnell and the South Florida Water Management District received the 2005 American Council of Engineering Companies' Grand Conceptor award for another mega-sized project — Stormwater Treatment Area (STA) 3-4, designed to help restore the Florida Everglades.

At 17,000 acres, and capable of pumping more than 5 billion gallons per day for treatment, STA 3-4 is the



The Everglades

world's largest constructed wetlands. But more importantly, the project illustrates the can-do attitude that Burns & McDonnell brings to clients' thorniest problems.

"Back in '92, '93, a number of scientists looked at the loss of Everglades habitat," recalls Burns & McDonnell Associate Vice President Galen Miller. "There were different opinions. Was it really phosphorus that was the problem? Was it a water quality problem at all?"

Team Enters Uncharted Territory

But something had to be done, and done quickly. The Everglades Construction Project (ECP) grew out of mediation resolving 35 lawsuits surrounding Florida's attempt to establish a Surface Water Improvement and Management Plan for the Everglades. A number of disparate parties — environmental groups, agricultural interests, and others agreed to an interim goal of reducing phosphorus to 50 ppb.

"We didn't know how to do it — we didn't know if created wetlands would work to that degree on that scale," Miller says. "So, the Everglades Construction program was deliberately launched as a two-step process. We would begin construction, monitor test results, and proceed from there."

"Wow" Outcome – On Budget, On Schedule

Early results were promising, and the work continued, culminating in STA 3-4. The ECP exceeded performance expectations, reducing phosphorus to less than 20 ppb.

The icing on the cake: Throughout more than a decade of ongoing consultation and design projects, Burns & McDonnell completed all projects for the South Florida Water Management District on time and within budget.

"We're on the road to success," says Henry Dean, former executive director of South Florida Water Management District. "It's been an exciting adventure with our partnership with Burns & McDonnell. I'm very optimistic about the future of the Everglades."

For more information, contact Galen Miller, (816) 822-3099.



The Everglades

Safely Successful

Projects like the Hoover Dam and Holland Tunnel are famous for their size and speed of construction — but also, unfortunately, for the lives lost building them. Today, a project isn't successful unless it's safe.

Burns & McDonnell safety training and programs are geared for zero accidents, a goal that has been achieved so far in 2005, with zero recordables.

Project safety achievements that contribute to a perfect record in 2005 include:

- 50,000 accident-free hours to date working on airfield and control tower construction for the U.S. Navy at North Island, San Diego
- 250,000 safe hours on low-sulfur gas projects at ConocoPhillips Ponca City, Okla., refinery
- 500,000 safe hours at the ConocoPhillips refinery in Lake Charles, La.

SAFETY FIRST
where we live, work & play



Domain CHP - Austin Energy



Domain CHP - Austin Energy

Groundbreaking Achievement

Not large in terms of earth or water moved, but huge in potential effect, are the integrated energy systems Burns & McDonnell is developing in conjunction with the U.S. Department of Energy (DOE).

With DOE cost-share support, Burns & McDonnell developed, built and tested the first successful full-scale application of CHP technology for Austin Energy in Austin, Texas. Installed at Domain Industrial Park, the system is the first to use exhaust heat from an on-site, natural gas-fired combustion turbine generator as the only fuel source — for the world’s largest heat recovery absorption chiller.

“We developed the CHP system in a pre-packaged, modular format that can be customized for each application,” says BMcD director of CHP development Ed Mardiat. “That saves time in procurement and construction.”

The Domain CHP project was honored by the Texas Council of Engineering Companies with a 2005 Silver Engineering Excellence Award. (See “News in Brief,” Page 5.) Based on the team’s success, the DOE is providing additional cost-share funding to Burns & McDonnell and Austin Energy for CHP installation at Dell Children’s Medical Center of Central Texas, part of the Seton Healthcare Network.

Reliable, Efficient, Secure and Clean

The medical center will be the first in the state of Texas to generate all its own power, with power from the grid as a backup. The project will also be the first in the nation in

which the CHP plant’s improved system efficiency will contribute to the hospital’s goal of becoming the first Leadership in Energy and Environmental Design (LEED™) Platinum hospital in the world.

“Post 9/11, hospital administrators realized that in a time of crisis or a large-scale natural disaster, they need to keep the entire hospital up and running — not just the one or two areas served by a single emergency generator,” Mardiat says. “CHP systems are also more than 70 percent efficient, as opposed to central generating plants, which have an average efficiency of less than 35 percent. By integrating the modules to meet each site’s specific energy needs, we can minimize fuel pricing risks and maximize demand-side savings while significantly reducing NO_x and CO₂ emissions.”

New Energy Direction

The DOE hopes to increase use of CHP technology to 96GW nationwide by 2010 — double the amount produced in 1997.

“It was a pleasure working with Burns & McDonnell, Austin Energy and the rest of the team to bring the largest Integrated Energy System (IES) to date on line,” says Ronald J. Fiskum, program manager, resources, U.S. Department of Energy. “Speaking for the



Department of Energy, we are looking into the future and hoping that projects maximizing the use of waste heat are just the start of IES systems worldwide.”

For more information, contact Ed Mardiat, (816) 822-3344.

Small Packages, Good Things

Some of the most important projects Burns & McDonnell performs for clients can fit into a file cabinet — technical expertise and research boiled down into a useful, intelligible, management report.

Burns & McDonnell helped JEA — utilities provider for Jacksonville, Fla., the nation’s largest city at 840 square miles — assess technologies that will enable it to implement an automatic vehicle location (AVL) system as part of a citywide wireless network.

“Many of the technologies we’re looking at are fairly new to the market,” says BMcD project manager Derrick Beasley. “Clients need to know what will work, and how much it will cost. We understand their businesses and we understand the technology. We make sure it’s viable for their particular use.”

Phased Studies Control Costs

AVL system research is one of several advanced technology studies Burns & McDonnell has performed for JEA and the city of Jacksonville.

To give clients maximum control over cost, each study follows specific stages of development, from research and design to RFP development to full deployment support.

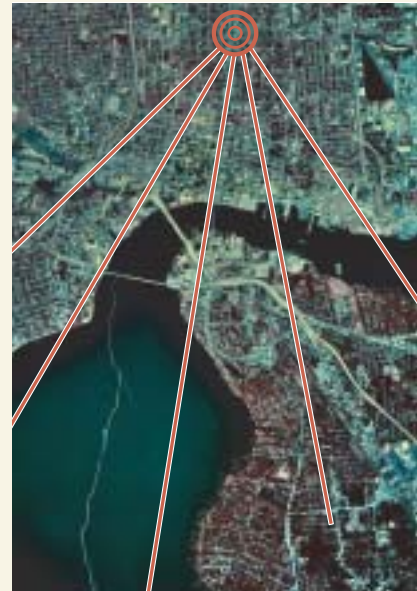
Citywide Rapid Response

Currently, Burns & McDonnell is helping design and implement a coordinated AVL system for more than 25 Jacksonville organizations, including JEA, the Jacksonville Sheriff’s office, the Fire and Rescue Department, the Port and Airport Authority and the Duval County School Board, and others.

The AVL development project is called SAFER, for Satellite Asset Finder & Emergency Response. Burns & McDonnell performed a needs assessment for each department and investigated appropriate technologies. Some of those technologies include global positioning systems, wireless communications, and field devices such as PDAs, ruggedized laptops and cellular phones. BMcD consultants helped Jacksonville develop the RFP, and will assist with proposal review and contract negotiations.

The AVL will help Jacksonville more efficiently coordinate day-to-day services — and save lives in the event of a hurricane, terrorist attack or other emergency. These functions are important in any city, but especially vital at this major seaport and U.S. naval base.

For more information, contact Derrick Beasley, (816) 822-4363.



JEA, City of Jacksonville



City of Jacksonville

Something for everyone

Texas transmission line structures turns up in every imaginable locale



Six flags have flown over Texas in its history: Spain, France, Mexico, the Republic of Texas, the Confederate States and the United States. That heritage complements the diverse geography of more than 268,000 square miles, populated by more than 22 million people.



Above and top: Steel towers on the 9-mile Benbrook to Mistletoe route cross everything from a golf course to a railroad yard.

Background

TXU Electric Delivery (TXUED), based in Fort Worth, Texas, provides electricity to about a third of the state's 370 cities and 92 counties. In 2000, TXUED faced an upgrade of its aging 138-kV system, more than 6,500 miles of the company's nearly 14,000 miles of transmission line.

Challenges

TXUED's 138-kV lines cross territory ranging from wetland to desert and rural to urban. The diversity of the environments, permitting issues and required structures meant the company could not go it alone.

Solutions

Burns & McDonnell began its partnership with TXUED in 2000 with two projects. That relationship has grown to more than 40 projects in various stages of development. The projects total more than 300 miles, ranging from 1 to 37 miles each. Burns & McDonnell is providing services ranging from project estimating to construction support services.

Team approach: Managing the large number and diversity of projects required a team approach. Burns & McDonnell has five design teams from two offices dedicated to TXUED. Each team leader is matched with a TXUED counterpart.

Creative methods: The diverse areas traversed by each project demanded diverse designs. A 9-mile route from Benbrook to Mistletoe alone runs through a golf course, crosses the Trinity River, parallels Interstate 30 and intercepts a railroad yard and hospital district. Part of the line was rebuilt with steel poles, and the remainder reused existing lattice steel towers.

The 18-mile rebuild project between Hillsboro and Whitney included the tower top replacement for an existing structure in the middle of Aquilla Lake, south of Fort Worth. A helicopter delivered the new tower top.

Unseen obstacles: Sometimes, it's what you don't see that can make a project challenging. Burns & McDonnell performed environmental background research for all of the TXUED builds to identify known occurrences of endangered species or cultural resource sites.

“Environmental monitors were present for projects crossing potential endangered bird habitat in central Texas,” says Jimmy Smith, project manager for the BMcD Environmental Studies & Permitting Group. “BMcD experts watched for signs of nesting by two 4.5-inch endangered birds, the black-capped vireo and the golden-cheeked warbler.”

Technological innovation: TXUED receives transmission line designs from many firms, but the digital information cannot easily be used for other business purposes.

Burns & McDonnell is developing a standard format and application that will load this design data seamlessly into the company’s Maximo Asset Management software.

“The biggest benefit is the elimination of the thousands of man-hours spent collecting and inputting data,” says Wes Hardin, BMcD project manager. “TXUED will be requiring standardized data submittals of all its engineering firms in the future.”

Outcome

The BMcD approach meant TXUED could tackle its system upgrades without overwhelming its own design staff. Burns & McDonnell has completed 17 projects covering 163 miles. Seven more projects are under construction, with about 20 in design or about to kick off.

“What we have done for TXU has freed their engineers to look at other issues in their system,” says Gary Collins, project coordinator in the BMcD Transmission & Distribution Group. “We have helped the company maximize the reliability of its system and increase its profitability.”

For more information, contact Gary Pence, (816) 822-3142.

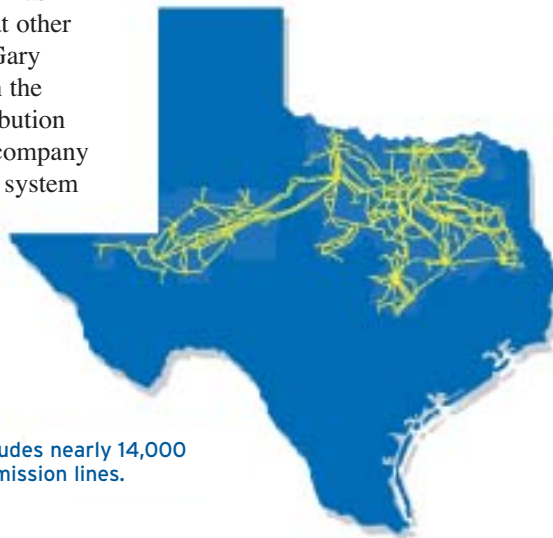
TXUED’s system includes nearly 14,000 miles of transmission lines.



Crews prepare to install insulators on a new steel structure on the 9-mile route from Everman to Handley.



A crane is used to rebuild a tower behind a residential development along the Everman to Handley route.



Out Front

TXU Electric Delivery is ahead of the game

Many providers, anticipating new requirements from the North American Electric Reliability Council, want to know maximum ratings on their transmission lines. And they want to know before competition makes it difficult to hire experts to conduct the extensive studies necessary to determine a line’s rating.

Over time, the landscape beneath the transmission lines may be altered, creating electrical clearance violations. Sometimes, lines can be rated to higher temperatures. Rating a line to elevated temperatures can relieve transmission constraints. An accurate and efficient way to assess a line’s actual rating is to do an extensive survey. Burns & McDonnell has assessed 18 of TXUED’s lines using a technology known as LiDAR – Light Detection and Ranging.

“LiDAR uses laser-based survey equipment mounted to a helicopter. Laser pulses hit objects and, based on the speed of the laser return, it feeds back data to determine what it hit,” says Leslie Duke, Transmission & Distribution Group manager in the BMcD Houston office. “Based on that data, the ambient air temperature and loads in the line at the time, we can assess the temperature of the conductor and create a baseline for rating it up or down.”

Burns & McDonnell has completed three of 18 line upgrades in the Dallas/Fort Worth area.

LIGHT FLIERS

What is a VLJ?

If you haven't heard those letters yet, chances are you will soon. VLJs are the latest development in a rapidly changing aviation market.

VLJ is the acronym for "very light jet" — commercial jet aircraft that weigh less than 10,000 pounds and carry just a handful of passengers. While these small jets have not entered the mainstream aviation markets, they are attracting attention from big names in the industry. Cessna and Embraer are developing VLJs, as are new companies like Eclipse Aviation and Adam Aircraft.

Most of these companies aspire to compete in the emerging air-taxi market. Air taxis ferry passengers point-to-point between smaller, general aviation (GA) airports. Many travelers enjoy this convenience because they don't have to travel through large hubs or drive several hours to get to their destinations.

The GA industry encompasses 19,000 airports and landing strips in the United States. The extent to which GA airports are changed by the advent of VLJs depends on how well the air-taxi market takes off.



For more information, contact Ed Mardiat, (816) 822-3344.

"There are still a lot of questions to be answered in the future," says Dave Hadel, BMcD GA services director. Even if the market does well, Hadel says, GA airport growth will depend on which routes are in demand.

"If the Garden City, Kan., to Fort Worth route becomes popular, it is more likely to be profitable and to stir growth and development in those communities," Hadel says.

Burns & McDonnell is throwing its aviation expertise into the VLJ market. Eclipse Aviation chose BMcD to help select sites for three of its first factory service centers (FSC), as well as preliminary design for the FSC to be located in Gainesville, Fla. The FSC will be used to service aircraft for Eclipse customers. Burns & McDonnell is finding sites at existing second- and third-tier airports that have wide visibility, as well as access to airfields, roads and utilities.

A consistent design for the service centers is important to Eclipse.

"For Eclipse, an important component of the FSC design is its contribution to trademarking Eclipse Aviation nationally," says project manager Mike Fenske. "The image, organization and commonality we bring to the design of their service centers will help signal the Eclipse Aviation brand."



Lighting the Way

Giving cities the information they need

The city of Lee's Summit, Mo., like many fast-growing communities across America, is proud of its quality of life — and scrambling to make sure its infrastructure keeps pace.

Those infrastructure needs go beyond roads and water mains. Street lighting needs multiply as roads are widened and new developments are built. Lighting also becomes a concern when cities revive blighted areas or restore historical downtowns. Street lighting system planners help cities facing these challenges find solutions — in the midst of a changing environment.

Weighing Options

In the past, electrical utilities owned and maintained streetlights. Today, as utilities seek to divest, purchasing the lighting system is an option for some municipalities. It gives cities an opportunity to improve services while trimming costs.

“Since street lighting leases aren't a major source of revenue for utilities, sometimes maintenance takes a back seat to other projects,” says Burns & McDonnell consultant Rod Schwass. “Owning a system gives the city control over it.”

Potential Savings

The prospect of owning streetlights might daunt city managers already coping with tight budgets and staff shortages. But there is a silver lining.

“There can be opportunity for savings when a city owns the system rather than continuing to lease it over decades,” Schwass says. “The city can contract for operation and maintenance with a third-party lighting service that typically offers lower rates than the utility lease terms.”

Checking It Out

BMcD consultants help cities evaluate the potential costs and benefits of system ownership. They provide the information needed for sound, defensible decisions — including financial analysis, inventory and condition assessment. Engineers combine field surveys with existing mapping and modeling software, for cost-effective condition and performance assessments.

Setting Standards

Even if a city chooses not to own its system, it still faces important lighting decisions.

While designing safe, attractive lighting for a new Lee's Summit roadway project, Burns & McDonnell helped the city solve an ongoing dilemma.

“Lee's Summit needed to have a street lighting standard to go by so when developers came to them for permits, or the city itself decided to make improvements, they could lay it out, without wrangling over the details each time,” says BMcD project manager Craig Koenig.

Koenig's group developed lighting criteria for Lee's Summit based on standards set by the Illuminating Engineers Society (IES).

To develop design criteria, engineers model potential lighting systems and compare the performance with IES-recommended practices. One factor they look at is the ratio of average to minimum illumination.

Safe by Design

“Uniformity of light is important because of how it affects the driver's perspective,” Koenig says. “Widening roadways or even adding curbs and gutters can change the distribution of lighting. There are special requirements for intersections, curves and hills, and other situations.”

Varying the lamp type, wattage, mounting height, and type of fixture and reflectors used controls the distribution of the light source. The Lee's Summit design criteria help ensure that motorists can see pedestrians in a crosswalk at night — and keeps lumens on the street and out of residents' windows.

In the past, municipal governments never had to be street lighting experts. With Burns & McDonnell specialists on their side, they still don't have to be.

For more information, contact Rod Schwass, (816) 822-4213, or Craig Koenig, (816) 822-3149.

Waste to Energy

Barlow Projects Inc. (BPI), a leader in waste-to-energy (WTE) technology, chose Burns & McDonnell to provide engineering services for its retrofit and upgrade of a 30-year-old energy recycling and recovery facility in Harrisburg, Pa.

The upgraded facility will be the newest WTE facility in the United States and provide 25 years of full-time operation, capable of continuously burning 800 tons of municipal refuse per day to generate steam for export to the district heating loop — or to a new turbine generator producing up to 26 MW of electrical power. The old plant is being completely gutted and rebuilt with state-of-the-art equipment for the project.

“Space is very tight,” says BMcD project manager Tom Haensel. “A lot of the pipe and equipment layout was difficult. Using 3-D modeling software proved to be a tremendous asset in minimizing conflicts during construction.”

Burns & McDonnell has provided detailed design for installation of the ancillary systems surrounding the boiler, air pollution control system and the turbine generator, including associated equipment, piping, and electrical and control systems.

BPI’s system includes its patented Aireal™ Combustion System and the air pollution control equipment necessary to ensure that the plant will comply with all state and federal emissions requirements. The revamped plant is scheduled to begin operating in 2006.

For more information, contact Tom Haensel, (303) 721-9292.

“Using 3-D modeling software was a tremendous asset in minimizing conflicts during construction.”



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