

currents

spring 2008

G R A N D R I V E R D A M A U T H O R I T Y



OKLAHOMA POWER FOR OKLAHOMA PROGRESS

When the Grand River Dam Authority began construction of the Pensacola Dam in the late 1930s many critics claimed there would never be a market for all the electricity the dam would generate. After all, the facility was built along the Grand River in the rugged, rural landscape of Northeast Oklahoma; seemingly far away from areas of high electricity demand. Also, the fact that the dam was the state's first hydroelectric facility — thus charting new territory for electric production in Oklahoma — attached a sense of unfamiliarity to the whole project.

However, today, nearly seven decades after the first megawatt was generated there by the power of falling water, Pensacola Dam continues to be a vital part of GRDA's overall generation mix. That rural landscape is now home to Oklahoma's premier water playground, Grand Lake, which serves as an economic engine for Oklahoma by helping create and sustain a broad tax base around its shores. And as for the unfamiliarity of hydroelectricity and the "excess" generation from the dam? GRDA built two additional hydroelectric facilities within 30 years of Pensacola's completion.

One of those additional facilities — the Salina Pumped Storage Project (SPSP) — faced its own criticism. GRDA's plans to build the project in the late 1960s were called risky by many who felt the pumped storage project, which was also a first for Oklahoma, would "break the Authority." Like Pensacola though, the SPSP has been an integral part of GRDA's overall generation mix since its completion.

The SPSP's ability to store water in its upper reservoir, to use at times of peak demand, has saved GRDA electricity customers millions of dollars over the years. Operating in concert with Pensacola Dam, Robert S. Kerr Dam and the GRDA Coal-Fired Complex, the SPSP gives GRDA a beneficial mixture of hydro and thermal generation that has been the foundation of GRDA's low electric rates throughout its history.

In the pages of this *Currents* you can read more about GRDA's efforts to insure the reliability of its hydroelectric resources. Through comprehensive preventive maintenance, long-term planning and the efforts of an experienced and dedicated workforce, GRDA is able to harness the waters of the Grand River to provide Oklahoma power for Oklahoma progress. It was the goal in in the 1930s and remains the goal today.

Thank you,

Anthony Due
AGM of Operations and Hydro
Grand River Dam Authority



Anthony Due
Assistant General Manager
Operations and Hydro

Cover: Aerial view overlooking GRDA's Salina Pumped Storage Project, southwest of Salina, Oklahoma.

GRDA *Currents*, Vol. 21, No. 2

GRDA *Currents* is produced by the Grand River Dam Authority for employees, retirees, families and friends. If you have any suggestions, news or story ideas, contact Media Services, PO Box 409, Vinita, OK 74301-0409, 918-256-5545, or via interoffice mail or email. Editorial: Justin Alberty, Shannon Cook and Melanie Earl. This publication printed by GRDA is issued as authorized by 82 O.S. 1981, Sec. 861 et seq. 1,000 copies have been printed at a cost of \$3,210. Copies have been deposited with the Publications Clearinghouse of the Oklahoma Department of Libraries.

GRDA partners with Oklahoma Aquarium

“Oklahoma’s Most Unwanted” display at the Oklahoma Aquarium (Jenks) was unveiled in March in conjunction with the Hayes Family Ozark Stream Exhibit. The exhibit is the Grand River Dam Authority’s latest effort to educate the public about the threat posed by zebra mussel, Oklahoma’s “most unwanted” aquatic nuisance.

The display and partnership with the aquarium will allow GRDA the opportunity to get the “Stop the Spread of Zebra Mussels” message to nearly one and a half million people every year. The exhibit is one of more than 200 educational and diverse exhibits currently on display at the aquarium.

“The people who see this display will be educated as to what invasive organisms are, the potential problems they can cause, and what people can do to prevent them from spreading elsewhere,” said GRDA Biologist Sam Ziara, who has been a member of the Oklahoma Zebra Mussel Task Force since 2004.

Ziara has already received positive feedback on the display from aquarium personnel, who have said it is not only receiving the public’s attention, but also keeping it.

“I think that we pulled together an interesting and informative display,” said John Money, curator of the Oklahoma Aquarium. “Throughout spring break it was constantly packed with people.”

The mission of the aquarium, “Conservation through Education” meshes perfectly with the GRDA Ecosystem Department’s goal of habitat restoration and ecological conservation in the Grand River basin.

“Invasive species like zebra mussels are a people problem; people are the ones that spread them, whether by accident or on purpose,” said Ziara. “People need to be informed of the seriousness of this situation.”

Included on the eye-catching display, is a brief introduction on invasive aquatic species. The three-phase exhibit also includes examples of zebra mussel infestation and an informative video, produced by the GRDA Media Services Department, detailing how zebra mussels made their way to Oklahoma waterways and the destruction they can wreak on ecosystems, if let unchecked.

“One of the main reasons people are so interested is because most don’t have a clue that invasives are such a problem and that these critters are located in their own ‘back yard,’” said Ziara.

GRDA has been monitoring water intakes along the Grand River for the mussels and working with other agencies to spread the word since the 1990s. GRDA has also worked with the United States Coast Guard Auxiliary to place zebra mussel prevention tips on signs at many public boat ramps.

The partnership with the Oklahoma Aquarium is one of many relationships GRDA Ecosystems Management has formed with other agencies to educate the public ecosystems protection.

“Working with the people at the GRDA has been a fun and productive experience,” said John Money, curator at the Oklahoma Aquarium. The zebra mussel covered artifacts and the video component seem to be very strong tools to educate and illustrate the hazards of invasive species. In short, it seems to be a hit and should help to get the word out.”

For more information on zebra mussels, or the GRDA Ecosystems Department, visit the department’s link on www.grda.com.

Top: “Oklahoma’s Most Unwanted” is the name of the exhibit featured at the Oklahoma Aquarium in Jenks. GRDA has partnered with the Aquarium in hopes of spreading the message about the dangers of zebra mussels.

Inset: Sam Ziara, GRDA Biologist, discovers a rock covered in zebra mussels in the Arkansas River in Tulsa.



Scheduled for completion in August 2009...

GRDA Ecosystems and Education Center



Renderings of the new Grand River Ecosystems and Education Center presented to the GRDA Board of Directors by Beck Design.

With one vote by the Grand River Dam Authority Board of Directors, seven years of plans and dreams moved very close to reality.

At its March meeting, the GRDA Board gave its approval to the floor plans and cost estimates for the GRDA Ecosystems and Education Center to be built on the shores of Grand Lake, in Langley. At approximately 16,000 square feet, the center will eventually house GRDA Ecosystems Management, as well as offices for the Grand Lake Chamber of Commerce (GLACC), a community auditorium and historical exhibits.

The idea of a lake area visitor center adjacent to Pensacola Dam really took off in 2000. GRDA donated the property and a visitor center committee, comprised of lake area stakeholders, was organized in 2001 in part to secure funding for the project. That group --- Visitors Center, Inc. --- has engaged in several fund raising activities in coordination with the Grand Gateway Economic Development Association and will contribute \$300,000.00 toward construction of the center.

After much work, much planning and even a few roadblocks, the finalization of a new partnership between GRDA and GLACC led to the new Ecosystems and Education building.

“We expect this building to become the face of GRDA on its lakes,” said GRDA Community Relations Director Holly Moore. Exhibits at the facility will highlight the history and geography of the Grand River, while the adjacent GRDA offices will be a “one-stop shopping” destination for obtaining lake-related permits. A state-of-the-art water lab will also be part of GRDA’s space in the new building.

That lab, according to GRDA Ecosystems Management Director, Dr. Darrell Townsend, will be “the foundation” for GRDA’s water management efforts in the future.

“Meeting our obligation requirements for managing the waters of the Grand River is a priority for us, and this lab will go a long way

in helping us do that,” said Townsend, adding that the University of Oklahoma, which has been conducting ongoing studies of the waters of Tar Creek has expressed an interest in being a cooperating partner in the water lab. “We expect this water lab to be a very important asset for ecosystems management and resource protection in Northeast Oklahoma,” said Townsend.

According to GRDA Chief Executive Officer Kevin Easley, the lab should also help GRDA’s case in regards to mitigation expenses associated with relicensing its hydro projects. “The Federal Energy Regulatory Commission issues our hydro project licenses,” he said, “and they like the idea of GRDA having its own water lab. We feel the addition of the lab, and really this entire GRDA lake operations facility, will help us keep our mitigation costs lower. In the long run, that will save money for all GRDA customers.”

“Meeting our obligation requirements for managing the water of the Grand River is a priority for us...”

Separate from the GRDA office space, the center’s other spaces will provide opportunities for the public to learn about the Grand River system, its history, its lakes and their impact on the region. Free tours of GRDA’s

historic Pensacola Dam (which now begin at the current Lake Patrol Headquarters) will originate at the new center. GLACC’s offices will provide information on the region while the community auditorium will be available for a variety of events.

“GRDA holds several public meetings each year to gather input or pass along information about various lake related issues,” said Moore. “The new auditorium really gives us a permanent location to hold many of these meetings, but we also expect it to be an asset for area schools, civic groups and other organizations.”

According to Visitors Center, Inc. Chairman Dr. Bruce Howell, the historical exhibits planned for the building are just the beginning of the educational benefits the building can provide.

“An affiliate of Visitors Center, Inc., the Grand Lake Historical Society, will coordinate educational activities slated to be incorporated

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GRDA customer spotlight...

Historic character is foundation for Cushing's progressive future



Displays like this one welcome visitors to the GRDA municipal customer community of Cushing, Oklahoma.

The historic town of Cushing, Oklahoma, a Grand River Dam Authority municipal customer since 1953 is situated on the rolling prairie land in the southeastern corner of Payne County and in the center of America's oil supply. Billed as the "Pipeline Crossroads of the World", Cushing has been a significant trading hub since oil was first discovered under the Oklahoma soil shortly after the turn of the century.

The founding of Cushing predated the discovery of oil. The community's sound infrastructure enabled the civic leaders to manage the sudden growth the boom created and preserve quality of life for its citizenry, even as it served as the hectic center of the oil field operations. As a result, the resilient community, unlike so many boom towns, continues to thrive and grow into the 21st century.

The second Oklahoma land run opened the tribal lands of the Sac and Fox Nation in 1891. The untamed waters of the Cimarron River carved a snaky northern border for the 900,000 acres of fertile prairie land where buffalo continued to roam.

William R. Little, who had traded with the Sac and Fox and was familiar with the land, was counted among the approximate twenty thousand would-be settlers that crowded and jostled at the boundaries, each hoping to be fast and fortunate enough to stake a claim. Before the sun went down on September 22, Little had been able to lay claim to the choice 160 acres that he had wanted. Ever the businessmen, within days he had fenced off his new homestead and turned his attention from building a house for his family to building a town.

According to the Act of May 2, 1890, Little could commute to cash 80 acres of his land as a town site, with the stipulation that at least 10 acres of land be set aside for parks, schools and other public purposes. He drew up a plat of the proposed town and included it with his application. When approval from the General Land Office came in 1892, Little purchased the land; the town site was called Cushing after Marshall Cushing, a private secretary to John Wanamaker, Postmaster General.

For the most part, agriculture supported the Cushing economy, relying heavily on crops and cattle. Ranchers knew the value of the rich blue stem pasture prior to the land run; they had leased the land from the Sac and Fox years before. The hardy grass fed an increasing number of cattle as settlers began clearing and populating the valleys and the gently sloping hills. The land was productive to say the least. During 1905-1914 there were four cotton gins operating in Cushing, process-

ing an astounding 16,000 bales of cotton. An estimated 500 to 600 hundred farmers brought their cotton to town daily. The Santa Fe and the Katy transported cattle and cotton to northern markets.

Progressive city leaders utilized the prosperity to benefit the community and elevate the quality of life for its residents. Conveniences of modern living were evident just five years after statehood with the arrival of electricity. A 20-year franchise was granted to Cushing Electric Light and Power Company in 1912. The company, owned by local businessmen, would supply the town with electric lights. The citizens

"There are exciting things going on here and a great past to share. Everyone shares the common goal of benefitting the community."

passed a bond in 1927 for the installation of a street lighting system. By the mid-1930's, construction of the town's power plant and distribution system began. The benefits of public power were recognizable early in Oklahoma's history.

In 1911, a couple of wildcatters, Tom Slick and C.B. Schaffer began drilling test wells around Cushing. The first wells proved disappointing but another attempt opened the Cushing-Drumright Field which soon would dwarf the size of the Glen Pool field that first gushed in 1905.

The summer of 1912 found Cushing bursting at the seams. The latest boomtown in Oklahoma grew from a few hundred residents to more than 5,000 by 1916. Buildings such as hotels and boarding houses were constructed at a frenetic pace but still were not able to keep up with the influx. Canvas tents were pitched on available space in and around town to house those who were not fortunate enough to find a bare patch of floor on which to sleep.

Amid the fevered excitement the oil continued to flow at an amazing rate. Soon Cushing was recognized in oil circles around the world. According to historical accounts, daily field production peaked in May 1915, when 3,090 wells produced 310,000 barrels of oil. By the end of 1919 the Cushing-Drumright field covered thirty-two square miles and produced 17 percent of all the oil produced in the nation.

Two factors were directly involved in setting the Cushing-Drumright field apart from the others: construction of refineries and pipeline development. Cushing is now and has been America's largest oil trading hub; storage capacity currently exceeds 35 million barrels.

Progressive leadership has continued to guide the community into the 21st century. Building on the foundation laid initially by William Little, land set aside for public use is still being enjoyed by residents and visitors alike. There are a number of small neighborhood parks as



Public power status continues to be a boost to the community's quality of life. The Cushing Youth & Community Center (Frisbie Activity Complex) pictured above, is one of the finest of its type in Oklahoma.

well as one large city park that includes an amphitheater for showcasing local talent, tennis courts and a combined swimming pool/ water park. There are approximately 2,000 students enrolled in the Cushing school system. Fans cheer on the hometown Tigers in a new auditorium that seats 990.

"We also have a great youth and community center with handball courts, basketball courts, gym equipment and pool tables. We have a wonderful senior citizens center," said Rick Reiley, Executive Director of Downtown Cushing Main Street.

Cushing has been designated a Main Street Community for the past ten years. The national program's mission is to preserve the local built environment through preservation of local history and to revitalize traditional downtown areas. Through the National Main Street Center, communities are given the tools needed to stimulate interest and growth in their hometown.

"It is the preservation of the historic character of the town. We want to make the community aware of what we have downtown, aware of businesses and business opportunities. Our goal is the revitalization of downtown Cushing," said Reiley. "There are exciting things going on here and a great past to share. Everyone shares the common goal of benefiting the community."

Downtown Cushing works in tandem with the Chamber of Commerce and Industry and the Cushing Economic Development Council. For over 50 years the Grand River Dam Authority has been a part of the solution for creating a healthy business climate.

Owning its own municipal power plant is integral to the quality of life the citizens of Cushing enjoy- simply put public power benefits residents. It was in 1935, that city leaders persevered in their fight to have a municipally owned power plant. The dual fuel stationary engine solely powered the community for almost 20 years until an increase in demand required that the city seek an outside supplementary provider of reliable, low cost power.

"Public power is very important to Cushing, historically and today. In our case, it is the quality of life issues, it allows us to not only target areas and respond to needs but it also provides a revenue stream for other public facilities," said Robert Felts, Cushing Economic Development Council. "Without the income derived from public power we wouldn't have one of the finest senior citizens centers and youth centers for a city this size in the state."

According to Felts being a public power community also has influence in the decision making process of those looking to relocate.

"Public power allows us greater control over the quality of life. People that are looking to relocate to the area are asking what the quality of life is, same way with someone looking to locate a facility, not necessarily people- what is the quality of life. It means a healthy and productive workforce. Our hospital, youth center, etcetera, contributes to the overall quality of life which affects the workforce directly or indirectly."

Deputy City Manager Steve Spears sees the advantage that public power gives the community. “Profits from electrical sales have stayed in the community and allowed the city to provide a better quality of life for its citizens by utilizing these funds to support such things as parks, Youth and Community Center, Senior Citizens center, library and the police and fire departments.”

Through the many efforts of civic organizations and solid leadership, Cushing continues to move forward while retaining its historic soul. Two festivals are held yearly celebrating the history and character of the charming community.

The BBQ and Blues Event is held in June. Good food and good music fill the air as bands play throughout the day.

The Festival in the Park, in its 19th year, has evolved to include a talent show, ala American Idol. The family oriented event includes a juried art show, local and professional entertainment.

“Over 10,000 people came to the events; we had record crowds at both. GRDA has always been unbelievably supportive of our festivals,” said Holly Tichenor, Executive Director of the Chamber of Commerce and Industry.

Meanwhile, the Centennial Park was unveiled during the annual Christmas Parade according to Reiley. The pocket park is located on Main Street in the old entertainment district and tells a little of early day area history through photos and storyboards.



“It has been a labor of love. We have been working on it for almost two years. It is where the American Theater used to be there in the 40’s so a stage will again sit where a stage once was,” said Reiley.

Downtown Cushing’s Centennial Park was unveiled during the community’s Christmas parade. GRDA’s support helped to make the park a reality.

“GRDA’s support was extremely instrumental in helping us leverage our matching contributions toward a grant from the Oklahoma Centennial Commission. We’re pleased not only about the contribution of these dollars to Downtown Cushing; we are excited too with GRDA’s personnel and their genuine excitement over the project. This is a gesture that won’t soon be forgotten.”

Some benefits of public power are not reflected on an invoice but rather in the face of a friend. In a vibrant, progressive city like Cushing, those faces are easy to find.

GRDA Ecosystems and Education Center

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in the Center,” said Howell. “The focus will be upon developing an awareness of the history, geography, ecology, and archeology relevant to the four counties (Craig, Delaware, Mayes, and Ottawa) surrounding Grand and Hudson lakes.”

Beck Design, the Oklahoma-based firm that designed the Oklahoma Historical Museum, was chosen, through a bid process, as the architectural firm for the project. During that March GRDA Board meeting, Don Beck presented the board with the project floor plans.

“You have a great site; the views are phenomenal,” said Beck, adding that the new building would have an “inside/outside feeling” incorporated into its green design. That design will also include plenty of open views of Grand Lake as it sits on property dubbed as the “home of the million dollar view” in 2000 when the building was first envisioned.

The final price tag for the project is expected to be \$3.8 million. Once completed, GRDA would recoup some of its costs through its lease agreement with the GLACC as well as special event rentals for the auditorium. The next several months will be devoted to finalizing specifications and completing the bid process. Construction is set to begin in late August 2008 and last approximately one year.

GRDA employee spotlight...

Not a “common man”

Johnnie Hargrove raised his right hand and solemnly took the Boy Scout oath when he was just eight years old. He has spent the last 54 years honoring that pledge, earnestly and sincerely living the words he echoed so long ago.

On my honor, I will do my best...

A self described “common man” Hargrove is anything but common, especially to those who know him best. His faith is matched only by a strong work ethic and his willingness to lend a hand. He served his country in Vietnam during the Tet Offensive, took in eight children and finished raising them along with his son and daughter, and is currently working on his 23rd year at the GRDA Coal Fired Complex (CFC).

Hargrove actually went to work at the CFC before the plant was in operation. As a Millwright, he helped construct Unit 1 in 1979 and Unit 2 in 1985.

“When I came back for Unit 2, I decided to apply for a job. I liked working here and knew it would be a good place to work,” he said.

He was hired as a maintenance mechanic in August. Through a series of promotions, he is now the Maintenance Supervisor.

“This is a great company, I couldn’t ask for a better place to work. I love being able to have the crew that I have, this crew of men, they amaze me. The last outage was so tight and we had some major problems come up before it was time to start and that crew got it done, I just sit back in amazement.”



Johnnie with his 100th Anniversary Edition Harley Heritage Soft Tail Classic outside the GRDA Coal Fired Complex in Chouteau.



To do my duty to God and my country...

Growing up during the 1950's and 1960's, Johnnie's life revolved around friends, family and motorcycles, favoring the Cushman Eagle and the Mustang. The motorcycle appealed to his mechanical nature and the two wheels satisfied his need for freedom.

The independent only son appreciated the view of life from a leather seat.

After his father, Ray lost an arm in a power plant accident; he moved his family to Tulsa. It was there, in 1959, that Johnnie became an Eagle Scout; the 14-year old had earned three more badges than was required. One year later he received his God and Country award. A Junior Scout Master by the time he was 18, Johnnie epitomized the Scout Law.

As he grew to adulthood, the placid environment of his childhood ended abruptly when America entered the Vietnam War. The country that he had sworn allegiance to would soon test that commitment.

He initially considered enlisting in the Marine Corps after graduating from high school but his girlfriend Glenda said she would not marry him if he did. He followed his heart and kept his girl when he enrolled in Northeastern A & M where he studied computer programming. After completing his sophomore year at NEO, he was drafted into the Army.

The hot and dry Oklahoma summers did not begin to compare to the unbearable Louisiana heat and humidity that Johnnie endured throughout his basic training at Fort Polk. The long blistering summer did come to an end with a fall graduation which led to a fall wedding; he and Glenda were married on September 29, 1966 in Tulsa.

The newlyweds were soon separated as Johnnie had to report to Fort Sill for radar school. The nine months of training did not prepare the scout for what he would face in the war that polarized a nation. Land-

ing in Vietnam in the summer of 1967, Johnnie was sent to Pleiku. As a member of counter-mortar radar unit, it was his job to track incoming mortar to determine the enemy's position.

"They would shell us with mortar rockets then we would track the incoming round and direct the outgoing artillery. We would then plot the position, call artillery and give them the map coordinates," he explained.

He spent the majority of his tour in the central highlands of Vietnam close to the Cambodian border. His assignments also took him to hot spots such as Dak To, Kontum, Qui Nhon and An Ke.

"We were real fortunate for about four months and then they started sending us to fire bases and places that had numbers instead of names. My mom was praying and I had a nine and a half month old son at home that I had never seen. I knew I was going home,"

Coming home to his wife and son Robert Ray, born on September 25, 1967, Hargrove set about building a life for his young family. One order of business was to bring his Boy Scout membership up to date. The Indian Nation Council had carried him during the two years spent in Vietnam. His 14-year membership was in good standing.

A daughter, Kristi, would be born to the couple in the winter of 1970. Johnnie put the education he received at NEO to work at a small oil company in Tulsa. Five years later, at Glenda's suggestion, he entered the Carpenter's Local 943 apprentice program.

After receiving his Journeyman Certificate, he went to work for PSO building the Oologah plants.

"After finishing both units at Oologah I came over to GRDA and finished up on unit 1. When

I heard they were going to build unit 2, I made many trips out here to talk to the contractors until I got hired to be supervisor for GE on all the auxiliary piping and equipment. We put the unit on line in 1985 and I came on as a maintenance journeyman. It was one of the best decisions I ever made."



Top left: Johnnie's military picture taken shortly after basic training in September 1966. After completing basic training in Fort Polk, LA, Johnnie reported to Fort Sill for Radar School before leaving for Vietnam.

Above: Receiving his Eagle Scout award with his parents in 1959. Following tradition, Alice (Johnnie's mother) pins the Eagle on Johnnie while his father, Ray looks on.

To help other people at all times...

As parents, it was important for Johnnie and Glenda, to stay involved in their children's lives, especially as they reached their teen years. The hands-on approach used by both parents when the kids were toddlers never subsided.



Many of the kids and family came together to celebrate Johnnie and Glenda's 25th wedding anniversary.

His son Robert soon followed in his father's footsteps by joining the Cub Scouts when he too was just eight years old. He and his sister were active in church as well.

"I always believed that you should take your kids, not send them," he said. "We were active in the scouts and the youth group. I know that is a trying time, but you have to go with your kids, it's so important."

Possessing an ability to relate to his own children helped Johnnie to reach out to other kids that were in need of some love and support. He and Glenda took in a total of eight foster children during those formative years. He admits to always being partial to the idea of a big family, remembering holidays around his grandmother's family table as busy and wonderful.

"Everybody has a gift, mine is being able to relate to young kids and kids could relate to me. It is probably because I am a kid at heart, still am at 62," he said with an undeniable spark in his eyes. "These kids

needed some place to stay. Most came to us in their teen years. They needed somebody to put their arms around them and tell them, "It's going to be okay."

"I think we inherited the kids because we treated them as our own and did things with them," he said.

The investment the couple made into the lives of the children has paid wonderful dividends. The family holds a camp-out during the summer and get together to celebrate the holidays after the first of the year.

"Most everyone is able to make it; we are still a very tight group," he said.

To keep myself physically strong, mentally awake and morally straight.

Being such a tight group proved to be very important to the family in recent years; especially during Glenda's battle with mounting health problems. After a courageous fight, she passed away in 2002.

As he entered a new phase in his life, Johnnie has a new companion, and longtime friend, at his side.

"The Lord put us together to continue," said Johnnie, about his wife, Jennifer. "It is a blessing for us both."

And it is a very large blessing: together the couple has a combined total of 26 grandchildren and three great-grandchildren. They also stay very active in church and scouts. Johnnie has served on the committee for Troop 4 for 28 years.

For over 20 years Johnnie hadn't been on a motorcycle, not since a good friend was paralyzed due to a motorcycle accident but his love of the machine had not diminished. Jennifer knew that his dream of owning a Harley Heritage Soft Tail Classic had not been left behind in his childhood. She wanted to make the dream come true for her husband and one summer day she found the perfect bike.

"It's the 100th Anniversary edition," said Johnnie. She bought the bike in July of 2003 and we have already put 58,000 miles on it."

The first road trip took the couple to the nation's capitol; Johnnie wanted to visit the Vietnam Wall.

"The wall has names of friends of mine on it, that was over 40 years ago and it still choked me up."

The couple has covered many miles of the land Johnnie swore allegiance to when he was a boy and fought for as a young man, from Yellowstone to Padre Island and has plans to go from sea to shining sea after retirement.

Back on two wheels, Johnnie is now an active member in the Patriot Guards and the Rolling Thunder. The Patriot Guards is a motorcycle organization that escorts soldier's home for burial, purely out of

respect. The Rolling Thunder is a pro POW/MIA group, the name is derived from the sound the B52's made bombing over North Vietnam.

Johnnie is still helping people. His modesty keeps him from seeing the differences he has made in the lives of those around him.

"I love my family, my job, my country and my Lord," he said humbly. "I am just a common man; you can find me on any street corner.

"If I haven't done anything else, I hope I have been able to instill values in kids at the time they needed it," he said.

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As a reference tool for lake area residents and visitors ...

GRDA publishing 2008 Summer Lake Guide

Visiting the Grand River Dam Authority's Grand Lake or Lake Hudson this summer? If so, you may want to pick up a copy of the 2008 GRDA Summer Lake Guide.

The publication contains information on boating safety, boating rules (including the Duck Creek Rules), an introduction to, and directory of, the GRDA Lake Patrol and Ecosystems Departments, as well as other information that lake visitors or area residents will find helpful.

"The lake guide seemed to be very well-received last year, so we're doing it again," said GRDA Corporate Communications Director Justin Alberty. "This year we'll add even more information, in hopes of making this a great reference tool for the thousands of people who enjoy GRDA waters each year.

GRDA's web site, grda.com, contains links to all kinds of vital lake information too, added Alberty. "You can always find updated lake level information, special bulletins about issues affecting the lakes and other GRDA updates there. Really, the goal with the lake guide, the web site and our other communications tools is just to make as much information available as we can to the public."

The GRDA 2008 Summer Lake Guide will be available at the GRDA Lake Patrol Headquarters, area marinas and other locations around Grand and Hudson lakes. For more information, contact GRDA at (918) 256-5545 or by email at questions@grda.com.

Designed from the bottom up



Mike Herron, GRDA Chief Engineer (left) with contractor from CanFer at a dead end tower foundation site on the MAID 161 kV transmission line.

It has been said that engineering is the art of directing great sources of power in nature for the use and convenience of people and the adage is true for the Grand River Dam Authority's engineering department.

Using nuts, bolts, wood and steel as fundamental parts of a king-sized erector set, the GRDA Engineering Department designs the transmission lines and substations needed to transfer, receive, transform and distribute the powerful force of electricity safely to customers across GRDA's 24-county service area. Codes and regulations must be taken into consideration when designing the circuitry and equipment in order to provide the required safety and clearances for the GRDA employees who work on the lines and substations, and the general public who lives near them.

Mike Herron, GRDA Chief Engineer, heads the engineering department that is comprised of a relay engineer, transmission planning engineer, transmission engineer, civil engineer, customer service supervisor, construction inspector, two draftsmen, two recent college graduates and a secretary.

An electrical engineer, Herron describes his department's responsibility as the design and follow-through of construction for transmission lines and substations as well as some distribution projects located in the MidAmerica Industrial Park.

"Our focus is primarily on transmission lines and the substations. The only distribution lines we work with are in the MidAmerica Industrial Park," he said. "We also provide service to other departments. For example, our civil engineer is working with Kerr Dam and Pensacola Dam on reconstruction and renovation projects. We do the jobs that we are assigned."

Several of the cities and counties within GRDA's service area are among the fastest growing in the state. The growth, while good for the economy, places a demand on GRDA's delivery system, and a new substation must sometimes be built to provide the power that is needed. According to the engineering department, anytime an electrical load increases beyond available capacity or a new customer requires service at a location that does not have adequate capacity, a substation must be built.

The engineering department will design it from the ground up, literally. The resistance and the load bearing capacity of the ground must first be determined. Electrical testing is done either by GRDA engineers or consultants to measure ground resistivity. GRDA then contracts with a geotechnical service to drill test holes in the soil and provide analysis of the soil's ability to support the weight of the structures and equipment pads that will be required. After receiving this information, designs can be completed for the substation.

The design time the engineers put in on building a substation can take six to nine months, with the purchasing process taking as much as a year depending on the equipment delivery quotes. Step by ordered step, the substation grows from the ground up. The ground grid and foundations are installed, followed by conduits for control and relay functions, support steel and bus, breakers, transformers and large pieces of equipment unless a control house is part of the plan, then it is constructed and placed on its foundation first.

Once these major components are present, interconnecting wiring can be pulled into the conduit and terminated on switches, relays, and control devices. Once all connections have been verified, the relay and breaker operations tested, and all operating mechanisms checked, the substation is ready to be energized. If the substation is to be interconnected with existing energized conductors, the wires must still be 'phased' to verify that the correct voltage phase, (A,B or C) is going to be connected to its same phase on the energized system.

Line construction projects are just as complicated from a technical viewpoint. But with line construction, the engineers are faced with the added challenges of finding and acquiring a useable right of way that requires obtaining easements from property owners along the line's path.

Speaking of the process, Herron said first you have to define the end goal. Then figure out how to get from point A to point B and provide the customer with reliability.

Whether or not the construction is performed by GRDA employees or an outside contractor, the engineering department is there every step of the way, making sure that the specifications are in compliance and also that the construction is conducted according to plan. The GRDA construction inspector watches over all work to verify that GRDA gets the work it pays for.

"We try to do the substation design based on timing more than anything else. We have the ability to do it in-house, but right now we are overloaded due to Google and the ice storm," he explained. "Our engineers oversee the product done by the consultants; we provide decisions for what they need when options must be considered. We are responsible for meeting with purchasing and preparing bid specifications and then doing bid evaluations and presenting recommendations to the GRDA Board of Directors."

Much of Herron's time is devoted to making sure the forms and evaluations are exact. Working with the legal department and the purchasing department, he or his personnel prepare specifications that are reviewed by those departments before they are sent out for bids. Once this phase is complete, the engineering department evaluates the quotations received, prepares recommendations for the bid awards, and if needed, presents the recommendation to the board for approval. The department must coordinated all orders in the context of the project time scheme, allowing for lead time that can be as much as 80 weeks on large transformers.



Left: (From l to r) GRDA's Nishi Ninan, Bud Averill, Phil Stoke, Mike Harris and Jerry Johnson survey the damage to the 412 Substation following January 2007's ice storm.

Considering the size, weight and location of the manufacturing facility of the large transformers used in the construction of substations, the department allows for lag time in receipt of the equipment when planning for construction services to be bid and work to be started. A recent transformer came from Bogata, Columbia, via ship to Texas and then to truck to GRDA. These substation transformers have shipping weights of 80,000 to 100,000 pounds and special equipment must be utilized for transport and unloading. Those services must also be bid and coordinated with expected delivery dates.

Herron has been involved in public power for 30 years; the last three of those have been spent with GRDA. He has met with a lot of change during this time.

“I have worked a little with substations and transmission lines, but until I came here, I had most of my experience with distribution level power delivery.”

During his work at Stillwater Power, Herron became aware of a need for more technical assistance from the power supplier.

“Investor owned utilities (IOU’s) usually have the needed technical depth to provide their customers with help on voltage questions, interference problems and overheating of equipment and that service was missing from the GRDA offering,” he explained.

Since coming to GRDA he has established a new position of customer service superintendent that is responsible for these types of services. Phil Stokes holds this new position.

“GRDA has purchased new testing equipment to allow Phil to do infrared scanning, voltage monitoring for harmonic problems and ground analysis. These services are now being provided to GRDA municipal customers and other customers on a contract basis. Many of our municipal customers have now contracted for scanning services,” he said.

In addition, Phil does infrared scans of all GRDA substations annually to check for hotspots. He also checks grounding at substations and on transmission lines to verify that the ground resistances are within adequate levels.



In the relatively short time he has been with GRDA, Herron has been particularly challenged by the Oklahoma weather. He has had to deal with tornados and the damages left behind, as well as two of the worst ice storms in history.

“The 412 Sub was a crash project. Bud Averill worked on the substation reconstruction, took some parts from other projects, and borrowed some from KAMO. We reconstructed the sub out of stock and borrowed spare parts that were available. J.D. Couch’s crew did a lot of the construction in a short time frame and the line crew helped with the installation, it was a group effort throughout,” he said.

“While that was going on, Doug Hill, Mike Waddell and I worked on the transmission lines to that sub. We had the job of completing 12 miles of new transmission line by June 1 to maintain power to the Siloam Springs area, and we got it done.”

Working with crews and FEMA, Herron had to break down all transmission line costs involved in the devastating storms that displaced hundreds of families. The 12 miles of 161 kV transmission line served three substations providing power to the NEO Cooperative and the GRDA wholesale customer of Siloam Springs. All but 1.52 miles was down due to the weight of the ice and all had to be replaced. Herron had to first estimate the cost of work and then refine those numbers and report them to FEMA. “We bid Feeder 105 west from Kerr Dam tap to where it feeds into 412 Sub. It had to be completed by June 1 because of the line loading limitations in feeding the loads from the other end. The SWEPCO lines in Arkansas were not able to carry the added GRDA load past that date; power did not normally feed it that direction. It was rather hectic getting out the bids. We learned a lot during the ice storm, if it happens again it will go a lot faster,” he said.

Above: Doug Hill looks at plans for a prepared transmission line relocation in Pryor.

Right: Joe Fultz points out a transmission line in the GRDA portion of the Southwest Power Pool map at the Engineering and Transmission Headquarters.



Herron will also participate in the designing of a new GRDA Engineering and Transmission Headquarters. The feasibility study is complete and the GRDA Board of Directors has approved the construction of the new five million dollar building.

“It was determined that the cost of renovating the current building would be over three million dollars and building a new one would be a little over five. The board decided to go with a new one,” said Herron.

The new building will be 19,000 square feet and house the Environmental and Safety Departments from the GRDA Coal Fired Complex, as well as the current people at Engineering and Transmission. Included in the design will be a new training room that will seat 120 people. Monthly safety meetings are conducted by the line departments in cramped quarters now. The new rooms will also be equipped with monitors and lighting that will serve the trainers.

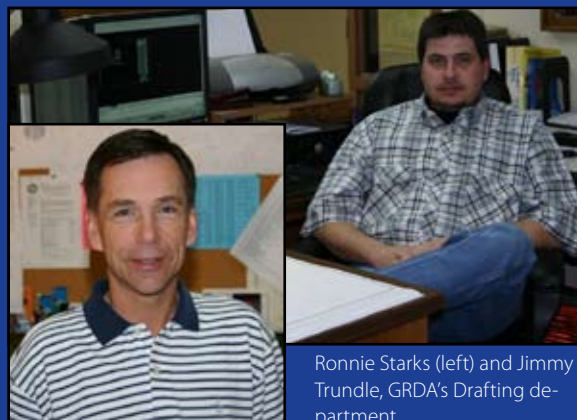
It will be constructed to the east of the current building so as not to disrupt daily operations. Once the construction is complete, the present building will be torn down and become a parking lot.

“With the signing of the new municipal contracts, several muni’s have indicated that they have new loads coming to their systems,” said Herron. GRDA will need to add substation capacity in some of these areas to provide for that load. Adding substations sometimes requires extending transmission facilities, which must also be worked into the overall plan.”

While keeping up with new growth, the engineering department must also manage an aging system and substation equipment as well as stay current with Southwestern Power Pool (SPP) system reliability requirements.

“We need to begin a program of planned replacement in which old lines and substations are reconstructed to meet modern standards and loading conditions,” said Herron. “And finally, there are some projects identified by the SPP for the purpose of system reliability. The Department will be scheduling those projects into the overall budget also.”

As GRDA, keeping with its original mission, continues to power progress and growth in Oklahoma, the GRDA Engineering Department is busy designing the blueprints that support that future success.



Ronnie Starks (left) and Jimmy Trundle, GRDA’s Drafting department.



Mike Waddell, Transmission Field Superintendent; Steve Martin, Civil Engineer; James Franks, Substation Engineer trainee and Vicki Rockey, Engineering Secretary.

Major ice storms fail to disrupt operations at MidAmerica's industries

Courtesy of the MidAmerica Industrial Park *MidPoint* newsletter.

Oklahoma has always been somewhat unpredictable, even for meteorologists. Certainly, 2007 had its share of surprises for Northeast Oklahoma with two “100-year ice storms” serving as bookends for the year.

However, for industries located in MidAmerica Industrial Park, the minimal impact of the freezing rain and ice in January and December 2007 again highlighted the importance of utility reliability at MidAmerica. Through both ice storms, the power stayed on, supplying the needs of MidAmerica resident firms.

“We have been communicating the reliability of GRDA power at MidAmerica Industrial Park to prospective industries for years. This service is critical for many of these companies,” said MidAmerica Administrator Sanders Mitchell.

With its Engineering and Transmission Headquarters located adjacent to MidAmerica, GRDA says it is in a good situation to help meet the needs of industrial park customers.

“...not one of our industries powered by GRDA lost even a minute of power...”

“Reliability is a priority,” said GRDA Corporate Communications Director Justin Alberty. “Having power line maintenance personnel close by, with a crew dedicated to park customers, helps us insure reliability.”

Additionally, with the GRDA Coal Fired Complex framing the southern edge of MidAmerica, an abundant supply of power is close at hand. That can mean less opportunity for weather-related outages, simply because of proximity.

“The transmission path, from our generation source to our MidAmerica customers is a short one, and that certainly benefits our reliability within the park,” continued Alberty.

Alberty also added that GRDA's right of way maintenance program is an aggressive one; meeting all the standards set forth by North American Electric Reliability Corporation (NERC).

“All the trimming and mowing done during the summer months goes a long way in protecting the system during an ice storm,” added Alberty. “We witnessed the benefit of the maintenance program not only in MidAmerica, but all across our transmission system last year.”



Construction of the new transmission line, running from GRDA's Coal Fired Complex to a new substation near the Google facility will help improve reliability in the MidAmerica Industrial Park.

Fortunately, MidAmerica customers witnessed that as well.

“We cannot afford to go without power for long, and it takes a long time for us to get started again,” said American Castings Plant Manager Mike Fuller. “It was a great blessing that we didn’t lose power through either storm.”

Gatorade Plant Manager Chris Weber added another piece to the equation of the park’s infrastructure. Weber stated, “When we talk of the reliability of the MidAmerica Industrial Park infrastructure and utilities, the absence of power outages is definitely important. But, just as important to our facility was the fact that MidAmerica kept the water flowing - the wastewater and the water pumps. We need it all to produce product, and we had it all. We were in full production throughout the storm.”

“We know from experience when companies want to relocate or expand, they all look for three basics that includes an available building and a strong workforce” said MidAmerica Industrial Park

Administrator, Sanders Mitchell. “However, at the top of the list, they want a strong infrastructure. They are looking for affordable and reliable utilities.”

“We have spent much time and money on our infrastructure and on building our relationships with companies that supply utilities and services to our industries. We are fortunate to have GRDA on-site. Along with rates that are a great bargain nationally.

Additionally, their reliability is simply among the best in the country.” Mitchell concluded, “During the two ice storms we had in less than twelve months - not one of our industries powered by GRDA lost even a minute of power. We were fortunate and we are grateful.”



NEXT DOOR NEIGHBOR ... Looking north, from the Unit 2 boiler at the GRDA Coal Fired Complex. The industries of the MidAmerica Industrial Park can be seen in the distance. High voltage transmission lines (both sides of the picture) help insure reliability to those industries.

GRDA to take new approach to dissolved oxygen issue

For the same reasons humans require oxygen for breathing, fish require oxygen --- in the form of dissolved oxygen (DO) --- in the water to maintain a healthy ecosystem and aquatic habitat.

While it's produced naturally by water systems --- through the atmosphere and processes such as photosynthesis --- DO is greatly affected by many factors. Water temperature and depth, as well as water activity (running or still) all have a part in determining DO levels. In areas where DO levels are too low to adequately support the fish habitat, man-made solutions are often implemented to give Mother Nature a boost.

With 70,000 surface acres of water and three hydroelectric facilities to manage, the Grand River Dam Authority is no stranger to DO issues. In fact, low DO levels that frequently occur below GRDA's Pensacola and Robert S. Kerr Dams in the summer months have been a concern for many years.

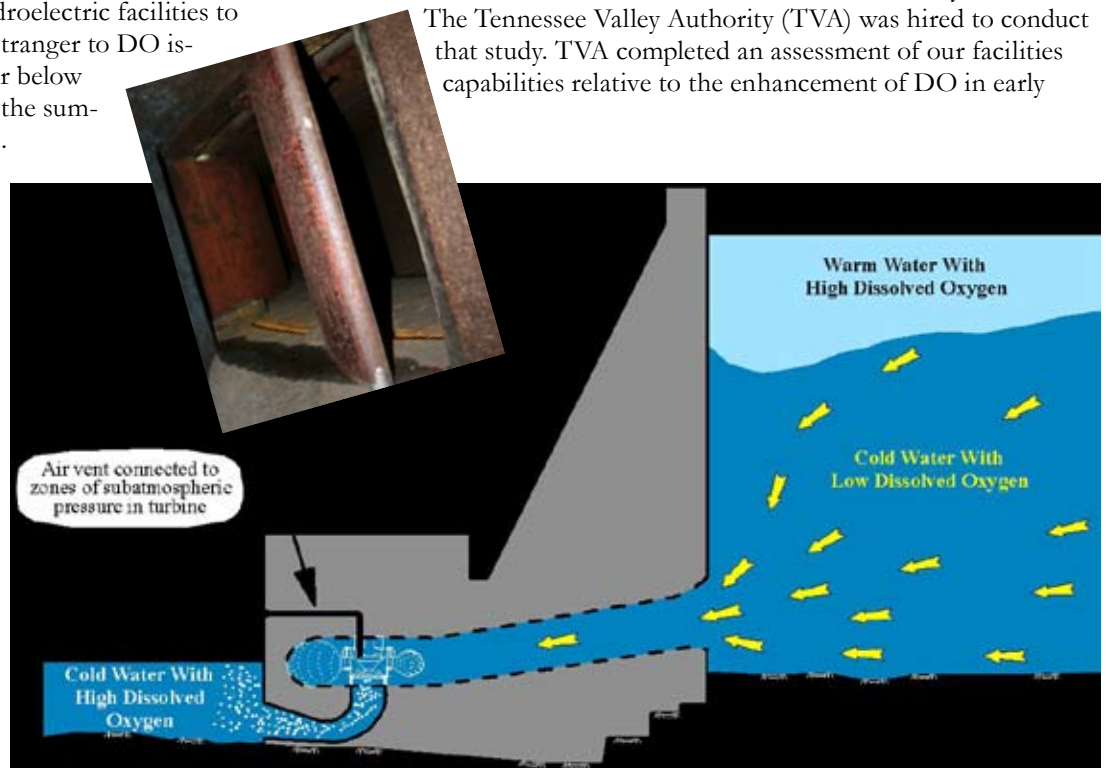
"This is not a new issue, it is quite common for dams and reservoirs," said Dr. Darrell Townsend, GRDA Ecosystems Management Director. "The low oxygenated water is generally found at deeper lake levels below the thermocline throughout summer months."

The thermocline could be defined as a thin layer of water in a lake, sandwiched between the upper, warmer layer and the lower colder layer.

Intakes for Pensacola Dam are located below Grand Lake's thermocline for most of the summer. Because of that, the water used for generation, and released to the tailrace, often has a low DO level. Unfortunately, low DO levels in the tailrace area can cause problems for aquatic organisms residing immediately below the dam.

In the mid 1990s, during a comprehensive upgrade project at Pensacola Dam, GRDA installed air baffles, also known as draft tubes, to improve the DO levels below the dam. These draft tubes were located on each of the hydroelectric turbine units and were designed to draw air into the tailrace. Unfortunately, other turbine components --- the wicket gates (which help regulate water flow through the turbines) --- had to be operated at high capacity in order for the draft tubes to work properly.

In the fall of 2007, the GRDA Board of Directors approved a feasibility study to explore other methods for increasing DO at the dams. Thus, GRDA was able to contract with another "authority" on DO. The Tennessee Valley Authority (TVA) was hired to conduct that study. TVA completed an assessment of our facilities capabilities relative to the enhancement of DO in early



Inset: A wicket gate at GRDA's Salina Pumped Storage Project.

Bottom: Example of summer time stratification associated with typical Oklahoma reservoirs. The schematic depicts the flow of low oxygenated water through the penstocks and its subsequent oxygenation prior to its release downstream via installation of vacuum breaker bypass attached the turbine headcover. Design by James Carter, Mechanical Engineer- Tennessee Valley Authority.



GRDA crews and contractors unload air compressors to be used for forced air testing procedures at GRDA's Robert S. Kerr Dam.

March and soon began working with GRDA on plans for upgrading equipment to improve DO at both Pensacola and Kerr.

The new approach at Pensacola utilized a “vacuum breaker bypass” system that provides the necessary air to improve DO throughout the range of the turbine operation, no matter how the turbines are being operated.

“The ability to draw air throughout the full range of operation is very important,” said Townsend. “The new vacuum breaker bypasses on each unit at Pensacola will allow us to do just that.”

“...TVA has perfected the technique, which is the primary reason we have chosen to contract with them.”

During the low DO season, (May through September), GRDA typically experiences little or no inflow and subsequently curtail generation to conserve lake levels. However, the ability to inject air at lower gate operations will conserve water to help maintain lake levels and simultaneously discharge higher levels of DO into the tail race.

After the installation is completed on Pensacola's six units, TVA will begin the design phase to install forced air compressors on two units at Kerr Dam.

Because the turbines at Kerr have the ability to generate approximately 3.5 times more water than Pensacola, they require the additional help of the forced air compression system to mix adequate air to improve or enhance the DO downstream.

“TVA has been at this a lot longer than us,” said Townsend. “Their research started during the late 70's and early 80's and they are attune

to the intricacies of the engineering differences between Pensacola and Kerr. TVA has perfected the techniques, which is the primary reason we have chose to contract with them,” said Townsend.

If the new equipment is successful, Townsend said the benefits will be most evident during the summer months.

In the end, Mother Nature gets a helping hand and the goal of a healthier ecosystem can be achieved.

Oklahoma's Public Power Team

Note: The following interview with Holman, is the first in the *Currents'* "Oklahoma Public Power Team" series.

Oklahoma Public Power Team: Cindy L. Holman

Cindy L. Holman, General Manager of the Oklahoma Municipal Power Authority (OMPA), is one of many members of the "Oklahoma Public Power Team." She started her career with OMPA in July 1985 -- the eighth employee hired by the Authority --- and served as an Investment Analyst in the Financial Services Department. In January 1990, Holman was promoted to the Director of Financial Services. In July 2005, Holman assumed responsibility for OMPA Operations and became the Director of Operations and CFO.

The OMPA Board of Directors on October 27, 2006 unanimously selected her as the new General Manager after conducting a six-month nationwide search. Holman assumed the General Manager's post on February 1, 2007. She now leads the 56 public power employees of OMPA as they work alongside a customer-led board of directors to insure that OMPA always delivers low-cost, reliable energy to thousands of Oklahoma residents.



Cindy L. Holman
General Manager
OMPA

1. When was OMPA formed?

The Oklahoma Municipal Power Authority (OMPA) was created by state statute in 1981 and began delivering power in 1985. We now serve 35 cities throughout the state of Oklahoma. The Board of Directors is comprised of 11 members who were elected by and represent their communities. The State Bond Advisor serves as an ex-officio member.

We are customer driven and customer governed. Our customers range from a town of 300 to a city of 80,000. We employ a variety of programs that support each and every community. The programs serve to strengthen the communities which in turn strengthen OMPA.

2. What is the mission of OMPA?

Our mission is to provide reliable, low cost energy to municipal entities to enable each municipality to be competitive, while maximizing the benefits to our shareholders.

3. Explain your view on the importance of Public Power to Oklahoma.

Municipalities throughout the state that own their own electric systems derive great benefit in both being able to provide competitive electric service and enjoy benefits from these revenues to assist other parts of city government that would not be possible without the electric system ownership.

4. Why is an organization like OMPA important to Oklahoma?

OMPA is owned by the members we serve. Our only reason for existence is to provide services to the cities that own us. If we do our job right, it is hard to distinguish between us and our cities. It comes down to what is best for them.

5. Are public power partnerships in Oklahoma important? Explain the relationships between the communities and organizations like GRDA and OMPA.

The Redbud Plant near Luther, Oklahoma is a great example of how we can accomplish goals together that might not be possible alone. The expansion of the Public Power Workshop from an all OMPA activity to one where GRDA, OMPA and the Municipal Electric Systems of Oklahoma (MESO) provide information, training, and share ideas and programs that can be used by all is another great example of public power at work for Oklahoma.

6. How does OMPA work to maintain partnerships with all the cities you serve?

Since OMPA was established by the cities, our goal is to always provide services that the cities need and want. The establishments of the Energy Services Programs and the Distribution Planning Engineer Program are examples of city needs met by OMPA efforts. These programs are all directed by committees made up of city staffs or elected officials.

In addition, a Blue Ribbon Committee of elected officials from the OMPA cities established the CUP program in 1995 to help the cities' utilities become the provider of choice.

These types of programs have led to very frequent contact by OMPA with city staffs and elected officials over the years. This two-way communication has allowed issues to be addressed before they can become problems. Each city has a power supply update in a council meeting twice a year. OMPA staff also conducts area meetings each year with elected officials, providing information on the direction of OMPA from the General Manager and other senior staff. We also try to have one or two Board meetings a year at a member city location.

An overview of OMPA...

The Oklahoma State Legislature authorized the formation of the Oklahoma Municipal Power Authority in June 1981 with the passage of the Oklahoma Municipal Power Authority Act.

OMPA was created with the purpose of providing adequate, reliable and economic sources of electric power and energy to Oklahoma municipalities and public trusts operating municipal electric systems on June 2, 1981. This would allow members the financial benefits of a large utility while maintaining control of their electric utility.

By December 1984, 26 cities had signed power sales contracts. Then on July 1, 1985, OMPA came into existence as a full-fledged power supplier. After the success of the first year, six more cities joined and in 1989 Fairview joined. In 1993, Perry became OMPA's 34th member when the council signed a power sales contract. Manitou became the 35th member in 1995. In addition, OMPA provides supplemental power to four cities in Kansas.

OMPA's power supply comes from a variety of resources: wind, hydro, natural gas, coal and others. Fairview, Kingfisher, Laverne, Mangum, Pawhuska and Ponca City own small generating facilities, and when necessary, OMPA schedules and purchases the generated power.

OMPA and the Grand River Dam Authority have been public power partners since the early 1980s. OMPA has a life-of-unit contract for 25 megawatts from Unit 2 at the GRDA Coal Fired Complex in Chouteau, Oklahoma.



Many hands make *light* work

Following a year in which ice and freezing rain delivered a knockout punch to a lot of electric lines across Oklahoma, we are proud to salute those who punched back. Battling the elements, the long hours, and sometimes massive amounts of destruction, electric linemen and utility personnel answered the bell, put on their gloves and went to work.

The Grand River Dam Authority is proud of all of you. In our book, you are the champs! Many hands make *light* work.

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