

CUSTOMER **Circuit**

DECEMBER 2015

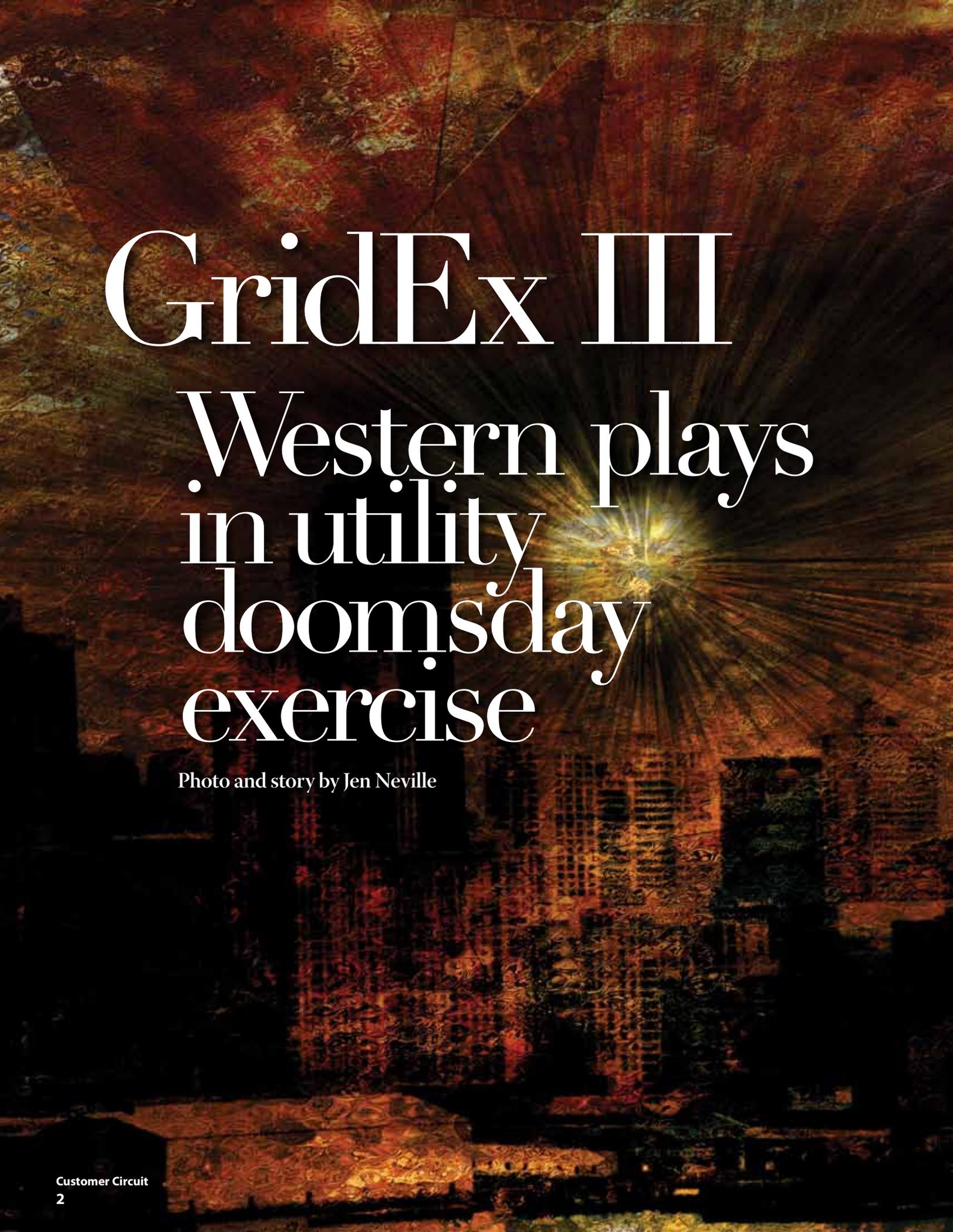
WESTERN AREA POWER ADMINISTRATION

Proactive approach increases reliability

This transformer was moved from Liberty Substation to Mead Substation to serve as a backup transformer and minimize outage time in the event of a failure. A new permanent transformer has been ordered and is expected to be functional by mid-2016. Read the story on Page 6. (Photo by Chris Lyles)

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GridEx III

Western plays in utility doomsday exercise

Photo and story by Jen Neville

Utilities and government agencies, including Western, have been battle-tested during the past six years to ensure their staff and systems are able to respond to and fend off cyber and physical attacks. Furthering its preparedness, Western joined more than 200 utilities for the third, bi-annual grid security exercise, or GridEx III, which serves as a simulation of a catastrophic, calculated attack on the bulk electric system.

“Successfully managing a crisis of this magnitude requires practice, and this gave Western an opportunity to do that,” said Chief Information Security Officer **Jim Ball**, who served as incident commander for the exercise.

Hosted by North American Electric Reliability Corporation, the Nov. 18-19 exercise was designed to test participating entities’ ability to respond to cyber or physical security incidents and provide improvements to local, regional and national grid security programs.

During the two-day scenario, 100 Western employees designated as “registered players” for the exercise and numerous “incidental” players were inundated with exercise injects, mostly through email. There were also realistic videos and photos that described simulated incidents and events occurring in Western’s grid ranging from large-scale physical attacks to cybersecurity hacks and attempted malware implants.

“When we’re talking about the bulk electric system, it is imperative to fully know your environment, appropriate response

personnel, communication plans and incident response procedures to respond properly to emergency situations,” said Cyber Security Information Assurance Supervisor **Kevin Schulz**, who led the planning and implementation of GridEx III at Western. “An exercise such as GridEx tests an organization’s preparedness in these and many other areas, identifying lessons learned to implement corrective actions that strengthen our response capability.”

Simulated disasters unfold

The first day, each utility underwent an onslaught of physical attacks including a substation fire, ammonia spill, drone activity and an active shooter scenario.

“Although the number and intensity of each simulated event appeared daunting at first, I was pleased to see that as the exercise continued, the command structure we were able to put in place helped us manage and respond to the events in an organized and thoughtful way,” said Senior Vice President and Sierra Nevada Regional Manager **Subhash Paluru**. “The experience was

meaningful and I believe we generated a lot of insights that will be useful in the event a real emergency were to ever occur.”

“Everything happened so quickly; it was a little hectic getting the initial emergency operation centers set up,” said Emergency Management Program Manager **Tiffani DeFore**, who

observed the exercise. “But once they were established, it was amazing to see how smoothly information flowed between each regional EOC.”

Western staff quickly coordinated information and responses across its 15-state region and interacted with other utilities. “Crisis management and emergency operations are things you have to practice to be good at,” added Ball. “I was impressed by the cohesiveness of the team. The players had not worked together before in this type of situation, but they came together during the exercise and it worked well.”

Planning leads to preparedness

During the past six months, a team of 28 Western employees, who served as exercise “planners,” orchestrated the scenarios and prepared for the exercise. The planners created realistic situations and challenges to test the system, as well as the staff’s procedures. “GridEx promotes tactical daydreaming at both the planner and player level,” said Colorado River Storage Project Energy Management and Marketing Office Manager **Steve Johnson**, who was a planner for the exercise. “Through the process of preparing and executing the drill, we wanted to test how our staff would handle things like breaks in normal communication channels and responding to critical cyber and physical events.”

The exercise ended for Western midway through the second day with copycat attacks mostly against Information Technology systems. By the end, as the chaos subsided and the players were managing the last few situations, the team began strategizing how to bring Western back to normal operations.

A few employees from Pacific Northwest National Laboratory watched the exercise. “We at PNNL appreciated the opportunity to observe. You’re managing across 15 states and that’s not a trivial thing,” said PNNL Senior Power Engineer **Mark Rice**. “We learned a lot about how a utility responds under crisis and we can take that back and incorporate that in our research. This has been great, and we will look for other opportunities to partner.”

Thinking about the lessons learned—what worked well and what can be improved—the planning team is already developing ideas for continuing to test Western’s staff and system during more regular ongoing activities, as well as when the next GridEx opportunity rolls around. □

Note: Neville is a public affairs specialist.



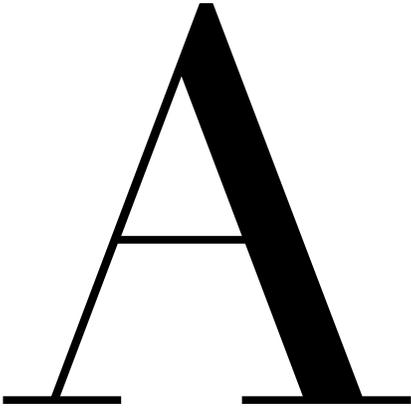
Western participants in GridEx III stand up a fictitious emergency operation center, or EOC, at the Headquarters office in Lakewood, Colorado, Nov. 18, to coordinate their response to simulated cyber and physical attacks on the bulk electric system.



THE HILL HAS EYES

Meet Western's WLO

by Kara Lamb



As a federal organization, part of our responsibility is to stay in touch with Washington, D.C. The Department of Energy is located there and so is Congress. But how does Western keep eyes on both the Department and the Hill? The answer: our Washington Liaison Office.

Senior Vice President and Assistant Administrator for Washington Liaison **Mike McElhany**, Legislative Liaison **Kathy Tyer** and Management Analyst **Shellie Scott** are Western's primary WLO employees. But this fall McElhany has been on detail to the Desert Southwest region and Scott to another organization within DOE. Three detailees from other Western locations have since joined Tyer at the WLO, filling in the temporarily vacated positions. Chief of Staff **Erin Green** is filling in for McElhany. Rocky Mountain Executive Assistant **Heather Bredeson** is detailing for Scott. Emergency Management Specialist **Clifton Welter**, is also in the WLO right now; although not on detail, he is serving on rotation through the Presidential Management Fellow Leadership Program.

Seeing customers

"Out here, relationships and interpersonal skills are critical," said Green. "The Liaison Office serves as Western's presence in D.C. and monitors policy and legislation as it affects the [power marketing administrations] and our industry. But it also advises senior management, coordinates reports on budget, finances, accounting and repayment issues, and serves as a liaison to the Department, other federal agencies and Congressional offices and staff."

Welter agreed. "We're the diplomatic arm of Western," he said.

The WLO sees a wide variety of high-level inquiry on a daily basis, with each

request requiring a different type of analysis. Liaison staff have to "see through each ask," understand the needs and build a strategy for response.

For example, this fall some of the high-priority issues for Western's WLO have included the response letter to Senators McCain and Flake of Arizona, who wrote the Deputy Secretary asking about costs, rates and impact to Arizona customers and Western's overall mission; preparing and updating reports on overhead costs, budget and finance; and they will soon be working with the Department on pass-backs for the Fiscal Year 2017 proposed budget.

Although some assignments are technical in nature, many are not. "We have to ask ourselves: What is the root cause of this inquiry? Is it a financial issue, a political issue? What is its driving factor?" explained Welter.

Bredeson continued the thought, "It means objectively analyzing what comes in, what must be done. It's social science in action—an art."

"And we do it as a team," added Green. "We do a lot of discussing our strategy. We work well together sorting through the tactical actions of this office. We also do a lot of aligning with our sister agency PMAs, as we share a lot of cross-functional knowledge."

Seeing results

If one has not visited the WLO, it is hard to visualize where it sits in the broader scheme of the nation's capital. It is located on the southwest side of the Department of

Energy office building—WLO employees jokingly call it the penthouse—just south of the National Mall. Down a white-walled corridor, a doorway opens on the left, revealing a long and narrow suite of offices.

"These we all share together," explained Green, "Western, [Southeastern Power Administration, Southwestern Power Administration] and Bonneville. Western anchors the north end of our suite, SEPA and SWPA are in the middle, and BPA anchors the south end." Western and BPA each have a small set of staff in the WLO. SEPA and SWPA are represented by one liaison, Barbara Smith, who worked for Western in WLO in the 1990s.

Together, and separately, WLO staff work to build trust—one of the most important functions of the office. They conduct outreach, negotiation, education and responsiveness. "That can become challenging when there's a critical issue due immediately and we're still in process of building a new relationship with, say, Congressional staff who have never worked with Western before," Green said. "Sometimes, they are not even familiar with the PMAs."

"That's one thing I've learned more about while on this detail," said Bredeson. "The PMAs have a lot of similarities, but differences, too. That influences how we work with our customers, whether they are within Western, in a Departmental office, or in Congress."

"We also see how the work we do in the field, at the regions, or at Headquarters rolls up into the larger picture," added Welter. "For example, I am currently working with the National Nuclear Security Administration's Office of Emergency Management on DOE's comprehensive emergency management order revision. This is cool because here I am, an OSEM person, in the work flow and policy making life-cycle of big picture DOE."

"Exactly," said Bredeson. "It's all part of how we represent Western from the WLO: by sharing our mission and vision with those who may not be familiar with the important work we do." □

Note: Lamb is a public affairs specialist.

Arizona, California, Nevada

We have your back (up)!

by Jen Neville

Delivering reliable power every moment of the day to thousands of Americans in the Southwest requires coordination with customers, as well as foresight, planning and preparedness. Having backup plans and replacement equipment is vital to providing resiliency.

“Mead Substation is an important facility for Western and many of our customers,” said Desert Southwest Electrical Engineer **Gerry Hartill**. “Having a dependable 345/230 transformer at this location is essential to meet contractual power flow requirements on the 345- [kilovolt] line.”

Weighing in at 373 tons, the existing Mead 345/230 transformer, identified as KU2A, performs its part in Western’s interconnected system. This massive unit is used to “transform” the voltage of power from 345 kV to 230 kV, or vice versa, depending on system demands and power flows.

Although the system is reliable, this 50-year-old transformer is close to the end of its useful life and presents a risk to the system, Western and customers. A new transformer has been ordered and delivered, and will be installed by mid-year 2016. However, the installation of this new unit requires numerous substation upgrades and will take several months to complete.

Moving pieces

Western, along with its DSW customers, decided last summer that the risk of failure of the unit was too great, and a backup unit should be prepared in the interim. “Since this piece of equipment is so important, Western’s managers decided that a similar transformer, stored as a spare at Liberty Substation, should be moved to Mead Substation to minimize the outage time if the Mead transformer were to fail,” explained Hartill.

Hartill worked with DSW Construction, Maintenance and Procurement personnel to prepare specifications and get a contract in place to have the transformer disassembled at Liberty Substation, transported, and then reassembled at Mead Substation.

The small business contractor that was awarded the project hired a specialized subcontractor to perform the disassembly and reassembly of the transformer. The contractor also hired a subcontractor that specializes in heavy hauling and moving

large transformers to transport the disassembled transformer between substations. The disassembled transformer still weighed about 213 tons when it was ready for transport by the heavy transport vehicle. The heavy hauling company carefully planned the route taking into account size and weight restrictions of roads and bridges.

The trip required two days and included police escorts in Arizona, California and Nevada. The removed parts were transported to Mead Substation by several flatbed trucks and the 31,000 gallons of insulating oil was transported in tanker trucks.

Now fully assembled, the backup transformer is stored near the existing KU2A transformer, which continues to transform power to support the Desert Southwest grid. If KU2A were to fail before the new transformer is ready for service, the backup transformer could quickly be moved into position to minimize the outage time on Western’s 345-kV transmission line.

“Our customers rely on the system’s strength and resiliency to serve power to millions of Americans. Taking this step was a proactive response to a very real concern,” said Western’s Administrator and CEO **Mark Gabriel** during a recent visit to the substation. □

Note: Neville is a public affairs specialist.

POWERING THE ENERGY FRONTIER

ENERGY INFRASTRUCTURE –

Provide reliable power and transmission to the customer. Facilitate a more resilient and flexible energy delivery system.

Reliability requires constant evaluation

Western’s Construction staff and Maintenance crews ensure the intricate web of energy infrastructure is enduring and dependable. They routinely inspect Western’s facilities and assets to identify items that need to be upgraded, repaired or replaced. Then Western reviews its asset management data and meets routinely with stakeholders to ensure that projects regarding its 17,102 miles of transmission lines and 320 substations are completed on time and to ensure customers continue to receive reliable service.



A view of Mead Substation showing the new, existing and backup transformers, which ensure reliability in the face of aging infrastructure. (Photo by *Christina Ramsey*)



Administrator and CEO *Mark Gabriel* and Foreman II Electrician *Randy Strand* stand in front of the backup transformer from Liberty Substation, Oct. 23, at Mead Substation in Boulder City, Nevada. (Photo by *Chris Lyles*)

Top 10 Stories of 2015

Each year the *Closed Circuit* takes the opportunity to recap Western's top stories of the calendar year. It is always a difficult task to narrow down the diverse and exciting stories that take place across our service territory and throughout our organization. We hope the year in review will instill a sense of pride in readers similar to what we experienced while creating the list.

Runners up:



CLDP kickoff lays leadership foundation—In January, Western kicked off a new two-year leadership program, one that serves the craft community specifically. The Craft Leadership Development Program targets 13 leadership competencies, helps participants develop Individual Progression Plans, provides a mentor to each participant, and encourages rotational assignments, classroom work and assigned reading. Thirteen participants were selected for the inaugural class.

Councils balance strategy, value, workload—Western's leadership councils gathered for their first-ever joint summit at Rocky Mountain's Power Marketing and Operations Center, July 7-9, in Loveland, Colorado. Western's Roadmap 2024 calls for the councils to provide input on the organization's strategic targets. The summit allowed each council a streamlined opportunity to collaborate on strategic topics and shared goals.

Reducing risk, increasing reliability—With reliability standards increasing in both number and complexity, along with the risks our organization must manage, Western combined its Enterprise Risk Management and Reliability Compliance programs, June 28. This new Risk and Reliability Office will help Western consistently and strategically approach reliability while following an industry trend. The new office is also expected to improve Western's preparedness for reliability audits.

10 SN, neighbors share easement land—Western and Sacramento Municipal Utility District have parallel lines running through in the city of Sacramento. The city still owns the land underlying the easement and had sanctioned community gardens to be established under the Elverta-to-Hurley 230-kilovolt line. The growing garden was blocking access to towers. Per North American Electric Reliability Corporation and Federal Energy Regulatory Commission regulations, the utilities need 24/7 access to and around the towers. During the summer, Sierra Nevada, SMUD, the city and the community gardeners worked together to find a way to coexist while ensuring safety and grid reliability.



A community garden grows underneath a Western tower and near a Sacramento Municipal Utility District tower in Sacramento, California.
(Photo by Sue Nielson)

9 New inspection tool—In January, about 30 lineman and subject matter experts gathered in Loveland, Colorado, to test a new field inspection tool that can document the condition of Western's more than 177,000 transmission structures and components. The team took great effort to integrate the information captured into Geographic Information Systems. Additionally, extensive work was done to ensure that the tool can meet each region's needs and capture data in a consistent way. The tool strengthened Western's Asset Management program, and when final phases of the project were completed later in the year, crews and support staff gained access to a comprehensive maintenance information system.

8 Government gone solar—On July 16, Western, the Department of the Navy and Sempra U.S. Gas & Power made history by finalizing an agreement that signified the largest purchase of renewable energy made by a federal entity. Fourteen Navy and Marine installations in California will receive energy from the 150-megawatt solar farm, named Mesquite Solar 3, in Arizona. Western has a long-standing agreement with the Navy to provide power purchase services for the Navy's direct access loads in California. Senior Vice President and Desert Southwest Regional Manager **Ron Moulton** said, "Agreements like this help build a stronger, cleaner and more secure energy future." The project is expected to save the Navy at least \$90 million over the life of the project.

7 Fall Protection program evolves, increases safety—Western sent all 25 line crews to Mead Substation in Boulder City, Nevada, between Feb. 17 and March 18, to train on the Occupational Safety and Health Administration's new fall protection standards, which went into effect a few weeks later on April 1. Both classroom and field components of the training supported linemen's understanding of the changes, which were mostly due to the complexity of wooden and steel structures they climb. Participants had the opportunity to try several new types of equipment to discover what worked best for their style. The training was presented by Western's Fall Protection Committee, who trained about 150 linemen.

6 Real-time analysis to improve grid awareness, reliability—Dozens of power dispatch centers around the country are responsible for achieving balance, voltage and reliability for our nation's electric grid—four of those centers are Western's. Due to new North American Electric Reliability Corporation standards that require real-time contingency analysis every 30 minutes, Western must develop solutions commensurate with each of its region's needs. For the most part, this involves a new 24/7 real-time desk staffed with new operational engineers.

5 More than corn grows in UGP—To maintain compliance with North American Electric Reliability Corporation facility ratings regarding ground clearance, Upper Great Plains raised some of its towers using new technology. In August, UGP used AmpJack's patented technology to add several feet to towers without removing conductor, needing cranes or involving many workers and heavy equipment. Headquarters Engineering supported the effort by designing new sections for the towers. The technology only works for double-circuit steel lattice structures. Other structures were raised in a variety of ways.

Using LIDAR, Western's Power Line Systems Computer-Aided Design and Drafting software, or PLS-CADD, and a 3-D program, engineers were able to create accurate models of UGP's transmission system, which helped determine which methods to use on the different towers. These tools will also aid in compliance and maintenance.



Maintenance managers get familiar with a new tool's user interface outside Loveland, Colorado, Jan. 13. The application, accessed on rugged computers, will standardize how Western assesses and tracks transmission line structure condition across its service territory. (Photo by Jen Neville)



Senior Vice President and Desert Southwest Regional Manager Ron Moulton, Secretary of the Navy Ray Mabus and Sempra U.S. Gas & Power CEO Patti Wagner sign the ceremonial documents for the Mesquite Solar 3 power purchase agreement, Aug. 20. (Photo by Lisa Meiman)



A lineman rappels from a steel tower as part of fall protection field training last year. Western and other participating utilities evaluated additional techniques including double-belt ascent, shepherd's hook, vertical lifeline ascent, horizontal lifeline, rappelling, rope access and drones. (Photo by Ed Hunt)

Top 10 Stories of 2015



Retirees and current leaders from Siemens, Institute of Electrical and Electronic Engineers and Western gather in the lobby of Western's Headquarters office, May 21, where the Milestones plaque is on display in Lakewood, Colorado. (Photo by Kara Lamb)



Deputy Secretary of Energy Dr. Elizabeth Sherwood-Randall speaks about the need for economic and reliable energy, Feb. 12, while celebrating the newly energized ED5-PVH project. (Photo by Jen Neville)

4 IT Evolution channels collaboration, communication—A year in the making, on Aug. 23, Western's new Information Technology structure became effective, marking the first step in maximizing our technology investments and providing agile support to our changing business needs. IT now has seven programmatic areas positioned to provide cost-efficient consistent IT support throughout Western. This new structure is just the beginning as the IT leadership teams develop plans, analyze gaps and amp up communication to help employees get up to speed with the changes. The IT Evolution has already resulted in a \$3 million cost avoidance and identified more than 200 projects planned for 2016.

3 Virginia Smith Converter Station wins award—The Institute of Electrical and Electronic Engineers awarded Western's Virginia Smith Converter Station its prestigious Historical Milestones award, May 21. The award honors the station for being the first of its kind to provide important interconnection using a set of converter control algorithms and equipment that link the two asynchronous grids. The station, located in Sydney, Nebraska, became operational in 1987.

The award ceremony drew current and retired employees from Western and Siemens, the company who designed the technology, as well as a local Congressional staffer.

2 ED-5 increases reliability, access to affordable energy in Southwest—Western celebrated the energization of its Transmission Infrastructure Program's 109-mile Electrical District No. 5-to-Palo Verde Hub, Feb. 12. Per the Department of Energy's press release, "The project provides increased capacity access to affordable energy in the region ... [and serves as a] critical component in President Obama's effort to accelerate economic growth, expand opportunity and improve the competitiveness of the American economy."

The project was completed on time and about \$3 million under budget and adds up to 410 megawatts to the grid—enough to power 30,000 homes.

1 UGP joins Southwest Power Pool—At midnight Oct. 1, Upper Great Plains transferred functional control of its integrated transmission system to Southwest Power Pool and began operating in the regional transmission organization, or RTO. Western began considering membership in SPP in 2011 and is now the first federal power marketing administration to become a full RTO member.

UGP merged its Eastern Interconnection Balancing Authority into SPP's BA while its transmission facilities in the Eastern and Western Interconnection were incorporated into SPP's new Upper Missouri Zone. UGP's Eastern Interconnections generation and load also became part of SPP's Integrated Marketplace. UGP continues to be responsible for delivering firm electric service to its customers and continues to be a transmission operator that develops rates, revenue requirements and other rates for use in SPP's tariff.

The transition was successful and will help UGP continue to deliver on its mission. SPP's footprint spans more than 550,000 square miles in parts of 14 states in the central U.S. and includes more than 800 generating plants, nearly 5,000 substations and about 56,000 miles of high-voltage transmission lines.

□

Partnership provides safe place for ospreys

Photos by Jen Neville



The new nesting platform near Lake Estes stands ready to welcome ospreys in the spring. Rocky Mountain linemen installed the new structure, Nov. 10, in Estes Park, Colorado.



Western partnered with the Bureau of Reclamation, Colorado Division of Parks and Wildlife and a local raptor advocate to install a new nesting platform for ospreys near Lake Estes in Estes Park, Colorado.

Rocky Mountain linemen installed the new structure, Nov. 10. The optimal nesting location for ospreys is the highest point near water, and the new platform—almost six stories high—provides both. Rocky Mountain Maintenance Manager **Nick Klemm** donated the 60-foot pole and crew time to provide a safe place for the ospreys to nest.

Western is committed to conserving birds while meeting its mission. Headquarters Biologist **Tim Langer** explained, “Transmission systems pose hazards to birds, and Western looks for opportunities to enhance avian conservation.”

Environment and Maintenance partner on projects like this one to ensure Western serves as a good steward of the community and surrounding ecosystems. □

Rocky Mountain linemen finish digging an 8-foot hole to secure the structure that will support a new nesting platform in Estes Park, Colorado, Nov. 10.

brief transmissions

Fall Protection video shows new attachment design for steel structures

In Western's latest video, Fall Protection Coordinators **Dave Katich** and **James Hill** present newly engineered flanges. The innovation demonstrates Western's commitment to safety and compliance with Occupational Safety and Health Administration regulations for 100-percent fall protection while providing a cost-efficient solution.



Watch the video at
<https://youtu.be/Lqx7bW2OOSA>

'Western, you don't look a day over 20'

Just a short 38 years ago, on Dec. 21, Western was signed into existence with the Department of Energy Act of 1977. It is because of our dedicated employees that we are still the same great organization that formed back in 1977. As we look forward to the future, we reflect back to our great advancements in technology and innovation, and continue to power the energy frontier.

