CUSTOMER Circuit
SUMMER 2018
WESTERN AREA POWER ADMINISTRATION

Operations

Reliable, responsive, resilient!

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LETTER FROM THE CFO

By Dennis Sullivan

Hello everyone. I just celebrated my first anniversary of serving all of you as WAPA's chief financial officer. In the Summer 2017 *Customer Circuit*, I wrote that this job appeals to me because of the passion WAPA employees have for executing its mission in support of WAPA's customers. Every single day, I see that passion helping WAPA realize its vision for business, technology and organizational excellence.

With financial management, one such example is WAPA's unobligated balance reserve strategy, which helps meet its core mission requirements effectively. Developed in conjunction with our customers, this tool provides flexibility with changes to capital construction needs and responding to drought or other emergencies. The table below summarizes our unobligated reserve balance strategy:

	Annual Operations and Maintenance	Capital funding	Purchase power and wheeling
Example	Salaries, supplies and equipment	Building new transmission lines and related structures	Buying power on behalf of customers when water conditions require it
Purpose	Allows WAPA to sustain operations during emergencies, continuing resolutions or lapses in appropriations	Provides funding in advance of starting capital construction projects and flexibility with schedule/priority changes in collaboration with customers	Improves both WAPA and customer cash management while minimizing energy rate spikes during a drought
Strategy	Retain 31% of annual funding need	Retain sufficient funding to cover 3 years of capital investments	Retain 3 years estimated funding during drought

A common business practice in federal government, WAPA has managed or reported on unobligated balances for 40 years. Our current strategy provides even greater ability to prevent or minimize adverse impacts to our customers. Carrying and maintaining unobligated reserve balances does not affect power and transmission rates, and WAPA only reserves what is necessary for safe operations and continued work toward capital investments in critical energy infrastructure.

After reviewing WAPA's use and strategy around unobligated balances, the Department of Energy's Office of Inspector General concluded that WAPA is appropriately managing its unobligated balances. The DOE OIG published its final report titled "Western Area Power Administration's Unobligated Balances from Various Funding Sources" July 10.

The stories in this issue illustrate the many ways in which WAPA's employees apply knowledge, technology and innovation and engage with internal and external partners to optimize operational effectiveness.

It is imperative in this time of change that WAPA prepares for success in the future. By pursuing the foundational values of business, technology and organizational excellence, we can continue to accomplish our mission and fulfill the needs of our customers and the nation now and in the future. □

Read the full DOE OIG report at
www.energy.gov/ig/downloads/inspection-report-doe-oig-18-38

Technology Symposium to explore physical security, cybersecurity issues

Join your industry colleagues to explore the latest trends, topics and issues surrounding physical and cyber threats Aug. 21.

WAPA is hosting the Technology and Security Symposium, a free event for power customers, Aug. 21, at WAPA Headquarters in Lakewood, Colorado.

Knowing that concerns about the security of our nation's transmission infrastructure weigh heavily on every power provider, WAPA has made protecting the grid one of its top priorities. The Technology and Security Symposium will bring WAPA power customers together with industry leaders to explore issues surrounding cyber and physical threats to the grid.

What you will learn

The symposium's agenda focuses on three key areas:

- Asset management
- Protecting physical assets
- Protecting cyber assets

The panel for each topic includes a WAPA executive, a customer representative and an industry expert from organizations including the Department of Energy, cybersecurity consultant Dragos and the Electric Power Research Institute. Speakers will discuss the latest trends, technologies and leading practices, and there will be ample time for questions and answers.

Planning your attendance

Registration for the Technology and Security Symposium is free; however, seating is limited to 100 due to space. Do not wait to register as seats are filling up quickly.

Lodging in Lakewood also fills up quickly in the summer. Visit the WAPA website, and select the "Hotels" tab to find hotels near WAPA Headquarters.

Information sharing and partnerships are central to building a security culture, so breaks and an onsite lunch are planned to encourage networking. WAPA is arranging a catered lunch so attendees do not need to leave the facility. Because WAPA is subject to federal regulations, attendees are asked to pay for their own meals. Lunch should be ordered online ahead of time. Shortly after registering, you will receive an email containing a link to the page where you can order lunch for this event. Payment options are cash, credit card or gift card. Your boxed lunch will be delivered fresh on the day of the symposium.

All WAPA facilities are secure federal sites, so your patience with necessary security measures will be greatly appreciated. Attendees should arrive at WAPA Headquarters 15 to 20 minutes before the start of the event to allow time for security screening. Bring your event ticket and one form of legal identification to the front desk. Acceptable forms of photo ID include:

- Driver's license
- Employee company badge or ID card
- Federal employee badge

If you will be staying overnight in Lakewood, WAPA will provide you with a list of nearby restaurants for dinner.

Sign up for optional tour

Registrants may also join an optional daylong tour of WAPA facilities Aug. 20, the day before the symposium. If you are interested in visiting the Electric Power Training Center in Golden, Colorado, and the Rocky Mountain region dispatch center and Flatiron Substation in Loveland, Colorado, call Chris Lyles at 720.962.7249. The same federal security measures that apply to the symposium apply to the tour as well, so be sure to make any necessary arrangements ahead of time and carry your legal ID.

WAPA is committed to working with partners throughout the electricity industry to protect its transmission grid. The Technology and Security Symposium will update power customers on the steps WAPA is taking and encourage them to share their insights, concerns and solutions with peers. We look forward to seeing you Aug. 21. ☐

Learn more about the Technology and Security Symposium at
https://www.wapa.gov/Pages/technologysecuritysymposium.aspx
and register at **https://www.eventbrite.com/e/wapa-technology-security-symposium-tickets-46995471721**

WAPA lifecycle management protects critical infrastructure

Assets—transmission lines and system components, maintenance tools and vehicles, office equipment, all manufactured products—have a timeframe of use, or lifecycle. Each step of the lifecycle, from inception through engineering design and manufacture, to service and disposal, presents opportunities to learn about using the asset more efficiently and effectively. Lifecycle management is a process businesses can use to collect, analyze and apply this information to get the full value of their capital investments.

Data collection begins

Recognizing the value of asset management to both its own operations and its customers, WAPA launched the Asset Management Program Improvement Project in 2012. Many WAPA departments had applied aspects of asset management to purchasing and replacing equipment before AMPIP, "but it was not consistently practiced so we weren't getting the full benefit of the process," said Asset Planning and Development Manager Todd Rhoades.

The project standardized how WAPA collects and processes asset data for critical transmission equipment across the agency. Data included how employees evaluate and document asset condition, calculate probability of failure and determine the consequences of the asset being out of service.

In 2014, WAPA staff started creating equipment asset condition reports and providing annual, risk-based, data-driven information to help with capital investment recommendations. Senior management and other stakeholders use this information to develop and update WAPA's 10-Year Plan.

Focusing initially on transmission lines, circuit breakers and power transformers, the first AMPIP reports revealed WAPA's most critical equipment asset classes to be in relatively good condition. In the second year, WAPA developed a risk-estimator tool to calculate future risks to asset classes and perform what-if analyses. The tool can also be used to optimize replacement strategies for the aging equipment fleet.

Strategy evolves

In 2015, WAPA transitioned AMPIP into a full-time Asset Management Program, or Asset Management 2.0. This latest iteration of the program expands on the processes introduced by AMPIP to provide objective, data-driven justification of capital funding requests and helps to prioritize projects. Going forward, Asset Management 2.0 will apply lessons learned from AMPIP to other equipment classes to gain the benefits of the strategy across the entire organization.

The asset management team is now able to gather inspection information for individual transmission line structures and conductors to develop metrics on the condition of the transmission line equipment. The team uses this data to determine and raise awareness of major risks to assets and document actions for addressing unacceptable risks. This allows preventive maintenance, asset replacement and capital planning to be based on the condition of the asset rather than solely on asset age.

As the database grows, Asset Management will be able to refine the methodologies for evaluating asset condition and determining risk and consider which other asset classes might benefit from tracking. By integrating lifecycle management processes into the program, WAPA looks forward to further improving its maintenance program.

Studying options

In lifecycle management, as in life, many roads can lead to the same destination, but some offer a straighter route with fewer detours than others. Taking time to study a roadmap before embarking on a journey can save time, save money and avoid difficulties.

Starting at the beginning of the lifecycle of power transformers, an internal group at WAPA is exploring acquisition strategies. An organization might choose to purchase individual units, arrange a mass buy, partner with another entity or go it alone. The study group will look at each of these strategies to determine which ones best meet WAPA's needs at an economical price point. The report is expected to be done by the fall.

The lifecycle management strategy is being brought to bear on WAPA's construction program as well. The Project Management group is leading a process improvement exercise to map the steps, responsibilities and schedules followed by infrastructure construction projects.

In the public sector, asset management that incorporates lifecycle management strategies promises more cost-effective maintenance of large infrastructure and increased long-term economic viability. WAPA will continue to study, update and refine the processes that keep its transmission system reliable and resilient to pass those benefits on to its customers. ☐

The Northeast Blackout of 1965 spurred the formation of the North American Electric Reliability Corporation to develop voluntary reliability rules for utilities and to encourage reliable operating practices. (Photo by Ralph Morse)

WAPA plans, tests, cooperates to prepare for black starts

There are certain events that rarely occur but their impact is so great that organizations must plan for them as a part of regular operations. In the electricity industry, a major widespread power outage, or system blackout, is one of those events. Restoring power after such an outage requires a black start, the process of energizing a non-operating generating facility or the grid without relying on external power.

Normally, the electric power used within a powerplant comes from the station's own generators. If all of the plant's main generators are shut down, station service power is drawn from the grid through the plant's transmission line. However, during a wide-area outage, offsite power supply from the grid will not be available. In the absence of grid power, a black start must be performed to return the grid to normal operations. As a transmission provider with hydropower resources, WAPA plays a key role in black-start plans in its territory.

Black-start plans provide system operators with coordinated strategies to restore the interconnection using available black start-capable resources specific to their region. Each plan consists of several individual strategies, or paths, in case one or more of them cannot be executed as expected. Once the black start has been accomplished, individual agencies can initiate their own restoration plans in coordination with neighboring operating entities and their regional reliability coordinator.

Communication, coordination critical

WAPA dispatchers are required to complete black-start training annually. The Bureau of Reclamation must test its generators every three years to ensure the units can do a black-start restoration. The agencies also team up with other federal entities, utilities and the regional reliability coordinator to annually evaluate black-start

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plans and participate in coordinated drills. "In the Rocky Mountain region, we hold black-start restoration training in the spring," said Jerry Krebs, supervisory power system dispatcher in RM. "The Peak Reliability Coordinator coordinates it and everyone participates."

The yearly review and simulation give every generating entity the chance to train on its own plan and to work with the other entities that will be involved should a black start be necessary. Given the number of individual plans and the multiple paths to black start, a central coordinator is essential to the success of both the training exercise and an actual event. The regional reliability coordinator serves as the focal point for restoration activities and provides the high-level strategy entities will follow to restore the interconnection.

Following the annual training, WAPA and other participants update their plans and submit them to the reliability coordinator. Modifications identified in the plans are made on a predetermined schedule.

Water works for black starts

Hydropower resources occupy a unique niche in black-start planning. Because hydroelectric powerplants need very little initial power to start, they are often designated as black-start sources to restore network interconnections. "You can use the fast startup to get fossil fuel or nuclear plants back online," explained Krebs.

WAPA maintains federal hydropower stations in conjunction with the Bureau of Reclamation and the Army Corps of Engineers.

"THE ELECTRICITY INDUSTRY HAS BEEN PRACTICING BLACK STARTS FOR 50 YEARS, AND WAPA HAS PERFORMED THE OPERATION ONLY ONCE—IN 2013 IN SAN DIEGO, CALIFORNIA, AND THIS SUMMER WITH THE CARR FIRE IN NORTHERN CALIFORNIA."

Learning from past

Before 1965, reliability of the interconnected electric grid was managed by individual electric utilities, or groups of interconnected utilities, which were, to varying degrees, accountable to state and local regulators. That changed Nov. 9, 1965, when a significant disruption in the electricity supply plunged parts of eight Northeastern states and Ontario in Canada into darkness. The Northeast blackout of 1965 left more than 30 million people and 80,000 square miles without electricity for up to 13 hours.

Following the Northeast Blackout of 1965, regional reliability organizations and, later, the North American Electric Reliability Corporation, were formed to develop voluntary reliability rules and to encourage reliable operating practices. Modern, interconnected regional networks reduce the risk of system blackouts by providing multiple redundant alternative routes to deliver electricity should equipment failures occur.

Creating black-start plans, conducting regular coordinated tests on the plans and incorporating lessons learned is another way to ensure reliability. WAPA will continue working with federal and industry partners to maintain and improve its black-start resources and strategies.

The electricity industry has been practicing black-starts for 50 years. WAPA has performed the operation twice—in 2013 in San Diego, California and this summer with the Carr Fire in Northern California. "We hope we never have to use it," Krebs said, "but we still have to be ready to keep the lights on." □

WAPA continues efforts to increase grid resiliency

Grid security represents a significant challenge, not only for the electricity industry in general but also for the installations charged with protecting our nation.

As a federal power marketing administration and wholesale power provider, WAPA is subject to mandatory regulatory requirements for both cybersecurity and physical security. With other members of the electric sector, WAPA engages with the Departments of Energy, Homeland Security and other federal agencies and electric utilities to share appropriate information and develop strategies for critical infrastructure protection. WAPA participates in meetings hosted jointly by government agencies and the Electricity Subsector Coordinating Council, as well as other industry groups. These meetings focus on improving, mitigating and staying ahead of cybersecurity and physical security risks.

"These collaborative activities further WAPA's commitment to sharing threat and vulnerability information across the industry," said Dawn Roth Lindell, WAPA senior vice president and chief information officer.

Studying gaps, preparing for challenges

WAPA's Office of Security and Emergency Management completed a number of actions and initiatives to improve security and resiliency of the bulk electric grid in 11 states and at unmanned and manned facilities in 15 states. About 74 all-hazard physical security risk assessments were completed in 2017 to determine weaknesses and gaps at critical electric facilities, particularly substations. Based on deficiencies in the assessments, OSEM created about 80 remediation plans and implemented 366 individual actions.

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WAPA began these assessments in 2014 and, between then and April 2018, has completed more than 270 security assessments. Based on the assessments, WAPA completed 225 remediation plans and procured five mobile surveillance trailers that can be rapidly deployed to monitor vulnerable facilities.

WAPA also awarded a five-year security contract to assist with installing physical security enhancements at critical energy infrastructure sites.

At the manned facilities, WAPA conducted live and tabletop active shooter exercises to prepare employees and leadership for the physical, mental and emotional challenges these situations create.

Finally, WAPA participated in a North American Electric Reliability Corporation-led exercise called GridEx, involving more than 200 utilities, regulatory agencies, law enforcement and other entities. The biannual GridEx tests participating organizations' incident command system, emergency operations centers and continuity of operations plans during multiple simulated cyber and physical attacks against the electric grid and manned facilities operating the grid.

Roth Lindell noted that the tests give WAPA the opportunity to strengthen valuable relationships with other federal agencies, customers and industry groups and gain greater understanding of partners' needs.

Building internal capabilities

In the cybersecurity realm, WAPA resolved 99.6 percent of incidents and reports within three days in 2017 and did not experience a single significant cyber event. The goal for 2018 is to resolve 90 percent of cybersecurity incidents and reports within two days.

Aggressive education and training programs continue to strengthen employees' ability to recognize and defend against phishing, the primary technique used by hackers to access secure systems. WAPA's Cyber Security office proactively develops homegrown phishing attacks designed to challenge employees' knowledge and understanding of these threats.

WAPA's asset management system has matured over the past several years to help WAPA identify investment and risk mitigation strategies based on the health and criticality of specific transmission assets. The asset management strategy allows WAPA, in coordination with customers, to make risk-informed decisions on 10-year capital investment plans that will result in a resilient, reliable and sustainable grid of the future.

WAPA also implemented the lifecycle strategy for information technology assets in 2017 to ensure funding is available to replace and upgrade outdated equipment. By keeping pace with changes in technology, WAPA will keep pace with changing security requirements and fixes.

Ensuring reliability for military installations

One key factor of resiliency is redundancy in the power system. Redundancy allows for continued operations even if certain elements are taken out of service. WAPA has embarked on a number of public-private partnerships to improve redundancy, and by extension resiliency, in the Southwest U.S. and in northern California transmission systems. For example, the proposed Beale Air Force Base Interconnection Line project in northern California will build new infrastructure to Beale Air Force Base, adding reliable, redundant and resilient power supply to existing infrastructure.

Recovery is also a key component of resilience, and WAPA must be prepared to restore normal business operations in the event of a worst-case scenario. In 2017, WAPA developed a transformer sparing strategy to expediently replace equipment that experiences catastrophic failures due to a widespread natural disaster or attack.

The strategy proposed four options for transformer reserves, and customers provided their input on the options this spring. Based on that input, WAPA is transitioning from an organization-wide mitigation strategy to a regionally based solution. Each region will determine the transformer mitigation strategy that best suits its regional needs, while looking for mutually beneficial partnerships with local utilities. WAPA will continue to improve its acquisition process for large power transformers which has the potential to reduce the lead time for procuring equipment from 24 months down to six months.

WAPA is responsible for long-term power contracts and power delivery for more than 30 military installations and national laboratories in its entire 15-state power marketing territory. This at-cost, reliable power ensures the critical missions at these installations can continue without interruption or concern over their power supply. WAPA is in regular contact with these critical customers to ensure their power needs are met in a cost-effective and efficient manner.

"Reliable electrical service is essential to these installations being able to perform their mission," said Roth Lindell. "Continuing to improve the grid's ability to recover from disturbance is in everyone's interest." □

Customers from six states attended the annual customer meeting at WAPA's new Salt Lake City office.

CRSP MC customers updated on initiatives, improvements

Story and photos by Lisa Meiman

On May 23, customers and representatives from six states attended the Colorado River Storage Project Management Center annual customer meeting at the new WAPA office in Salt Lake City.

At the meeting, customers received a range of updates on strategic issues and opportunities facing WAPA and CRSP MC, budget, hydrology, rates, cybersecurity and Olmsted Powerplant, WAPA's newest hydropower project.

"We need to be prepared for the changes our customers are facing because what happens to you ultimately flows up to us," said Administrator and CEO Mark A. Gabriel in his opening remarks.

Gabriel also shared the good news that CRSP MC will receive an almost $4 million refund from the settlement of the 2000-2001 California Energy Crisis litigation. The money will be deposited in the Colorado River Basin's Power Marketing Fund and reserved for capital projects.

"We're making a lot of changes to preserve the value of WAPA for customers in the future. In the past two years, rates have decreased for more than 60 percent of our customers," Gabriel said. "The Salt Lake City Area Integrated Projects rate has been flat for nine years."

"There is a lot of discussion and collaboration involved when coming up with rates," said Colorado River Energy Distributors Association Executive Director Leslie James. "I want to thank both WAPA and the Bureau of Reclamation for that. I believe there is real effort by both organizations to be flexible and keep the rates as low as possible."

Public Utilities Specialist Chrystal Dean shared that the major powerplants in the Green River Basin anticipate above average runoff, with Fontenelle at 135 percent of average and Flaming Gorge at 114 percent of average.

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What is Dragonfly?

Cybersecurity software company Symantec, while unable to definitively determine Dragonfly's origins, does have a lot to say on the subject. "This is clearly an accomplished attack group," their Security Response Attack Investigation Team wrote in the Threat Intelligence section of the company's website. "It is capable of compromising targeted organizations through a variety of methods; can steal credentials to traverse targeted networks; and has a range of malware tools available to it, some of which appear to have been custom developed. Dragonfly is a highly focused group, carrying out targeted attacks on energy sector targets since at least 2011, with a renewed ramping up of activity observed in the last year."

Source: symantec.com/blogs/threat-intelligence/dragonfly-energy-sector-cyber-attacks

Moving lower into the Colorado River Basin, however, the average forecasted runoff dwindles, including the flows into Lake Powell and Glen Canyon Dam. The projected runoff is expected to be 35 percent of average, which will likely result in Lake Powell reservoir levels dropping this year.

This summer's special releases at Glen Canyon Dam to improve the insect populations, otherwise known as bug flows, are expected to cost about $335,000 in lost hydropower revenue.

"We appreciate the work WAPA has done for the bug flows," said James. "There will be a cost to customers, but if not for WAPA staff, it could have been a lot worse."

Fish Biologist Craig Ellsworth added, "We are always looking for win-win solutions and data-driven decisions that will decrease the cost of environmental compliance."

Shielding employees from cyberattacks

Of major concern for all utilities and the country is the increase in number and sophistication of cybersecurity attacks. Acting Senior Vice President and Sierra Nevada Regional Manager Dawn Roth Lindell shared WAPA's activities to prevent a successful hack of WAPA systems, including creating internal phishing campaigns to test employees.

"When you get phished, even if it's fake, there is an emotional reaction to being tricked," she explained. "You are much more hesitant to click on suspicious links or emails. I encourage you to test your people with fake cyberattacks. We need to stay on top of cyber threats and learn from others' misfortunes. The ways to hack keep changing, and we have to adapt, too."

The allegedly Russian-sponsored Dragonfly attack was found in about 20 utilities. It entered information technology systems from spearfishing, waterholing and third-party vendors. Roth Lindell credits multifactor authentication at WAPA with successfully preventing a breach.

WAPA's newest powerplant

At the end of summer 2018, WAPA's newest hydroelectric facility, Olmsted Replacement Powerplant, will begin serving customers in seven Utah counties.

Olmsted Powerplant has an interesting history dating back to the debate on whether the country's electric grid should use alternating or direct current. It was built more than 100 years ago, in 1910, and was designed to demonstrate the superiority of AC power.

The plant was operated by PacifiCorp until 2015. The government obtained the plant and associated water rights under the provisions of a settlement agreement signed 25 years ago. The original plant could no longer operate efficiently, so public and private stakeholders came together to build a replacement generation facility.

Olmsted Replacement powerplant, WAPA's the newest hydroelectric facility, nears completion.
Photo by KC Shaw, Central Utah Water Conservancy District.

"The technology is so similar. It is incredible how little has changed," said Public Utilities Specialist Lyle Johnson, who is leading the effort to incorporate the plant into the CRSP MC. "We still generate power the same way, though more efficiently with new technology."

Testing will occur this summer with commercial generation likely beginning in August. The run-of-the-river plant will average 27,000 megawatt-hours a year and will be operated by the Central Utah Water Conservancy District, which will also be a primary customer. Power customers will receive a percentage of annual generation rather than a firm amount of power.

A *Federal Register* notice was published June 13 announcing the proposed allocations for Utah customers in Davis, Morgan, Salt Lake, Summit, Utah, Wasatch and Weber counties. After a comment period, the final allocations will be published.

There will be a ribbon cutting and dedication of the new plant Sept. 19, including tours of the new powerplant and historic facilities.

"This is one of the greatest things I have done in my career," said Johnson. "You just don't see many new hydropower plants coming online." ☐

Note: Meiman is a public affairs specialist.

Fast facts about CRSP MC

- CRSP MC markets Salt Lake City Area Integrated Projects, Provo River and Falcon-Amistad.
- CRSP MC represents about 20 percent of WAPA's customers, second behind Pick Sloan Missouri Basin Program – Eastern Division.
- CRSP MC is WAPA's second-largest marketing area.
- CRSP MC has the second-largest hydropower sales in WAPA.
- CRSP MC has the third-largest number of transmission line miles in WAPA.

CUSTOMER Circuit
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