Utilities Department – Highlights for 2015

Production Division

Platte Generating Station

- Boiler tuning was completed with Alstom and ABB. This made improvements to feed water control, DA level control, and improved NOx emissions at lower loads.
- PGS personnel did extensive work on the Air Quality Control System, learning to operate the new system and tweaking the system to make it run better.
- Two new reverse osmosis systems and pumps have been installed in the existing water room to improve the water quality used for the Air Quality Control System.
- Cooling water circulating pump 1A was removed from service to be inspected and rebuilt. The spring maintenance shutdown was started on April 16th, and the following items were completed:
  - Turbine valve inspection and repairs
  - Precipitator cleaning
  - Duct cleaning
  - Boiler slag blasting
  - Bottom ash high pressure wash
  - Air heater wash
  - Piping replaced from MOV-69 to the condenser
  - Blowdown tank drain line was replaced
  - Outfall drain line to the pump basin was repaired
  - Semi-annual radioactive source inventory
  - Installed new exciter, replacing the EX2000
  - Started up two new 100 gpm reverse osmosis units to supply water to the Air Quality Control System
  - Spray dry absorber was cleaned
- The 2014 Platte Generating Station Greenhouse Reports were completed.
- The Air Quality Control Performance Test was completed.
- During the availability test, the atomizer cooling water system failed. Repairs were completed and the system was put back into service. A second availability test will be conducted.
- With above normal rainfall, coal for PGS became saturated. The Material Handlers worked to uncover and load dry coal. Some wet coal was loaded into the “A” bunker and maintenance worked extra hours to keep the coal flowing through the feeder.
- After the outage was completed, PGS was brought back on-line along with the Air Quality Control System.
- Certification testing on the Particulate Monitor and Hg sorbent trap system was completed.
- Performance testing of the Air Quality Control System was conducted the last week of May.
- Boiler tuning was completed, allowing the full operation of PGS at 100 MW.
- The steam inerting valve was repaired.
- The ID booster fan inlet damper linkages failed causing a forced outage for three days. New linkages were installed by plant maintenance staff and the unit was put back on-line. Plant staff did an excellent job getting the unit off-line, repairs made, and back on-line.
- A new water supply line was installed to the plant water room reverse osmosis units by plant maintenance staff. Another great job completed by plant staff. A new larger auxiliary water line was installed to supply more water to the reverse osmosis units.
- Operations spent a lot of time optimizing the scrubber system, making changes to keep the ash dry in the scrubber vessel and monitoring the amount of ash produced. The lime slurry feed rate was reduced to determine the effects on the system and found that the system is working better than expected.

- An additional power line was run to the top of the Spray Dry Absorber for a future hoist used to lift atomizers.
- The lime silo and activated carbon silos were completely emptied for inspection. Several contractors were scheduled and parts were purchased for the outage.
- Discharge ponds were cleaned, as sediment builds up from cleaning operations and the material must be removed to keep the capacity of the ponds. Sediment was tested and then sent to the City Landfill.
- A permit for the beneficial reuse of scrubber ash was obtained and a local farmer agreed to take the material to use on cropland. Scrubber ash has been shown to increase the yields of corn and soybeans.
- A project was started to have the wastewater that goes through the onsite waste treatment plant to be pumped to the City's Wastewater Plant. The onsite plant has served PGS for 33 years and is in need of repairs/replacement for continued service.
- The fall outage was completed at Platte Generating Station. Projects completed included:
  - New belts were installed on conveyors #1 and #3.
  - Rebuilt steam coil #4, and installed.
  - Stack heat trace system was installed.
  - SDA vessel inspection ports were installed.

Burdick Station

- The Burdick Outfall Ditch was cleaned out and a backflow system was installed to prevent water from the storm water channel from entering into the Burdick Water Collection System.
- GT-2 generator was inspected per FM Global requirements.
- Burdick Well #5 was pulled and inspected. It was decommissioned in November when the cost to renovate was too high.
- Crews worked with a contractor to troubleshoot GT-3 start issues. It was repaired after the unit would not start consistently.
- The mobile generating station was run at Rogers Pumping Station.
- In July the gas turbines ran to supply peaking power.
- Number six fuel oil is no longer used for Steam Units 1 – 3. Burdick operators and maintenance staff worked to move the oil to trucks to be sold in Texas. About half of the oil was sold.
- Steam Units #1 and #2 have been removed from operation and will no longer be marketed to sell power. These units have served Grand Island well in the past; however, a significant investment would need to be made to keep these units operational.
- Gas meters on Steam Unit #3 were removed and calibrated. One meter required repairs.
- Annual service was performed on the Mobile Generating Station.

Water System

- In January, the City Wellfield flooded from an ice jam. The water came up and flowed across the east end of the Wellfield, but no wells were damaged or were in danger from the rising water, however, there was some damage to the access roads. Staff used a drone to determine the extent of the flooding.
- Rogers Reservoir #2 was drained, cleaned and inspected for routine maintenance. Minor repairs were completed.
- Uranium removal system train #2 vessel and #1 lateral support was repaired.
- Media in train #2 of the Uranium Removal System was exchanged.
- Rogers Reservoir #1 was inspected.
- In June, flooding was occurring at the Wellfield. One road had water running over the top and there is still water in the low lying areas.

- Water Remediation Technology performed a backwash on the Uranium Removal System several times this year to maintain higher flows through the system.
- A contract to remove cedar trees from the Wellfield to restore the land back to prairie grass was started. The contract is for one year and will remove cedars from the eastern point.
- A flushing line was added to the WRT Building for future flushing and preparation for ice pigging the line from the wells to the WRT Building.
- A fence was added at Parkview Well #2.

Water Department

- The Water Department's major accomplishments this year were mainly focused on the Capital Avenue Widening Project. At the Capital and Broadwell Avenues intersection, the Water Department took on several water system improvement projects that one contractor was not getting completed:
  - A new 4" water service to Ashley Park
  - Replacing 6" water mains and line valves going North and South on Broadwell Avenue.
  - Completed the installation of a new 2" water service the United Veterans Club.
  - Two 18" line valves were installed along Capital Avenue.
  - A 6" line stop was installed on Broadwell Avenue to keep water customers' water flowing during numerous outages because of construction.
  - Two 6" valves and a fire hydrant were replaced at Capital and Huston Avenues.
  - A new fire hydrant was installed at Capital Avenue and Kruse Street.
  - There were multiple water mains damaged during the installation of the new sewer main along Capital Avenue and at St. Paul Road. Crews were busy isolating leaks, delivering materials for repairs, and working with the contractors to assure repairs were being done correctly.
- 228 new and replacement taps were made ranging in size from ¾" to 12" for various projects and plumbers throughout the City.
- 17 broken water mains were repaired
- 17 fire hydrants and nine valves were replaced by the Water Department.
- Normal system maintenance included:
  - Operating line valves and fire hydrants
  - Flushing dead end mains
  - Repairing or replacing 48 water meters
  - Placing and picking up 109 fire hydrant meters with backflow assemblies for contractors
  - Performing 2,980 locates that had been requested through Digger's Hotline of Nebraska
  - Painted 275 fire hydrants
  - Repaired or replaced 11 fire hydrants that had been hit by motor vehicles
  - Responded to 55 after hours trouble calls
  - Checked 4,934 fire hydrants for proper operation
  - Repaired 17 broken water mains – sized 2" though 12"

Backflow Program

2015 Backflow Prevention Device Testing Statistics:

- ✓ 4,179 First Notice reminders were mailed
- ✓ 887 Certified Letters Delivered
- ✓ 176 48 Hour Notices left at the door
- ✓ 36 Water Services shut off for failure to test

2015 Backflow Prevention Device Installation Statistics:

- ✓ 34 First Notices to require installation were mailed
- ✓ 16 Certified letters were delivered
- ✓ 6 48 Hour Notices were delivered at the door
- ✓ 0 Customers shut off due to non-compliance of backflow device installation

Transmission – Phelps Control Center

- Substation "J" was completed and placed into service. This substation incorporates new technologies as well as a storm hardened control building that will eventually act as a back-up center in the event that Phelps Control Center needs to be evacuated. This substation will help alleviate loading at "Substation "A" directly north and provide power to the Highway 281 corridor and Industrial Park.
- The Phelps Control Center warehouse was completed. This included a new electrical feed to Phelps Control Center and an automatic switch to a back-up source for both Phelps and the warehouse in the event of a failure of the primary source. All materials have been transferred from the old warehouse to the new warehouse. Inventory and organization in ongoing.
- New distribution protection relays have been purchased to replace aging relays throughout the system. These replacements will be installed as time permits.
- Load break switches were purchased and installed at several substations. These switches will allow the transformers to be removed from service without taking any transmission lines out of service. Due to increased regulation and advanced notification requirements, transmission outages require more planning which can be difficult to coordinate.
- Transmission relaying has been upgraded for Line 1062 between Substations "A" and "B". This leaves one line left to upgrade in order to have all line segments utilizing new digital relaying. The remaining line segment is planned for upgrades in early 2016.
- The west half of Phelps Control Center was remodeled. A new server room was constructed that will provide a single location for the various servers that operate at Phelps. In addition, a new conference room was constructed as well as new carpet and a new ceiling throughout. Additional remodeling will take place as time allows.
- A new communications tower was constructed immediately north of the new warehouse. Radio communications as well as AMI collector communications have been transferred to this tower.
- An intrusion detection pilot project was installed at the new Substation "J". This incorporates perimeter intrusion detectors in conjunction with security cameras to help secure the substation. If deemed effective, similar technology will be installed at the other substations.
- Black & Veatch completed the Electric System Master Plan. This plan evaluates the electric system's ability to provide for the City's needs for the next 20 years and provides recommendations for upgrades and improvements.
- A Power Purchase Agreement was signed with Invenergy for the entire 35.8 MW output of the Prairie Breeze III Wind Facility near Elgin, Nebraska. Separate Power Purchase Agreements were signed with Nebraska City and Neligh for 7 MW and 2 MW shares of this wind farm. The wind farm is expected to begin commercial operation early in 2016.
- One of the recommendations of the above mentioned Electric System Master Plan was the upgrade of Line 1064B between Substations "C" and "E". A detailed design package was completed and bids were received for the materials and construction. A contract with IES was awarded for this project. The upgrade is anticipated to be completed by June 2016.
- The old Substation "G" transformer that was replaced in 2014 due to potential failure concerns was sold for disposal and a new spare substation transformer was received. This transformer is sized in such a way that allows for the replacement of any substation distribution transformer in the system.
- An RFP was issued for a NERC compliance consultant. NERC compliance is required for Grand Island Utilities and is a constantly changing environment. Larger utilities typically have multiple people dedicated to this effort. A decision was made that an outside firm would be able to provide better oversite and guidance. A contract with Volkmann Consulting was approved late in 2015 to provide these services.
- Breaker H-1-1 in Substation "H" experienced a hail strike that caused the breaker to fail. This breaker is associated with Burdick Station Steam Unit #2. Since it was decided to retire this unit, breaker H-1-1 is no longer needed. Instead of repairing the breaker, plans are in place to

remove the breaker, modify the relaying and operate without it. This modification will most likely be completed in early 2016.

Underground Division

- Planned rebuilds were oftentimes integrated with service upgrades being done by customers. The combining of the two met the need of new customers and maintenance of the system. Under this combination, 37 transformers and 16 medium voltage terminals made up of 68 cable runs with 101 cable terminations were installed.
- Some notable projects in this classification were:
  - √ Diamond Plastics – 1212 Johnstown Road
  - √ Bosselman Contracting Services – 4705 Juergen Road
  - √ Engleman School – 1812 Mansfield Road
  - √ Fisher Fabrication – 3809 W. Old Potash Highway
  - √ Piccadilly Apartments – 3000 Block West Stolley Park Road
  - √ Lots 2108 and 2112 Brentwood Place
  - √ City Hall – 100 East 1st Street
  - √ VFW Club – 1914 W. Capital Avenue
  - √ French Village Apartments – 900 and 1000 Blocks of S. Greenwich
  - √ Principle Financial – 3025 W. College
  - √ Homestead Subdivision – 3000 Block Homestead Drive
  - √ Riverside Subdivision
  - √ Wells Fargo Bank – 3404 W. 13th Street
  - √ Stuhr Museum
  - √ Grand Island Mall Area
- New customer services required the installation of 78 transformers and 17 high voltage terminals that were made up of 131 cable runs and 299 cable terminations. Notable installations were:
  - √ Woodland Park Subdivision – Michigan, Idaho, Pennsylvania Avenue and Jersey Circle
  - √ Shoemaker School – 4200 Old Potash Highway
  - √ Feel Fit Fitness – 1002 N. Webb Road
  - √ Copper Creek Subdivision – Sunflower Circle, Lovegrass Drive, Indiangrass Road, Yarrow Drive and Aster Drive
  - √ Rainbow Lake – Rainbow Road
  - √ Five Points Bank Data Center – 3111 Stolley Park Road
  - √ Oseka Construction – 3000 N. Shady Bend Road
  - √ Leetch Residence – 168 E. Capital Avenue
  - √ Central Nebraska Regional Airport (Fixed Base Operations) – 3855 Sky Park Road
  - √ Central Nebraska Regional Airport – 3773 Skypark Road
  - √ Westgate Park 2nd Subdivision – Bronze Road, Silver Road and Westgate Road
  - √ Scooters Coffee – 3420 W. State Avenue
  - √ Taco Bell – 1911 N. Diers Avenue
  - √ Firehouse Subs – 3440 W. State Street
  - √ Northview 9th Subdivision – North Point Circle
  - √ Continental Gardens Apartments – 3111 College Street
  - √ Garland Cell Tower – 3004 S. Garland Street
  - √ Sterling Estates 4th Subdivision – Norseman Avenue and Sunrise Drive
  - √ Stuhr Cell Tower – 1203 S. Stuhr Road
  - √ Raising Canes – 1230 W. 13th Street
  - √ Hooker Brothers – 3840 and 3860 S. Locust Street
  - √ Wildcat Concrete Services – 3751 East U.S. Highway 34

- √ Von Ohlen Subdivision – Shady Bend Lane
- √ Starr School – 1800 S. Adams Street

- Transfer of existing overhead areas to underground was prompted to meet the needs of increased size of existing customer services; readying the system to allow for customer installation of underground services; reduce the needs of maintenance due to trees, and to deal with limited alley access. Installed during these projects were: 18 transformers, one high voltage terminal and 23 runs of cable, made up with 50 terminations. Projects under this classification were:
  - √ Lazy K Ranch – 5700 and 5900 Blocks of South Locust Street
  - √ Kingswood Estates – 2323 Bellwood Drive
  - √ 2700 and 2800 Blocks of South Blaine Street
  - √ Capital Avenue Project
  - √ Eddy Strip Building – 809 W. 5th Street
  - √ Dinsdale Dealerships
- Installed feeder capacity infrastructure:
  - √ Two switch cabinets
  - √ Five medium voltage terminals
  - √ 851 circuit feet of cable
  - √ 36 terminations
- Total cable footages installed during the year included:
  - √ Single Phase new: 25,184 ft.
  - √ Three Phase new: 14,767 circuit ft.
  - √ Single Phase replaced 9,448 ft.
  - √ Three Phase replaced 8,144 circuit ft.
- Inspected proposed excavations sites and completed documentation for 8,420 locates requested through Diggers Hotline of Nebraska. Of those requests, 4,010 required marking of underground facilities of either utility owned lines and/or customer owned secondary voltage lines up to the main distribution device.

Overhead Division

- In 2015 the Overhead Division maintained and upgraded the overhead distribution lines which entailed 3,215 linear feet of single phase line and 9,534 linear feet of 3-phase line being rebuilt. These upgrades eliminated old primary lines and secondary service wires to provide safer and more reliable service to utility customers and to keep the interruption indices (SAIDI) and (SAIFI) well below national averages.
- Crews converted 5,143 linear feet of single phase to 3-phase to allow for more switching alternatives and feeder ties in the distribution system.
- One of the main projects for the year was the relocation of the double circuit primary line on Capital Avenue. Fifty-four poles were replaced; 5,900 linear feet of new conductor and 11 new switches were installed along this corridor.
- Twenty-five 3-phase banks for dewatering were installed to aid in the installation of the North Interceptor project.
- Crews upgraded 3,000 linear feet of 3-phase primary at the Wellfield with new poles, shorter spans, and new conductor. This will help to eliminate any future issues on the line that feeds Wells 7, 8, and 13.
- As an ongoing effort to upgrade primary line switches, 38 tie switches were upgraded and arrestors were moved to adjacent poles.
- New switches were installed and capacitor banks and faulted circuit indicators were relocated on the seven new Substation “J” feeders.
- The Overhead Division continued efforts to keep vegetation clear of power lines in 2015. There were only six reported outages that were attributed to trees. This was accomplished

with the division's own Tree Trimming Crew and the use of a contractor clearing nine sections of lines and removing 186 trees.

- Line Crews installed or replaced 326 transformers and 10 capacitor banks. This has improved system reliability and power quality for utility customers as load continues to increase.
- The automated meter infrastructure pilot project continues to be a success. There are currently 169 water meters installed and 622 electric meters. The daily read percentage has been 99.8%. The system has been useful for meter readings, performing disconnects and troubleshooting for both water and electric. All monthly reads are being received remotely for both water and electric in Route 115.
- In 2015 LED lights were installed on the new West Faidley Avenue. Currently comparisons are being done between the LED lights vs. the 250 HPS equivalent. The LED lights are showing a 65% savings in kWH and a more consistent light output. Also, twenty-six 100 watt HPS lights were replaced with 45 watt LED lighting in the downtown parking ramp. See pictures below.

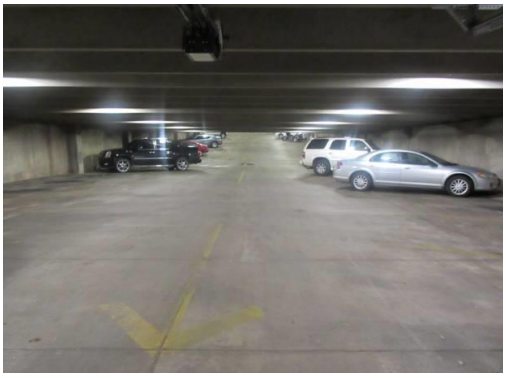
<u>Faidley Avenue</u>

250 watt HPS

110 watt LED

<u>Parking Ramp</u>

100 watt HPS



45 watt LED

Utility Warehouse Division

- The Utilities Storeroom quoted, purchased, received and stocked $1,703,348.94 worth of materials.
- During 2015, the Storeroom issued $2,426,127.94 worth of materials while salvaging, cleaning and restocking $587,784.75.
- Personnel pre-tested, sorted, documented and sold the obsolete and burned up transformers in May of 2015 which earned the Utilities Department $37,226.56.
- The Utilities Storeroom processed, weighed, stored and sold $89,638.85 worth of scrap aluminum, copper, electrical brass and ACSR wire.

Utilities Engineering Division

- The Utilities Engineering Division provides full engineering services, including:
  - Planning and design
  - GPS surveys and staking
  - GIS data
  - Construction inspection
  - Testing for electrical and water infrastructure projects
- In May, the Engineering Division relocated their offices to 1306 W. 3rd Street. The building was originally constructed in 1954 for the Southern Power District. After a variety of tenants and uses over the years, it is once again home for a Utility.
- Projects completed by the Engineering Division:
  - Drafting, editing or revising 412 CADD files and related database files
  - Prepared 37 easements and permit applications
  - Eight contracts and requests for proposals for department projects
  - Performed construction inspection and testing on 19 public and 13 commercial projects. The work involved installation of over 32,200 linear feet of new water lines and 6.1 miles of new power lines throughout the service area.
- The Hall County Public Works Department has recognized the proficiency of the Utilities Engineering Division's surveying capabilities. They have requested assistance in providing them with horizontal control data. From the Engineering Division's field work, over 1,200 data points using high-accuracy GPS are currently shared with the County. This process will continue on future surveys.