

# Utilities Department – Highlights for 2010

## Production Division:

- Platte Boiler Fan Motors

The boiler at Platte Generating Station requires a controlled supply of air in its combustion process. The forced draft fan (moves air into the boiler) works along with the induced draft fan (draws exhaust gases out of the boiler) to perform this process. These are large fans which require unique electric motors (1250 and 3000 horsepower, respectively) to drive each of them individually. These motors were original to plant construction and had been in constant service for 29 years. Should either of these motors failed, operation of the plant would not have been possible. Delivery times for new motors are six months, therefore, to avoid a possible extended forced outage of the unit, new replacement motors were purchased and installed. The cost of the new motors was \$350,000. The original motors will be refurbished and stored on the plant site as spares.

- Coal Operations Unloading Platform

Coal train unloading operations at Platte have been a major demand on the material handling staff in both time and harsh working conditions. Over the years, efforts have been made to automate more of the unloading process, including air-operated coal car doors and remote control of the locomotive. The year 2010 saw the completion of the Coal Operations Unloading Platform (COUP). The COUP is an enclosed control room overlooking the coal car unloading area. From this control room, a materials handler can perform all coal car unloading operations, including locomotive movement, car shaker, coal conveyor, and coal car door operations. The control room is environmentally controlled to minimize exposure to temperature extremes and coal dust for the operators and electronic control equipment. The structure and control systems for the COUP were designed by plant staff.

- Coal Storage Area Expansion

The coal storage area at Platte Generating Station is comprised of two storage areas, active and long-term. The active storage pile is for short-term storage of coal before it is conveyed to the plant for use as boiler fuel. The long-term storage area provides a fuel reserve for disruptions in coal deliveries. To prevent spontaneous combustion of the coal, long-term storage requires the coal to be compacted in order to reduce air cavities. This compaction is performed by systematically placing the coal in shallow lifts in a specific pattern so that the action of the heavy dozers driving over the coal achieves sufficient compaction to prevent spontaneous combustion. The geometry of the pile should not exceed a 4 to 1 (horizontal to vertical) slope to allow safe operation of the side slopes. Slopes exceeding this ratio increase the hazard of coal dozers roll over. Since plant start-up in 1982, Platte has experienced several interruptions in coal delivery. In two of those instances, coal inventory was severely reduced to a couple of weeks. Coal-fueled plants normally plan for 45 to 60 days of long-term coal storage. As the City has grown, so has its electric usage and so has the volume of coal required in long-term storage. Because of the original storage

area footprint at Platte, maintaining this inventory level required a very steep side slope ratio of 1 to 2. As a result, the storage area was filled substantially above design capacity. To correct this issue, plant engineering staff developed plans and specifications to increase the size of the long term coal storage area. The increased storage capacity provides more area and a favorable geometry to maintain the coal pile and allowed increasing storage. The project included expansion of the original long-term coal storage area, and required relocation of a 12" fire protection water main and installation of a clay liner seal under the active storage area. The coal storage area expansion was completed at a cost of \$270,000.

- Burdick Controls Computer Upgrade

In 1997, the burner management controls for Burdick Units 1 and 2 and the plant controls for Unit 3 were replaced with a digital control system. This digital control system included personal computers as the operator interfaces. The personal computers utilized Windows 95 as their operating systems. Windows 95 is an obsolete operating system and replacement of a failed workstation was no longer supported. To allow further use of this system, the workstations were upgraded to Windows XP operating systems and the computers, software and graphics that interface with the control system were replaced. The computer upgrade project was completed at a cost of \$225,000.

### **Phelps Control & Dispatch:**

- St. Libory Transmission Loop

The Utilities Department is in the process of constructing a new 115 kV transmission line to the northwest of the City. This line will connect Substation F located on Capital Avenue with a new St. Libory Junction Substation owned by Nebraska Public Power District (NPPD) located along Engleman Road north of Chapman Road. Easements for this new line have been acquired and surveying has begun. NPPD substation site preparation has been completed with construction plans set for 2011.

- Substation J

Preparations and equipment acquisition began for Substation J to be located in the northwest corner of the Platte Generating Station property. Substation transformers are ordered with plans to contract dirt work and foundations in early 2011.

- Substation and Transformer Maintenance

Load Tap Changer (LTC) maintenance was completed in 2010. LTC maintenance is performed every seven to eight years. This is a complex process that requires removing the transformer from service, draining the oil and opening up the LTC compartment. A thorough cleaning and inspection is performed. Replacement of certain parts may be required as well.

- Transmission Breaker and Relay Testing

In order to comply with federal standards, all transmission breakers and associated protective relays were tested to ensure proper operation. A total of 46 breakers and 106 relays were tested throughout the year. Testing intervals range from five to ten years depending on the type of equipment.

- Phelps Control Center Site Security

With security becoming more critical in the power industry, a decision was made to improve the security of Phelps Control center (PCC). A chain link fence and card reader system were already in place to limit vehicle access to the site. Since PCC is manned 24 hours a day, card readers and electronic locks were added to the building doors to limit foot traffic to authorized personnel only and improve safety for the employees.

### **Water Division:**

- The Water Division handles all of the maintenance issues of maintaining a water system, parts of which are over 100 years old. Monitoring the quality of the water delivered to our customers requires over 800 samples to be taken and sent for analysis.
- The ability to use the system when needed is of prime importance. This requires continuous valve operation, hydrant checking, hydrant painting, and replacing of outdated hydrants. The shape of the system is of prime importance to fighting fires and retaining a good insurance rating. That rating affects all properties in Grand Island.
- The system had a small part upgraded along 6<sup>th</sup> Street this year by replacing a 4" line with a new 8" line and providing four times the amount of water to the area. Overall maintenance included repairing 21 broken mains, replacing seven valves, and upgrading 13 fire hydrants.

### **Construction & Engineering Division:**

- The Utilities Engineering Division provides civil engineering services for new and existing private developments, outside agencies, and other City Departments. Projects the division was involved with during calendar year 2010 included over 45,100 feet of high voltage power line improvements and approximately 30,800 linear feet of water system construction, to serve 22 commercial developments and 12 new subdivisions. Some of the major projects included:
- During the Spring, construction was finished on the public water main for the Nebraska State Fair located at Fonner Park. Approximately 4,100 lf. of 12" main was installed. Additionally, the related potable and fire protection service lines for the Agriculture Arena, Swine Building, Exhibition Buildings 1 and 3, and the new RV Park were completed.
- In May, Van Kirk Brothers Contraction of Sutton, Nebraska, completed installation of over 15,00 lf of 12" and 16" diameter water main. The project provides City water to the Village of Alda. The construction was done as a joint agreement between the City, the Village, and the U.S. Department of Agriculture, Rural Development.
- During the summer, the Division was part of an inter-departmental committee to develop a proposal and recommend antivirus software for use on all City computers. In accordance with the RFP, a three year agreement was awarded to Avast Software as the City's security solution.
- Late this Fall, the Division took the lead on a joint endeavor between the City's IT and Utilities Departments to install a fiber optics network to several division

buildings. The project installed a 48 fiber OPGW and ADSS aerial cable between City Hall, the Water Department, and the Electric Line Department. The project also provided the final high-speed network link for the Street Department, Shop/Garage, and Electric Underground division buildings.

### **Overhead Distribution:**

- The Overhead Division was confronted with rebuilding and maintaining overhead electrical lines. Tree trimming and the removal of 62 trees was a major part. This entailed working with four different contractors on 15 different sections of GIUD service area.
- The Overhead Division's crews rebuilt one mile of double circuit line on Blaine Street, and two miles of three phase line on Webb Road and Abbott Road. These improvements will benefit the future addition of Substation E, and system reliability.
- The past year our line crews installed and replaced 284 transformers and 136 capacitors. The replacement of the transformers improves system reliability. By adding and moving the capacitors, power quality in our service area was greatly improved.
- The Overhead Division upgraded the electrical lines in the alleys between 14<sup>th</sup> and 15<sup>th</sup> Streets from Pine Street to Broadwell Avenue, and between 5<sup>th</sup> and 6<sup>th</sup> Streets from Clark Street to Wheeler Street, and between 13<sup>th</sup> and 14<sup>th</sup> Streets from Broadwell Avenue to Wheeler Street. This upgrade eliminated old service wires and distributed the electrical load to provide better service to customers.

### **Underground Distribution:**

- As in years past, the majority of time and effort was spent on keeping up with the needs of projects requiring new or upsized electrical services. Projects such as finishing up last minute needs for the State Fair along with the new Veterans Park Ball Field Complex, to strip malls and apartment buildings. Hornady Manufacturing Company's most recent expansion was responsible for a loop feed being installed back to Claude Road. Goodwill Industries expanded with construction of a new building which included the conversion of several sections of overhead conductors to underground, providing easier truck access to two of their buildings and increased roof clearances on a third. New residential construction remained constant with additional development taking place in the northwest area of town in the Woodland Park and Sterling Estates Subdivisions.
- As new construction takes place alongside of existing areas, the Underground Division attempts to get a double benefit by rebuilding or upgrading adjoining portions of the system. That was the case with a development along East Bismark Road. The newly subdivided lots abutted the existing Ravenwood Subdivision area along three sides. The timing of this development and subsequent rebuild took advantage of temporary easier access to existing rear easements.
- The Underground Division, as all other City Departments, is attempting to best deal with budget constraints while continuing to provide excellent customer

service. The division is to maintain, if not increase safety and services, while being limited by budget constraints. Through this, we continue to strive for greater efficiency by extending the working life of equipment, and subcontracting portions of less technical work. Staff continues to increase their use of computers to efficiently organize information and data. A greater emphasis is being placed on performing documented field inspections in order to follow-up with organized repair and maintenance. Tracking and monitoring of the system are done with the intent to locate system failures that could lead to outages. Our priority is to provide safe, reliable electricity and to improve the outward physical appearance of various components of the system.