

# Utilities Department – Highlights for 2009

## **Production Division:**

- Rogers Reservoir #2

The Master Plan for the water system developed by the Utilities Department and our consultant, CH2MHill, in 2000 showed a need to increase the pumping capacity of the Rogers Pumping Station at Old Potash Highway and North Road to provide for increasing development in the northwest area of Grand Island. The recommended improvements have been made over the last nine years as budgets allowed. This included the replacement of a low service pump at the Platte River Pumping Station in 2003 and the addition of a new pump at the Rogers Pumping Station in 2005. The capacity expansion was completed with the addition of a second 3.5 million gallon reservoir; Rogers Reservoir 2. This project began with engineering in February, 2008, with construction starting in the following September. This reservoir was constructed of concrete instead of steel, as had been used in the past for other city reservoirs. Market conditions at the time of the bid favored the use of concrete, which should also allow significant future cost savings due to reduced maintenance compared to steel tanks. The total project cost for the new reservoir was \$1,500,000.

The second reservoir was placed in service in December, 2009. The completion of this large capital improvement represents a major step in completing the needed system improvements identified nearly nine years ago in the Master Plan.

- Cooling Tower at Burdick Station

The #3 steam generating unit at the Burdick Station Power Plant utilized a wooden structure cooling tower that was built in 1969. The tower lasted 38 years and was a survivor of the 1980 tornados, sustaining an indirect hit. The generating unit cooled by that tower was on-line at the time, and remained on-line for several days as power was slowly restored. The fan cylinder cones at the top of the tower were completely destroyed, and the tower structure received severe damage, including some damage that was not discovered until several months later. After tornado damage repair and nearly 40 years of weather exposure, the tower was no longer structurally sound. It was leaning to the south about five degrees from vertical and structural consultants advised that it was in danger of collapsing. Normal life expectancy for a wood cooling tower is 25-30 years. In order to maintain reliability of this generating unit, the cooling tower was replaced in May for a cost of about \$1,300,000. The new tower is made of an improved design of fiberglass and PVC plastic construction.

- Coal Storage Area at Platte Generating Station:

The coal storage area at Platte Generating Station is comprised of two storage piles. The active storage pile is for short-term storage of coal before it is conveyed to the plant for use as boiler fuel. The inactive storage pile is for long-term storage of coal as a 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 the use of heavy, rubber-tired dozers driving over the coal. The geometry of the pile should not exceed a 4 to 1 (horizontal to vertical) slope to allow safe compaction of the side slopes. Slopes exceeding this ratio increase the hazard of the coal dozers to tip over. Coal-fueled plants normally plan for 45 to 60 days of long-term coal storage. Because of the storage area footprint at Platte, maintaining this inventory level requires a side slope ratio of 1 to 2. As a result, the current coal storage area was filled to twice the recommended capacity. To correct this issue, plant engineering staff developed plans and specifications to increase the inactive storage area. The increased storage capacity provides more area and a favorable geometry to maintain the coal pile to lower the risk of hot spots occurring, and allows for the ability to increase the coal reserve up to 90 days. Increasing this coal storage capacity required the movement of the 12" fire water main loop, installing a clay liner, and adding a clay liner under an area that is currently used for short-term coal storage. This project was completed in October for a cost of about \$220,000.

- Gas Turbine at Burdick Station

For much of the past year, GT-1, a 15 megawatt gas turbine at Burdick Station, has been in an "emergency use only" status due to high vibration levels on the generator. GT-1 was the only City generating unit that could be started upon a loss of power to the electric system, and removing it from service to perform corrective action was not recommended as it would leave the City without an emergency power source to start other generating units. With the purchase of a new 1.5 megawatt trailer-mounted diesel generator in October of this year for \$650,000, another emergency power source was now available and repairs to GT-1 were initiated. The GT-1 generator rotor was removed and shipped to a generator repair facility where it was disassembled, cleaned, reassembled, and balanced. In addition, the generator stator windings were cleaned with a specialized high pressure process using dry ice. The generator was reassembled in November and the vibration levels were reduced by half of the previous levels to allow the unit to be placed back into normal service. The total cost of the generator overhaul was \$100,000.

- Cooling Tower at Platte Generating Station

The Platte Generating Station completed the third and final phase of rebuilding the plant's cooling tower. The cooling tower is comprised of wooden structural members and decking and fiberglass louvers and fill material. This project was planned over three years to level annual costs and to minimize plant outage time. The last phase began in September of this year and construction finished in the first week of December, three weeks ahead of the contract schedule for a final price of about \$1,200,000. During the construction, plant generation was limited to 90% of full capacity.

## **Phelps Control & Dispatch:**

- St. Libory Transmission Loop

With the completion of a Transmission Study in 2007 followed by a presentation given to Council in early 2008, the recommended projects began to take shape.

One project that officially began in 2009 was the planning and design of a new transmission line to connect Substation F along Capital Avenue just west of Highway 281 with Nebraska Public Power District's Saint Libory Junction along Engleman Road north of Chapman Road. Approval has been given to begin easement acquisition and negotiations with land owners will begin early in 2010. Estimated completion of this project is mid 2012.

- Substation J

In addition to the new transmission line to the northwest of the City, a new substation began the planning and design phases during 2009. Substation J will be located on the northwest corner of the Platte Generating Station property at the corner of Wildwood and Blaine. This substation will help to serve a growing Industrial Park load along Highway 281. A preliminary layout has been developed as well as specifications for various components such as construction, electrical circuit breakers and transformers.

- Substation and Transformer Maintenance

The Utilities Department completed a significant portion of a substation transformer maintenance project. Included in this project are items such as bushing replacement, oil leak repairs, re-painting and load tap changer maintenance. Several older bushings with industry known problems were replaced and all substation transformers were re-painted. This new paint is anticipated to last fifteen to twenty years. Four out of twelve transformers have had load tap changer maintenance performed which requires replacement of some internal components. The remaining transformers are planned during 2010.

- Nebraska City Unit #2

The Utilities Department began receiving power from Omaha Public Power District's new Nebraska City Unit #2 Power Plant in May. This is under an agreement for five percent of the plant's output or 33 MW. Dispatching this capacity over the regional transmission grid created numerous challenges and a steep learning curve for the power dispatchers, with expected first year operating issues and integration with GI generation. The process has become fairly routine as of the end of 2009.

## Water Division:

- When the water service to the Grand Island Daily Independent at 422 West 1<sup>st</sup> Street broke in July, 2009, it became evident that the valves in the area used to isolate sections of water main were not operating properly. Upon further investigation, it was discovered that a total of six line valves originally installed in 1933 on 1<sup>st</sup> Street between Greenwich Street and Locust Street, and on Cedar Street Between 3<sup>rd</sup> Street and Division Street varying in size from 6" to 12" were not holding, and needed to be replaced. All six valves were replaced with the strategic use of line stopping equipment and functioning downstream valves to help keep outages to a minimum. A fire hydrant was also updated and relocated at 1<sup>st</sup> and Greenwich Street. This work was performed by the City Water Department while coordinating with the City Street Department, as they were milling and asphalt overlaying the streets in the same area. The project took

three weeks to complete and was a major improvement to the City water system in the area.

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

- The Utilities Engineering Division provides a full range of services, including surveying, design, computer aided drafting, global positioning systems, graphic information systems, construction management, system mapping and web design.
- The Division was involved with all new and existing development providing engineering services and acting as a liaison between other City Departments, outside agencies, and the public for electric and water infrastructure activities. The Division worked on over 71,000 feet of high voltage power line improvements, 9,000 lf of water system construction, and 15 commercial developments.
- During calendar year 2009, the [www.grand-island.com](http://www.grand-island.com) web site was entirely re-developed. The Utilities Engineering Division's GIS Coordinator took the lead in redesigning and coordinating the project. This included working with the City's committee in preparing the RFP; conducting vendor interviews, evaluations and selection; and extensive months long work in transforming the City's web site to a modern integrated product. The site can now be easily updated and maintained by the various City Divisions. This allows them to add content, and maintain current and pertinent data on their pages for use by the public and City staff.

### **Overhead Distribution:**

- The Overhead Division is tasked with rebuilding and maintaining overhead electrical lines. Tree trimming is a major part of maintaining the system. This entailed four different contractors working on 22 sections of line and removal of 67 trees.
- Poles were replaced and an electric conductor was upgraded to T-2- 4/0 ACSR in many rural areas including Stuhr Road, Schimmer Drive, Hwy. 34 and Shady Bend. The new T-2 wire is used to prevent the "galloping" caused by high winds that tear pole lines apart.
- In the City alleys, lines were reconstructed from Walnut Street to Plum Street between 17<sup>th</sup> and 18<sup>th</sup> Street, and between 13<sup>th</sup> and 14<sup>th</sup> Street from Locust Street to Vine Street. Over eight miles of three-phase lines were upgraded.

### **Underground Distribution:**

- New construction projects were very consistent throughout the year. Developments such as the State Fair, Woodland Park, Sterling Estates, three new hotels, and many more projects that were being built with extremely limited timelines. Design and construction of buildings and infrastructure that normally run consecutively in an organized fashion ended up being done simultaneously. This resulted in a very limited time in which to complete both temporary and permanent power systems and orchestrate it with site development.

- The Underground Electric Division coordinated several rebuild projects with the upgrading or maintenance needs of customers. The largest of which was Colonial Estates, with 306 customer accounts. In addition, the Underground Division was able to coordinate outages with the Central Nebraska Regional Airport and two blocks of Downtown along West 2<sup>nd</sup> Street. This included Ron Trampe Accounting and the New Life Community Church in the 300 block, and the Relax Inn in the 500 block. Coordination of projects benefits both parties in limited outage times, increased capacities, and improved reliability.
- The Underground Division continued to provide support staff and equipment to help meet the needs of other departments and divisions. This included providing assistance to Platte Generating Station as needed for cooling tower and conveyor maintenance and repair. At Burdick Station, the Underground Division assisted with the means of connection to a large portable generator to facilitate a tie-in to the City's distribution grid in order to provide emergency power for black start capability in case of a total system failure.