

Keeping up with new regs; Marion makes water treatment plant improvements

The city of Marion is located on the western slope of the Flint Hills near the center of Marion County on Highway 56. Marion is a community of 2,000 residents conveniently located in the “Golden Triangle” of central Kansas formed by the cities of Wichita, Salina, and Topeka. The city advertises itself as the “The Town Between Two Lakes,” Marion County Lake and Marion Reservoir. Marion County Lake, 153 acres in size, is less than five minutes east of town. Marion Reservoir is a federal facility located 10 minutes west of town, between the cities of Marion and Hillsboro, and serves as the water supply for both cities.

Marion Reservoir, which was authorized by the Flood Control Act of 1950, is situated in the Cottonwood River valley in Marion County. The project was designed and built as a flood control project under the supervision of the Tulsa District, US Army Corps of Engineers and

was completed in 1968. Marion Reservoir encompasses 6,200 acres of water surface surrounded by 6,000 acres of public lands.

History

The Marion Water Works Company, chartered February 22, 1887, was authorized by the city to supply Marion with water for the non-drinking purposes of fire fighting and filling livestock water

tanks. Drinking water at the time was obtained from the river, cisterns, or private wells. By 1904, a water system was well established and by 1928, the first

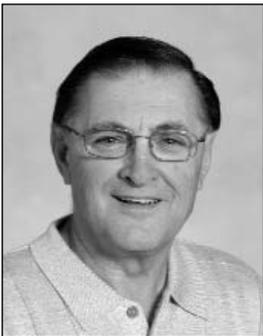
locally as Luta Creek), which meanders through town. This source of water was used until 1981 when the opportunity to obtain water from Marion

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water treatment plant was completed. This plant was used until 1964 when the current plant was constructed.

Water was obtained via an intake on Mud Creek (also known

Reservoir became available. The city took advantage of this opportunity and installed a 12-inch line from the reservoir. Raw water gravity flows to the water plant at a rate of 670 gpm. With



Bert Zerr
Consultant



The Marion city sign at the edge of town welcomes travelers and advertises the city with the slogan, “The Town Between Two Lakes.”



Far Left: Operator Marty Fredrickson checks a control on the plant's liquid oxygen storage tank. Ozone is generated from the liquid oxygen.



Left: The machine pictured is one of two Mitsubishi ozone generators in use at the water plant.

the improved raw water quality from the reservoir, the water treatment plant performed adequately for a number of years. However, in 2000, the treatment plant was upgraded to comply with new drinking water standards. These upgrades included online turbidity monitoring, construction of a 200,000 gallon clearwell, and automated pumping devices. With the implementation of additional drinking water standards, it was evident the plant would no longer be capable of treating water to meet standards. It was obvious at this point that changes or upgrades were needed and city officials needed to decide on a course of action.

What course of action?

The consulting engineering firm of Bucher, Willis, and Ratliff, Salina, Kansas was hired to look into various options to achieve compliance. A proposal was presented to the city, which included extensive upgrades and since the city of Hillsboro also obtained water from Marion Reservoir, the funding agency, USDA Rural Development, with concurrence from EPA and KDHE, specified that Marion and Hillsboro investigate the

possibility of joining forces. As a result, arrangements were made between KDHE, Marion, and Hillsboro to hire another consulting engineer to look into various options to allow both cities to comply with drinking water regulations. The options included forming a wholesale water district, which would sell water to both cities or upgrading

one of the existing plants to serve both cities.

According to David Mayfield, Marion City Administrator, "The estimated cost for a project to join forces was about \$7 million, an amount we considered too expensive to pursue." Each city then moved forward with their own upgrade project, (see the

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The blower unit above was installed to operate the air scourer system at the filters.

November 2006 issue of *The Kansas Lifeline* for an article on the Hillsboro project).

The most significant improvement to this plant is the

addition of ozone generators. It was decided to utilize the ozonation process as the primary disinfectant for effective control of bacteria, viruses, Giardia and Cryptosporidium. Another benefit of ozone, which was a major issue

change order to install additional online monitoring equipment in the main plant building to allow operators to monitor the ozone level from the plant site.

Other improvements include an aluminum cover for the two-

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in choosing this process was taste and odor control. Ozone treatment has the added advantage of removing compounds that cause earthy and musty tastes and odors due to the algae that grow in the lake. This part of the project included two Mitsubishi ozone generators, liquid oxygen storage tank, ozone detectors in the buildings and online monitoring equipment in the ozonation building. The city has submitted a

stage rectangular sedimentation basin to control algae growth in the basin; filter to waste pump and pipeline to ensure compliance with turbidity requirements; installation of a standby generator sized to power the entire plant; and rehabilitation of the three existing filters. New filter control valves, underdrain piping, media, and air scourer will be provided in the filters. The top layer of media in two of the filters will be anthracite and the third filter will have granular activated carbon (GAC) as the top layer.

The city obtained \$1,840,000 from USDA Rural Development to fund this project. The grant amount was \$500,000; the loan was \$1,340,000.

“Monthly customer user charges are \$24.00 minimum for the first 1,000 gallons plus \$2.50 per thousand gallons thereafter,” Mayfield said. “City officials made a decision to increase customer fees a few years back to prepare for this project.” Current water production at the plant is about 0.320 MGD. Plant design capacity is 1.0 MGD.

The contractor on this project is Walters Morgan, Manhattan, Kansas.

“Operating staff are looking forward to this project being completed as they are currently in

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This is a view of the filters and filter control panel. The filters are being rehabilitated.



Pictured above is a view of online turbidity monitoring equipment installed as part of the 2000 upgrade project.

the process of the filter upgrades. Plans are to have the filter rehabilitation project completed by mid-September. All other improvements have been completed," Water and Street Superintendent Marty Fredrickson explained. He also noted, "I am especially pleased that we will no

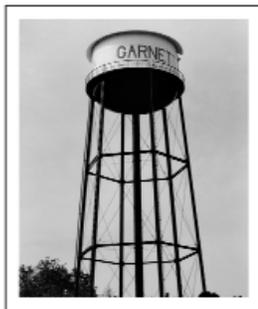
longer be feeding powdered activated carbon to control taste and odor."

Fredrickson and the other operators were in agreement that customers appear to be very satisfied with the water and there have been no taste and odor complaints since the change was made to ozone as the primary

disinfectant. Combined chlorine (chlorine combined with ammonia) continues to be used as the maintenance residual (safety chlorination) in the distribution system.

Congratulations to the City of Marion on the improvement project.

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