

Valley Falls plant improvements to meet regs and add capacity

The city of Valley Falls in northwestern Jefferson County about 35 miles west of Leavenworth is working to ensure the city's water treatment complies with new Safe Drinking Water Act (SDWA) regulations. In 2003 the city's engineer completed a study to determine needed plant improvements to increase plant capacity and meet the state and federal regulations. The city then decided to make these improvements in three phases for financial reasons.

Valley Falls' current water supply source is the Delaware River just north of the plant. Water also is provided from springs located northeast of this city of 1,256 persons. Due to low flow in the Delaware River, the city installed a low water dam approximately 500 feet downstream from the water intake to pool water during drought conditions.

Water from the river and springs is pumped to a 3-million gallon impoundment near the plant. The impoundment provides pre-sedimentation and storage prior to treatment. The plant is a clarification plant. Treatment consists of rapid mix, slow mix, sedimentation, and filtration. The plant has a 500,000-gallon clearwell.

The city currently has 516 meters and has experienced a water loss around 20 percent in past years. For the past several years the

city of Valley Falls has implemented a meter replacement program to replace all the service meters.

The city originally used groundwater as its source for drinking water. The wellfield was

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The city's consultant is in the process of evaluating the options of increasing the plant flow rate from 220 GPM to 300 GPM. This would shorten the average run time of the treatment plant from 12 hours a day to eight hours a day.

abandoned when the surface water plant was constructed.

Phase I work

Phase I of the plant improvements has been completed. The work under Phase I was focused on trying to help



*Lonnie Boller
Surface Water Tech*



KRWA Surface Water Tech Lonnie Boller and Valley Falls City Administrator Bret Frakes look over some of the plans for the new city water treatment plant improvements.

the plant meet disinfection by-products requirements. The Phase I improvements include:

- Moving the primary chlorine feed point from the rapid mix basin to the inlet pipe into the sedimentation basin
- Addition of an online free chlorine analyzer and sample pump at the sedimentation basin effluent
- Addition of a second chlorine feed point at the filter influent line
- Addition of a second online free chlorine analyzer on the filter influent line after the second chlorine feed point
- Moving the ammonia feed point to the filter influent line after the second chlorine feed point and online chlorine analyzer
- Addition of an online total chlorine analyzer on the filter effluent line
- Addition of an online total chlorine analyzer on the high service pump discharge line

- Purchasing a scale for dual, 150 pound chlorine cylinders and an automatic switchover device for the chlorine cylinders
- Addition of controls to automatically shut the water plant down in the event of low chlorine residual

- Addition of a potassium permanganate chemical feed system to oxidize iron and manganese in the water being pumped from the impoundment to the treatment plant.

Operation changes were to include feeding powdered activated



This photo shows the existing water treatment plant in Valley Falls. The city is planning for major improvements to meet SDWA regs and add some capacity.



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carbon only for taste and odor problems in the water that were not oxidized by the addition of potassium permanganate. Also the sedimentation basin is scheduled to be cleaned every one or two months based on keeping the sludge buildup to less than 18 inches.

The cost of the Phase I improvements was \$76,000. These improvements have brought the city into compliance with the Disinfection Byproducts Rule.

Phase II work

The city is currently working on Phase II of the project which includes the construction of a chlorine contact basin. This basin will allow the operators to control and adjust the free chlorine reaction time before the ammonia is added. This will allow for further reduction of the disinfection byproducts levels in the water.

The Phase II improvements also include:

- Repair river intake
- Add an additional, backup river intake pump
- Clean, inspect, and repair the clearwell
- New impoundment reservoir pumps
- Rehabilitate concrete sedimentation basin
- Replace existing flocculators
- Replace existing rapid mix units
- Filter-to-waste piping on filters
- Replace yard piping
- Electrical and SCADA upgrade
- Site work
- Sludge lagoon cleaning and storage

The cost of Phase II is estimated to be \$681,000.

Phase III considerations

In the future the city will be considering a Phase III project. The city will evaluate a

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groundwater source that should be beneficial in droughts that result in low river water levels. When the city implements the Phase III improvements, the plan is to process the well water through the water treatment plant. This will help oxidize/remove iron and manganese in the well water. Also, the well water will make the treatment plant operate better due to reduced temperature effects on chemical reactions. The addition of well water may also help reduce unit operational costs for the present surface water plant. Phase III has an estimated cost of \$2,085,400.

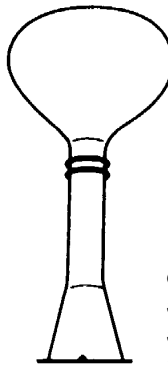
The consultant for the city is The Larkin Group, Kansas City, Mo. Financing for the Phase I improvements was made from the city's internal funds. The city is seeking funding from both USDA Rural Development and the Kansas Public Water Supply Loan Fund for Phase II and III.



To reduce costs, the city of Valley Falls employees constructed a building at the water impoundment to house the potassium permanganate chemical feed system and the low service pumps. They also intend to construct a building separate from the plant for the activated carbon feed equipment. This will help control the carbon dust problem they are presently experiencing in the plant. Operator Shannon Shields is shown outside the potassium permanganate building.

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