



P.O. Box 226 • Seneca, KS 66538 • 785/336-3760  
FAX 785/336-2751 • <http://www.krwa.net>

March 8, 2010

City Commission  
% Lynne Ladner, Administrator  
City of Hiawatha  
723 Oregon  
Hiawatha, Kansas 66434

Re: Water Supply Operations

Dear Lynne,

I wish to thank Rick, Dave and you for the opportunity to visit and discuss water supply operations on March 5 with Rita Clary, Jeff Lamfers, and me. The main topic of discussion was the nitrate levels in the city drinking water.

The city's consulting engineer's report has estimated the capital cost of providing nitrate reduction at \$12 million for a reverse osmosis treatment facility. The engineer estimates that the yearly operation and maintenance cost would be \$489,000 for the reverse osmosis facility.

In a subsequent letter, the engineer now is apparently proposing to further evaluate an ion-exchange treatment facility and provide updated costs. The cost of the ion-exchange facility with a conventional softening plant ahead of the ion-exchange treatment units was estimated in the engineer's report.

The following confirms some of my comments made during our meeting as to what the city needs to consider in choosing how to address the nitrate levels in the drinking water.

The estimated capital costs and operation / maintenance costs are substantial. Both these costs are based on two assumptions that need to be carefully considered by the city.

First, the estimated costs are based on assumed future water sales that are not certain. The projected water needs for 2020 included 150 MGY for a biodiesel plant, 50 MGY for a pre-cast concrete plant, 65 MGY for Brown RWD #2 and 38 MGY the future RWD #3. Thus, out of a total projected 536 MGY for 2020, the estimated costs include a total of 303 MGY of assumed water sales that are not certain. As you know, the city's contract with Brown RWD #2 and the upcoming test drilling of RWD #2 make even this present customer uncertain for the future.

Secondly, the estimated costs are based on the assumed need to reduce hardness. In the cost estimate in the engineer's report for an ion-exchange treatment facility, this assumption results in the construction of a conventional

softening plant prior to the ion-exchange treatment units. This softening plant in itself has considerable capital costs and operation and maintenance costs. The ion-exchange facility also results in four separate pumping arrangements in sequence to move the water from the well to the city's customers.

The city's well water has a total approximately hardness of 220 to 250 mg/l and total dissolved solids around 310 to 360 mg/l, according to the engineer's report. These levels of hardness and total dissolved solids are not high by Kansas well water standards. In comparison, locally, the city of Horton well water has a total hardness around 240 to 280 mg/l and total dissolved solids around 380 to 430 mg/l. The city of Marysville has a total hardness around 240 to 280 mg/l and total dissolved solids around 380 mg/l.

The assumed future water sales and the assumed need to reduce hardness have a considerable effect on any treatment plant sizing and costs. The city should carefully evaluate these assumptions.

In reference to water sales, the treatment facility could be constructed in phases so that additional treatment capacity is constructed only when the future water sales are certain. Also, the first stage construction can be quite flexible in that the hours of operation and blending of well water can be varied without a large, treatment plant peaking capacity. This flexibility is possible because the city presently has considerable water storage capacity at the north wells and in elevated storage. The north wells are presently in compliance with regulated drinking water standards. .

If reference to hardness reduction, considerable capital costs and operation / maintenance costs could be saved by not reducing the total hardness. Other Kansas well water suppliers are presently in the process of adding treatment to remove nitrate without the additional treatment needed to reduce hardness. The decision to not provide hardness reduction will save considerable monies.

At the February 5 meeting I attended, the city provided data that showed essentially the south wells having nitrate levels out of compliance with regulated maximum contaminant level (MCL) of 10 mg/l and that the north wells had nitrate levels in the range of 9 to 10 mg/l but below the MCL, generally.

The city is also concerned about using the south wells in order to keep the water rights to these south wells. KRWA will evaluate the south wells' water rights to determine how the water rights can be retained without the use of these wells as a drinking water source. The south wells could be held only for emergency operation and thus cause the city drinking water to be below the MCL for nitrates.

The present north city wells have considerable capacity to meet the city needs. If not, an additional, north well could be constructed. If the city carefully monitors the nitrate levels in each of the north wells, then the blending of any north well whose nitrate level increases could be blended with wells with lower nitrate levels to meet the MCL for nitrate in the drinking water.

Without knowing the source(s) of the nitrates in the water of the north wells, the future nitrate levels cannot be predicted. There is a natural background level of nitrate and there is probably nitrate from agricultural use. The city's limited, recent history of the nitrate levels in the north wells suggest that the blending of the wells, the pumping rate of the wells, and the water table may all have an effect on the drinking level of nitrates. Optimistically, the north wells may be able to be operated many years without nitrate violations. Pessimistically, a nitrate removal facility may be needed at the north wells sometime in the future.

The city's decision on what to do in the matter of nitrates in the drinking water is complicated as there are many factors to consider and significant costs involved. The above comments only partially address these factors. It appears that the future sales or non-sales to RWD #2 is one major factor that the city may not be able to control.

I hope the above comments are helpful. I am willing to discuss the matter further if the city should so choose. The above comments are made to hopefully give some perspective and options to the city. The comments do not state my opinion on what the city should do.

If you wish to further discuss the nitrate issue or any matters pertaining to the water supply system, please contact me through the KRWA office at 785.336.3760 or call me directly on my cell at 785.640.9427.

The above assistance was provided through a contractual arrangement between the Kansas Dept. of Health & Environment (State Revolving Loan Program set-aside) and KRWA. Also, visit the KRWA website [www.krwa.net](http://www.krwa.net) for news and information concerning water and wastewater utilities, training opportunities and other KRWA programs.

Respectfully,

S. Patrick McCool, P.E.  
KRWA Consultant

C: Helen Holm, KDHE