



HANNIBAL BOARD OF PUBLIC WORKS

ELECTRIC, WATER AND WASTEWATER

3 INDUSTRIAL LOOP DRIVE
PO BOX 1589
HANNIBAL, MISSOURI 63401-1589
573-221-8050
www.hannibalbpw.org



DATE: January 8, 2018
TO: Hannibal Board of Public Works
FROM: Robert W. Stevenson, P.E.
Re: Status of Chloramine removal at the Water Treatment Plant

At the December 2017 Board meeting, Black & Veatch delivered their final draft report to the Board detailing their findings on the efficacy of GAC treatment for the removal of DBP precursors in the Hannibal finished drinking water supply. That study addressed the size and capacity of a plant needed to serve the City, its capital cost and predicted O&M costs over a 20 year operating life. The study also compared the 20 year present worth cost of this GAC plant to an equivalent Reverse Osmosis plant and reported the present worth costs of the two systems were comparable. The GAC plant was estimated to be lower in capital cost and higher in operating costs than the equivalent RO plant. But the present worth cost estimates were so close (within 5%) to each other as to be within the margin of error of the study. Both systems should be considered to be financially equivalent.

Also at the December meeting the staff was asked to express opinions as to which system would be preferable and it was revealed that the staff actually had an unresolved difference of opinion at that time as to which system to recommend. Since that time there have been meetings and a tour of one nearby RO facility. George Hausdorf has provided a written opinion (attached) favoring RO which is compelling [but disagreement remains. Note that the disagreement is mild as no one is passionately for or against either system. We all agree the systems are essentially similar and all could live with either choice technically.](#)

Note that the GAC system that Black & Veatch recommends is more costly than either the system recommended by Robert Bowcock or the system recommended by Jacobs Engineering in an earlier study. The Black & Veatch study is the only one to use actual pilot scale data which should be more reliable as a predictor of GAC costs. I suggest our planning going forward be based on Black & Veatch cost estimates. But, the higher costs may change how we see the solution to the ammonia removal problem.

With the Black & Veatch report completed and submitted to MoDNR for their final comments, we are now in a position to make some decisions as to next steps which could happen concurrently or in sequence as I will explain below. They are:

- Develop financing options and timeline
- Board decision as to basic treatment process
- Develop and award detailed design engineering contract

- Revise or redo the Water Cost of Service Study and establish new recommended water rates and an implementation schedule

FINANCING

I believe we have enough data to begin a financing plan. There are two basic methods to finance this project. One is a lease-purchase option which is essentially a rent to own plan on a large scale. It will be characterized by higher effective interest rates and a shorter amortization period. The other is a conventional sale of revenue bonds which will yield a lower interest rate and a longer amortization period. The bond sale will require a voter referendum which is an unpopular idea among certain city councilmen and may not be approved by them. The City Council has approval authority over what can be placed on a city ballot. However, the bonding method will yield the lowest rate increases on our customers and should not be ignored. Later in the Agenda will be an opportunity to approve a contract with WM Financial Services, our historic Financial Advisor to prepare the documents needed for either option.

TREATMENT PROCESS

The decision on the basic treatment process may be close at hand. The Black & Veatch study and report has accomplished two things that are significant. We now know for sure that a GAC treatment plant will be more costly than anybody previously predicted. The capital cost will be higher than Jacobs predicted. And the operating costs will be a lot higher than Jacobs predicted. We have a good idea of what plant design elements will be required by MoDNR to meet their approval. We have what we asked from Black & Veatch and the Board could decide to proceed with detailed design at this point. We have asked Black and Veatch to provide a design contract for Board approval based on the use of GAC as a post filter treatment media.

However, the report also indicated that the cost of a GAC treatment system is equivalent in cost to a Reverse Osmosis treatment system, a conclusion we were not prepared for. Therefore the Board may want to take a little time to consider the merits of RO. As I said earlier, staff has made one trip to observe an RO treatment plant in St. Charles. We do have staff treatment plant operators with some experience in RO operation.

An RO option has not had the benefit of a deep study like the GAC option. We may not need one of the same depth as the GAC Study but the Board might consider taking some time to look a little closer before we jump in to a project. For instance, there are a variety of membranes that could be used. Which is optimum in our system? Only further study work will provide that answer. The pricing trend for RO membranes has tracked downward over the last decade. Will that continue? Or, what is our risk that future membrane costs will be higher than expected? For that matter, what is our risk that GAC media pricing will not skyrocket due to some unforeseen market change in the future?

Beyond the technical merits discussed by Black & Veatch and our own staff, there are some political considerations. The GAC method has been much discussed over a long time. People are comfortable with the thought of it. The RO system is a new idea to Hannibal residents, offers some operating flexibility to navigate around future changes in regulations, and is already somewhat familiar to MoDNR who has to approve every step of whatever we choose to do. There may be a small time delay necessary to fully communicate the merits to the public. Later in the Agenda will be a proposal to begin our next customer survey. Among other things, this could be a tool to find out what our customers think about this method without an actual vote.

I have told this Board that I would never present you with a decision without also giving you my recommendation. This particular decision borders more on a matter of policy due to the political

nature of the decision. But, based purely on the technical merits, I recommend no decision at this time to allow for further investigation of the RO system with an expectation that we have what we need by the February meeting. I know that the decision we are about to make is going to have a profound and long term effect on the City as a whole, reflecting on our ability to compete for new industry, to keep the industry we have, and to keep our water affordable for those on fixed incomes. A hasty decision on such an important element of our community life is not prudent.

DESIGN CONTRACT

We expect to have a fee proposal from Black & Veatch for detailed design and construction documents for consideration by the Board at the meeting. We also expect it to offer options about how the fee might be structured that are not available at this writing. They will be at the meeting to present their proposal to the Board. Since we asked them last month to prepare their proposal based on a GAC plant, it may be inappropriate if the Board chooses to investigate or pursue one of the other technical solutions. A decision on the hiring of Black & Veatch or a request to revise their proposal can follow after a decision on the technology is made.

RATES AND COST OF SERVICE

Water rates will be going up dramatically. This is not a shock to anyone who has been following this project. After the Board's recent training on Cost of Service analysis, we should be able to develop some rates that are fair to all ratepayers. It has been about three years since our last cost of service study for water. Now, two major events are about to disrupt the results of that study. The loss of PWSD #1 as a customer and the large investment in new treatment technology together indicate a need for a new Cost of Service Study and resulting rate design. We have sufficient information now about prospective capital costs, prospective operating costs, and unit sales by rate class to initiate a new study. Results should take two or three months to develop. We should know what the new rates will be so that we can begin making smaller adjustments as soon as possible to avoid the rate shock that is bound to come.

We should be able to estimate what rate adjustments will be required before the study is complete if the Board is agreeable with some principals from our rate design training. For instance, we know from experience that water unit sales are elastic, meaning as usage prices go up customers tend to conserve more. Historically, when the Board approves a 4% usage rate increase, consumption drops by 2%. The customer charge is not subject to usage amounts and represents that part of our bill that provides very stable revenue to the utility. A new GAC treatment plant is high in capital cost and high in operating costs. Good rate design requires that the capital cost which is fixed once the money is spent and must be paid back regardless or independently of water usage. So, it would be financially prudent (and may be required by our lenders) to repay the capital principal and interest through the monthly customer charge and to pay for the increased O&M costs through the usage charge.

The GAC treatment system is somewhat lower in capital costs and higher in operating costs compared to the RO system. This difference would reflect slightly different rate adjustments between the customer charge and the usage charge but the total monthly bill per household would be very similar for either choice.

Later in the Agenda there will be an opportunity for the Board to consider initiating a new Cost of Service Study. I recommend approval of that contract. Before we have the results of that, and to help the Board understand the impacts to our customers, Abe Gray has prepared a matrix to illustrate rate impacts under various scenarios of interest rates, capital and O&M costs, and rate class differences. That also is attached.

Everyone needs to be aware that the above discussion on rates only addresses rate changes that will be required to finance and operate a new treatment plant process. There will have to be other rate adjustments as well for other reasons. The biggest known future adjustment involves the discontinuation of PWSD #1 as a customer sometime in 2019. Lost revenue from that event will have to be made up by the other Hannibal water customers. We predict another 12% increase on top of the treatment plant impact. Also, we know from experience that the costs of treatment chemicals, labor, pipe and electricity keep going up, so we can expect to see annual inflationary adjustments for these items as well.

As a point of reference I am including as an attachment a water rate survey done by MPUA in 2014. Note that of the 49 largest cities in Missouri the average water rate is 0.75% of median household income. Ours is 1.12% of MHI now. Of those 49 cities only five have a higher monthly average residential bill now. After we apply the rates required to implement GAC or RO, Hannibal will have the highest or second highest water rates in the state. Only Festus will be slightly higher.

“The mission of the Hannibal Board of Public Works is to provide safe, reliable utility products with excellent customer service at reasonable prices.”