The City of
Rutland, Vermont

Board of Alderman

Public Works Committee

Minutes October 30, 2024

Committee Members present: Alderman, Barbagallo, Gillam to achieve a quorum President Talbott

Other BOA Members Present: City Treasurer Markowski, Asst. City Engineer Gillen, and Commissioner DPW Bob Protivansky, Rep. Paul Clifford, RRA Ed Bove, Gordon Dritschilo, Rutland Herald

5:30 meeting Call to Order Chair Gillam, LaMontagne Conference room

Issue

1) Water Disinfection By Product (DBP) issues
2) Water System Study
3) Graffiti on public assets update

Item 1 Water Disinfection by Product (DBP) issues

Water Plant and system DBP issue, City Engineer Ted Gillen updated the committee on the advice from the state, the city applied to an EPA program and the federal agency did more studies and testing, coming away with three alternatives. He said each had pros and cons that DPW would run through at a series of upcoming community meetings. informational meetings are planned for **Nov. 13 at 6 pm and Nov. 20, at 7 pm** both at the Rutland Recreation Community Center. They with a panel discussion and input from the public with meeting moderator.

Option 1. Building a granular activated charcoal filter to the filtration facility would cost $9.5 million and then $352,000 a year to operate, (see attached doc)

Option 2. Installing a magnetic ion exchange or MIEX filter would of $5.6 million to build and $327,000 a year to operate. (see attached doc)

Option 3. Switching the city's disinfectant to chloramine, which produces fewer byproducts, for an initial cost of $541,000 and an annual operating cost of $18,500. (see attached doc)

The issue remains in committee for additional review and study financing options with the City Treasurer, and the input from the public. Issue remains in Committee

Item 2 Municipal Water Study

City Engineer and DPW Commissioner updated the committee on what is needed to achieve in the study

In the Study what is needed improved the municipal water system, developed a plan to

A. priority list old pipes (some at 100 yr old)
B. fixes dead end to a loop system to achieve better pressure for fire protection and homes and keep the lines from standing water
C. A report on of capacity of present system, and what is need for allotments for the future growth projects
D. What is needed to loop in municipal water service to Rutland Town Fire Districts on Townline and Gleason Road
E. What will be the estimate cost for engineering and construction of the Water plan
F. What is the timeline to complete and stay in compliance with Vermont and US Agencies

These are all possible issues to be addressed in the Water Study, this is for information only and no action was taken by the committee and the issue remains in committee.

3) Graffiti on public assets update

The DPW Commissioner update the committee on the joint graffiti task group, (Dept of Recreation, DPW, Fire and police dept) and community volunteers
The commissioner commented that the group have achieved clean-up goals showing great improvement in the city. The group will have a monthly project list to fight graffiti to complete based on reports from police and recreation. All the departments are kind of stretched thin and we don't have time to deal with this head on. It's kind of new but it's working well," he said. "We got an email chain that had a spreadsheet. As we see things, we add them."

Overall, the new Task Group is working well and having good process in place.
The issue will be dropped from the Public Works Committee item list. Request the Full BOA to relieve the committee on this issue.

The committee adjourned 6:25 pm

MOONSHOT MISSIONS

newin New England Water Infrastructure Network

Technical Memorandum

Disinfection By-Products Solutions
Prepared for: Rutland City, VT
Prepared by: Shannon Gority, P.E.
Alan Huizenga, P.E.
September 2024

The City of Rutland's Drinking Water

The City of Rutland sources its drinking water from Mendon Brook, storing it in an 80 million-gallon (MG) reservoir. The system has experienced exceedances of disinfection byproducts (DBPs) above the MCL in the past, and the issue has recently recurred.

The city has received some design engineering support in the past and has now sought assistance from the New England Water Infrastructure Network (NEWIN) within the New England (Region 1) Environmental Finance Center (NEEFC). Subsequently Moonshot Missions reviewed and updated the previously provided opinions of the probable cost of the alternatives. Data has been gathered to understand the source of DBPs and further data collection is planned for a thorough analysis.

Currently, the city is leaning towards switching from chlorine to chloramine disinfection and has asked for additional data analysis prior to making a final decision. If chloramine treatment is selected, they would like assistance relaying the benefits and reasoning to the public.

Statistical Analysis

Statistical analysis by Moonshot Missions indicates that while there is (on average) a greater concentration of organic matter in samples with THAA above the MCL, the presence of organic matter is likely not the **only** cause of excess DBPs. This analysis does not provide insight into the source of organic matter. Other potential contributors to excess DBPs include elevated water age, temperature, pH, or bromine in source water. The city is moving forward with a hydraulic study to estimate water age in the distribution system.

Treatment Alternatives

An April 2012 study by Otter Creek Engineering (OCE) examined four treatment alternatives, for reduction of DBPs:

1. Split chlorination
2. GAC "sandwich" in the slow sand filters
3. MIEX®
4. Chloramines

The report concluded that only MIEX® and chloramination were capable of reliably reducing HAA5 concentrations below 60 ug/l over an extended period. A considerable difference was found in capital (40:1) and operating (7:1) costs between the two alternatives, with chloramination being the least costly.

An August 2012 follow-up report (by OCE) anticipated the use of gravity GAC filters after the sand filters, resulting in even higher capital and operating costs than MIEX®.

Updated Cost Estimates

Appendix A includes updated construction and operation and maintenance cost estimates for the GAC, Chloramines, and MIEX alternatives, prepared by Moonshot Missions. The updated costs show little change in the relative capital (10:1) and operating (17:1) costs, with chloramination remaining the least costly alternative.

City's Preference

The city has little to no interest in the MIEX or ion exchange process. After seeing a pilot unit and visiting an operating MIEX plant in Maine, the staff determined the process to be far too complicated and operator-intensive to scale up to 3.6 MGD. Rutland's slow sand plant is simple, completely gravity driven, and relatively cost efficient. Adding an ion exchange process is not an option given the more cost-effective alternative. In addition, there are no wastewater disposal facilities available for the brine backwash, even if the old reservoir which receives the filter wash water would be approvable for storing the MIEX brine waste.

The updated costs show an even greater disparity in relative capital (17:1) and operating (19:1) costs between GAC and chloramination, with chloramination remaining the least cost by far.

Recommendations:

Short Term:

- Extend the time the raw water valve is closed, as much as reasonably possible based on demand.
- Consider running finished water tanks in parallel with relocation of chlorination point
    - Conduct Jar testing
    - Review data from when running with one tank.
- Collect additional data (temperature, pH, bromine content) in conjunction with organics data to facilitate further root cause analysis.

Long Term:

- Conduct a hydraulic model to understand water age throughout the system.
- Consider use of chloramines (paired with community educational programming) instead of other, more expensive treatment alternatives.

Water-

APPENDIX A

Granular Activated Carbon (GAC) Filter Addition to Rutland City Water Filtration Facility

Description	Quantity	Unit	Unit Cost	Total
General Excavation/Site Work	1	L.S.	$ 225,000	$ 225,000
Site Piping	700	L.F.	$ 300	$ 210,000
GAC Building	4,500	S.F.	$ 325	$ 1,462,500
Filters	1	L.S.	$ 3,750,000	$ 3,750,000
Filter Installation	1	L.S.	$ 75,000	$ 75,000
Filter Building Interior Piping	1	L.S.	$ 75,000	$ 75,000
Backwash Pump System	1	L.S.	$ 60,000	$ 60,000
GAC, delivered and placed, included in Filter Cost	1	L.S.		$ -
100-200 gpm Slurry Water System for GAC Loading/Removal	1	L.S.	$ 37,500	$ 37,500
Generator and Accessories	1	L.S.	$ 60,000	$ 60,000
Chemical Injection Vault and Piping	1	L.S.	$ 45,000	$ 45,000
Restoration/Landscaping	1	L.S.	$ 22,500	$ 22,500
Electrical Service to GAC Building	1	L.S.	$ 30,000	$ 30,000
Paving Overlay	2,500	S.Y.	$ 30	$ 75,000
Modification to Existing Storage Tanks	1	L.S.	$ 15,000	$ 15,000
SCADA Integration	1	L.S.	$ 7,500	$ 7,500
Subtotal				$ 6,150,000
Construction Contingency, 20%				$ 1,230,000
Total Estimated Construction Cost				$ 7,380,000
Preliminary Engineering/Basis of Design				$ 315,373
Final Design/Permitting				$ 630,745
Construction Phase Engineering				$ 1,156,366
Total Estimated Project Cost				$ 9,482,484

ENR (bldg. *=8307/5167=1.6
ENR (cons. *13582/9290 = 1.46 = use 1.5

Engineering Costs based on State Fee Curve

MIEX Filter Addition to Rutland City Water Filtration Facility

Description	Quantity	Unit	Unit Cost	Total
Sitework, Exterior Piping	1	L.S.	$ 75,000	$ 75,000
Building Addition, 45' x 60'	3500	S.F.	$ 280	$ 980,000
1.8 MGD MIEX Package Process Equipment	1	L.S.	$2,005,000	$ 2,005,000
Mechanical Piping, Heat, Ventilation	1	L.S.	$ 225,000	$ 225,000
Electrical Installation	1	L.S.	$ 225,000	$ 225,000
On-site Disposal System	1	L.S.	$ 75,000	$ 75,000
SCADA Integration	1	L.S.	$ 7,500	$ 7,500
First Year's Resin Use	1	L.S.	$ 43,000	$ 43,000
Subtotal				$ 3,635,500
Construction Contingency, 15%				$ 545,325
Total Estimated Construction Cost				$ 4,180,825
Preliminary Engineering/Basis of Design				$ 145,213
Final Design/Permitting				$ 290,427
Construction Phase Engineering				$ 968,090
Total Estimated Project Cost				$ 5,584,555

Chloramine Addition to Rutland City Water Filtration Facility

Description	Quantity	Unit	Unit Cost	Total
Liquid Ammonium Sulfate Tank and Feed S	1	L.S.	$ 22,500	$ 22,500
Contact Time Yard Piping/Tank (Allowance	1	L.S.	$250,000	$ 250,000
Chloramine Analyzer and Chlorine Analyzer	1	L.S.	$ 37,500	$ 37,500
Electrical/Plumbing Modifications	1	L.S.	$ 7,500	$ 7,500
Modification to Existing SCADA	1	L.S.	$ 7,500	$ 7,500
Miscellaneous Improvements	1	L.S.	$ 7,500	$ 7,500
Subtotal				$ 332,500
Construction Contingency, 20%				$ 66,500
Total Estimated Construction Cost				$ 399,000
Preliminary Engineering/Basis of Design				$ 14,741
Final Design/Permitting				$ 29,481
Construction Phase Engineering				$ 98,270
Total Estimated Project Cost				$ 541,492

Operation and Maintenance Cost Comparison

Description	Quantity	Unit	Unit Cost	Total
Granular Activated Carbon (GAC) Filter Addition to Rutland City Water Filtration Facility				
Labor (salary & benefits)	1	L.S.	$110,000	$ 110,000
Building Heat	1	L.S.	$ 25,000	$ 25,000
Power	1	L.S.	$ 30,000	$ 30,000
Carbon Replacement	1	L.S.	$175,000	$ 175,000
General Building Maintenance	1	L.S.	$ 12,500	$ 12,500
Total Estimated Annual O&M Costs - GAC				$ 352,500
Chloramine Treatment Modification to Rutland City Water Filtration Facility				
Labor (salary & benefits) - no change	1	L.S.	$ -	$ -
Building Heat - no change	1	L.S.	$ -	$ -
Power	1	L.S.	$ 1,000	$ 1,000
Chemicals	1	L.S.	$ 17,500	$ 17,500
General Building Maintenance - no change	1	L.S.	$ -	$ -
Total Estimated Annual O&M Costs - Chloramine				$ 18,500
MIEX Treatment Modification to Rutland City Water Filtration Facility				
Labor (salary & benefits)	1	L.S.	$110,000	$ 110,000
Building Heat	1	L.S.	$ 25,000	$ 25,000
Power	1	L.S.	$ 30,000	$ 30,000
Resin Replacement	1	L.S.	$ 50,000	$ 50,000
Sodium Bicarbonate for On-site Disposal	1	L.S.	$100,000	$ 100,000
General Building Maintenance	1	L.S.	$ 12,500	$ 12,500
Total Estimated Annual O&M Costs - MIEX				$ 327,500