VAN ANDA IMPROVEMENT DISTRICT

MEETING OF THE BOARD OF TRUSTEES and RES'EAU TEAM

Date:	August 24, 2016	
Location:	Van Anda Improvement District Office	
Attendees:	Trustees: • Bob Timms (chair) • Mike Craggs • Walter Gussman • Terry Holo • Karen May Employees: • Heidi Gable (Administrator) • Ken Soles (Water Operator) Lin Johnson (Administrator)	Guests: • Andre Balfe, Lafarge • Chris Crawford, Lafarge Safety and Environment Coordinator • Keyvan Maleki, RES'EAU • Madjid Mohseni, RES'EAU • Jeff Huang, RES'EAU • Ed McBean, U Guelph

ACTION ITEMS:

- Madjid will arrange to have an acronym dictionary forwarded to the VAID.
- Andre will forward the Dillon report contracted by Lafarge to VAID and Jeff Haung. Andre will also report o where in the lake the samples were collected.
- Heidi will forward the McElhanney report to Ed.
- Lin will forward the Capital Assets report to Ed when it is completed.

1. Bob Timms welcomed the guests to the meeting and introductions were made.

- Ed McBean is a Professor of Engineering at the University of Guelph and a Risk Assessment Specialist for water supply. Ed will be assisting VAID with a water safety plan.
- Jeff Huang, RES'EAU is a Chemical Engineer who will be asking for feedback, input and data to move the data collected forward
- Keyvan Maleki, RES'EAU
- Madjid Mohseni, RES'EAU
- Chris Crawford, Lafarge Safety and Environment Coordinator
- Andre Balfe, Lafarge GM

2. Madjid presented the findings of the water pilot project.

RES'EAU:

- Is a national program funded by government and community partners including academia and industry
- Works collaboratively with partners, including communities for sustainable solutions for water supply
- Works in the lab and in the field

PROJECT WITH VAID INCLUDES:

- Evaluate and monitor water quality
- Evaluate suitable technology for treatment
- Study and evaluate distribution system
- Assist with the development of a water safety plan
- Look at particulates, organic matter, microbial contamination, and trace contaminants in the VAID water supply

TREATMENT OBJECTIVES:

- Improved disinfection
- Improved control of TOC (total organic content)
- While there is always a risk of parasites entering the water, treatment needs to demonstrate that it can remove 99%
- Disinfection by-products – THM should be less than 100. It is expected that there will eventually be regulations regarding the total amount of THM that can be in the water supply, but now there are only recommendations. Haloacetic acid (which is slightly elevated in VAID water samples) result from chlorine mixing with organic matter in the water. Haloacetic acid consists of nine different compounds, none of which have been proven to be carcinogenic
- VAID was informed that Public Health needs to approve any technology VAID is considering for water treatment
- At this point, information suggests that micro pollutants are not an issue

ACTION: Madjid will send VAID a glossary of acronyms.

WATER QUALITY DATA FROM PRIEST LAKE PRESENTED:

- Water is good, with the exception of DOC high (dissolved organic carbon), which leads to elevated THM's and AHA
- Turbidity is good, less than 1%. A storm event could change the turbidity. Without filtration, this could be possible. A final decision on whether filtration is required for the VAID water supply will rest with the Water Officer
- Inorganics were not tested, eg. arseni.

ACTION: Andre will forward the Dillon report contracted by Lafarge to VAID and Jeff Haung. Andre will also report o where in the lake the samples were collected

- It has been suggested that the soil that the water flows through to the lake also be studied for contaminates

OBJECTIVE AND SCOPE OF THE PILOT:

- Demonstrate the performance of the selected technology
- Compare Cost

TIMELINE:

- Preliminary discussions started in January 2016, with the pilot trailer being moved off of the location in August 2016
- The trailer was parked at Priest Lake, very close to the intake

PROCESSES EVALUATED:

- Filtration (bag and cartridge)
- Ion exchange
- Electro-coagulation (not commercially validated)
- Activated carbon
- UV

- Filters remove particulate matter
- Treatment scenarios were discussed, including River Bank Filtration, UV and chlorine. River Bank Filtration can be a very good system, but there is a risk of introducing other minerals (eg., iron) into the water. River Bank Filtration requires a lot of land, but it can be a very cost effective system. The only other treatment method needed would be UV. There would be an initial cost to hire a hydrologist to study the area. RES'EAU may be able to assist with that
- Coagulation + sedimentation + rapid sand filtration + chlorine – problem is high operational costs and management
- Slow sand filter – good system. Removes TOC and parasites. Chlorine can be used for disinfection. Drawbacks is large space required and high initial capital cost. Once installed, however, the system is very easy to operate. The technology has been proven. Jeff will be evaluating this process
- Ozone + UV + chlorine - very expensive
- Cartridge + UV can reduce the level of chlorine, which reduces the development of THC. This reduced the development of THC's
- Chlorine management in the distribution system was discussed. Results presented
- All the filters were reviewed. The turbidity in the VAID is low, but filters can reduce turbidity further, and can keep particles from entering the system in a storm. Turbidity vents clog fast, so they need to be replaced regularly. Cartridge filters are not recommended. Back filters could be used at a reasonable cost
- TOC reduction through Ion Exchange – most effective, but with a high cost. This system removes up to 70% of organics after 24 hours of operating time. There is a need to regenerate the system after 24 pumping hours. The spent brine can be expensive to dispose of, unless a permit to discharge into the ocean could be obtained. Jeff will research this, and talk to Ministry of Environment about a discharge permit. If disposal costs are eliminated, costs are more reasonable. Initial cost could be under 200,000 for infrastructure. Resins have to be replenished annually, but this is a reasonable cost. The Polymers in the resins are contained, there is no risk of this product escaping into the environment
- Inactivation of microbes – UV reduces all pathogens
- Disinfection by-product (DBP). UV does not reduce the disinfection by-products. Ion Exchange results in low reading of THM. There needs to be both an Ion Exchnge and UV to reduce infections

<u>OPERATING COSTS PRESENTED AND DISCUSSED:</u>

- Madjid informed the group that these are estimates only
- Cost estimates were based on power, pump usage, costs of using a UV system.
- Currently 1 pump and a chlorination system are in use
- With any new system, hydro costs will increase
- Some communities just use boil water advisories when necessary. No other treatment is used

<u>WHERE DO WE GO FROM HERE?</u>

- Jeff is going to look at costs, processes etc. in detail, and prepare a report. This should be completed by year end
- It was suggested that the Riverbank Filtration, Slow Sand, and UV may be the best systems to research further. Advantage for Slow Sand is if Gillies Bay chooses this system, both communities will have similar systems
- Madjid will talk to colleagues and see if he can find a hydrologist to assist with this work.
- Lafarge may be able to assist with the hydrological work, once they know the scope of that project

- All viable options will be explored, including Riverbank; UV and chlorine; Ion Exchange; UV and Chlorine. Costs will be explored and consultants will review all the recommendations

SUMMARY:

- UV disinfection followed by chlorination will be sufficient for inactivation of microbes
- Filtration does not seem to be necessary, but the Water Officer must make that decision
- Ion exchange is a viable alternative for removing organics
- Bag filter, plus UV and chlorination will be enough to meet current requirements
- Better management of distribution system may meet current requirements
- Simple UV installation on existing system will meet requirements
- Why consider ion exchange if we can use UV and chlorination? To be proactive
- The District Water Officer will need to be more involved as we move forward. They need to approve the system
- UV system is reasonable. The cost would be $30-40,000.
- RES'EAU will report back in a few months
- Consultant partners will be asked to verify data in the final report
- There may be a need for booster station in the system
- Small systems require more maintenance

WATER SAFETY PLAN:

- Ed McBean discussed Water Safety Plans and what that work entails
- Ed reported that there is good methodology available for Water Safety Planning. Source, treatment and distribution and emergency systems are looked at. Then, identify and look at the vulnerability of the system, and how to reduce risk (eg, a truck driving into the lake.
- The McElhanney Report was discussed.

ACTION: Heidi will forward the McElhanney report to Ed

- 197 questions looking at possibility, likely hood and consequence. Items rated. Multiple barriers to overcome risk. Method of assigning most likely events that could cause issue, highlighting them and minimizing exposure. Cross connection contamination biggest risk
- The plan looks at source water and the distribution system
- Electrical outages in Van Anda are not a big concern, and a generator fills gaps.
- There are no severe temp changes on Texada Island
- Aging infrastructure is a concern. Lots of the system was installed in the 1960's and upgraded in the 1970's
- Ed asked to look at the distribution system. VAID will provide maps and take Ed on a tour
- Trustees reported that an is expansion to eliminate dead ends is planned, but that will take time. To date, there is no timeline for that work
- Currently the distribution system is maintained by regular flushing. There are 8 sample stations throughout the village, and the water is tested at each station every 2nd week (4 stations one week, 4 the next). If there is a problem, the whole system is tested.
- Currently, a Capital Assets inventory is being developed

ACTION: Lin will forward the Capital Assets Inventory to Ed when it is completed. Asset management needs to include age of infrastructure.

- Safety of equipment and keeping people away from infrastructure was discussed
- Disinfectant management distribution system – will be discussed at future meeting
- Existing distribution lines – flow was discussed. Jeff will look at creating a formula to determine flow rates. What would be the most effective way to develop loops? Discussion. It was suggested that modelling could be done to get some data on dead ends

- Currently, there are 5-6 meters for commercial users. There has been discussion on starting a metering program. This may be a good way to identify leaks.
- There appears to be little risk to the water supply from septic systems. This has been assessed by the Water Health Officer.

Meeting adjourned at 4.34

Minutes Approved:

_____ _____

Bob Timms, Chair Heidi Gable, Administrator