

## REQUEST FOR DECISION

**To:** Bamfield Water Advisory Committee

**From:** Russell Dyson, Chief Administrative Officer  
Andrew McGifford, CPA, CGA, Manager of Environmental Services

**Meeting Date:** October 3, 2016

**Subject:** Ultra Violet Treatment – Bamfield Water System

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**Recommendation:**

***THAT the Bamfield Water Advisory Committee support the inclusion of Ultra Violet Treatment as a component of the Dissolved Air Floatation Water Treatment Plant project as designed in the Request for Proposals.***

**Summary:**

At August 16<sup>th</sup>, 2016 Bamfield Water Advisory committee meeting, the committee requested a follow up regarding the inclusion of the Ultra Violet (UV) Treatment within the proposed Dissolved Air Floatation (DAF) Water Treatment Plant. The requirement to include the UV Treatment when the log credits were attained through filtration and chlorine alone was discussed. Further there was a request to estimate the annual Operations and Maintenance (O&M) costs to provide a better understanding of the impact of the treatment method moving forward.

The Bamfield Water System Contractor and the ACRD Water Lead Hand were consulted on their position for UV Treatment in a water treatment system. Both water professionals support the inclusion of the UV Treatment as a component of a multi barrier water treatment system. The Bamfield Water system contractors position is that the multi-barrier treatment method provides more comfort knowing that the water source is a surface source and the bacterial and viral exposures that could occur with the Sugsaw Lake. Each individual barrier may not be able to completely remove or prevent contamination, but together the multi-barrier approach provides greater assurance that water will be safe to drink.

Both Bamfield Water System Contractor and the ACRD Water Lead Hand stated UV treatment is an effective method for disabling protozoa, and when used in combination with chlorination it is a very effective treatment process. Being non-chemical in nature the maintenance work and handling is safe, causes no disinfection by-product and UV treatment is the only type of disinfection that has a 5 out of 5 rating for disabling giardia and cryptosporidium.

The engineer has provided their comments to inclusion of UV Treatment within the proposed Dissolved Air Floatation Water Treatment Plant, as follows:

## UV Disinfection

The inclusion of UV disinfection provides an additional barrier of protection to the Bamfield Water System at a relatively low cost.

Disinfection by UV radiation works by inactivation of microorganisms. The UV light penetrates the DNA of a microorganism altering it such that the microorganism is unable to reproduce. When required as part of the overall treatment process, a validated UV device is typically a minimum requirement of the Health Authorities.

**Advantages:** UV is capable of providing disinfection without the addition of chemicals, avoiding the potential of generating DBPs such as THMs. UV is most effective against cysts such as *Cryptosporidium* and *Giardia*. The units are compact and relatively easy to maintain and do not change the taste, odour, or colour of water.

**Disadvantages:** UV does not maintain a residual within the distribution system. Some double stranded viruses may be able to withstand doses of 40 mJ/cm<sup>2</sup>. UV treatment on its own can be ineffective when turbidity spikes and/or high colour events occur in the raw water supply. Therefore, pre-treatment such as DAF and Filtration is required.

UV Treatment is an effective, non-chemical, low cost and environmentally friendly water disinfection technology. Some microbiological agents of concern are more resistant to certain forms of treatment than others. Ultimately, the best approach to ensure complete disinfection of water intended for human use is a multi-barrier one.

As most disinfection systems require clear water to ensure maximum efficiency, it may be necessary to combine multiple specific treatment technologies. The DAF water treatment, UV treatment and chlorine will provide the multi-barrier process to ensure public safety is built into the Bamfield Water system. To provide the most effective protection and apply best practices in water treatment.

### Financial:

The UV treatment component from the RFP is listed as \$46,500 and the annual Operations and Maintenance (O&M) costs moving forward would be estimated as follows:

#### ESTIMATED ANNUAL O&M COSTS

ITEM	DESCRIPTION	ESTIMATED ANNUAL O&M COSTS
1.0	Chemical Consumption (Chlorine, Coagulant, etc.)	\$11,000
2.0	Power Consumption	\$2,500
3.0	Waste Handling (DAF Float)	\$20,500*
4.0	Maintenance	\$11,000
5.0	Operator Hours	\$15,000

*\* The value is closely related to the amount of water used during trough clean up and spray bar usage. If water usage can be minimized (as seen during pilot testing) then the pumping and hauling volumes should remain low.*

The deletion of the UV Treatment equipment could potentially result in a 5% savings in the total estimated annual O&M costs. The deletion of the UV disinfection equipment may also reduce the construction cost by approximately 3% and the reduction in building size may result in another 2.5% in savings. It is important to note that a new lower price will need to be negotiated with the supply contractor.

In response to various questions the engineer provides the following additional information:

***I still will need a little more clarity around the UV O&M costs, when you state the reduction in the operating costs would be 5%, would that be on the whole \$60,000 = \$3,000, or just the components that drive cost if UV is in place such as power, maintenance and labour (\$28,500)?***

*Yes, approximately 5% of the estimated annual O&M costs (\$60,000). The 5% was estimated based on the following. Approximately \$250 in energy consumption, approximately \$1,750 for maintenance and \$1,200 for labour (totaling \$3,000).*

***Then the 3% reduction in the construction cost would be 3%, which is the \$46,500 listed, correct? 3% is related to the entire project – please confirm.***

*Yes, the 3% was based on \$46,500 divided by the total estimated cost of \$1,180,000 plus 15% contingency.*

***2.5% of the construction of the facility – once again the complete project?***

*The UV equipment requires approximately 10% of the building space and the building accounts for approximately 20-25% of the overall cost. Therefore, one could assume (10% x 25%) 2.5% savings. Alternatively, you could assume 10% x 20% = 2%*

***In your opinion would the possibility of receiving those savings be likely given the bargaining position that the company has knowing we would select them as the lowest bid?***

*You are correct, once the competitive pricing environment has been removed it can be difficult to negotiate a new lower price with a supplier. We would start by clearly defining and explaining what is being deleted from the RFP documents.*

*Also, please keep in mind that the estimated percentages noted above are less than the accuracy of our Class C estimate. Projects such as these are very specific to the communities needs and therefore can be challenging to estimate at a high level of accuracy.*



Submitted by: \_\_\_\_\_  
Andrew McGifford, CPA, CGA, Manager of Environmental Services



Approved by: \_\_\_\_\_  
Russell Dyson, Chief Administrative Officer