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Brian Schweitzer, Governor  
Richard H. Opper, Director

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August 23, 2011

Marty Gagnon, PE  
Morrison-Maierle, Inc.  
P.O. Box 1113  
Bozeman, MT 59771

RE: River Rock Water and Sewer District  
New Wastewater Treatment Process Approval  
WPCSRF Program #: C302224-+

Mr. Gagnon,

At this time the AlgEvolve treatment system may not be a feasible alternative for the River Rock Water and Sewer District's solution for a new wastewater treatment system due to the fact that DEQ considers this technology to be experimental at this time. There are two essential reasons for the District to continue with their current membrane bioreactor (MBR) treatment alternative. These include the *E. coli* limit requirement and the permit compliance schedule.

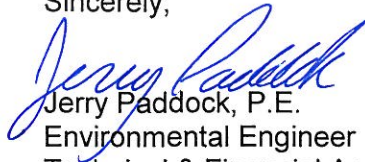
With a discharge permit discharge limit of less than 1 cfu/100 ml, a very fine filter (less than 0.5 micrometers ( $\mu\text{m}$ ) will be required to remove *E. coli* bacteria. This filter will provide a physical barrier to *E. coli* bacteria because the bioreactor membrane is 0.08  $\mu\text{m}$  (about 6 times smaller than the bacteria). The bioreactor membrane will also remove the larger solids, which will optimize the treated wastewater for ultraviolet (UV) light disinfection because the larger solids "shade" the smaller solids from the UV radiation. In addition to the *E. coli* bacteria, the membrane would also remove some viruses.

While AlgEvolve has shown great promise on a small, short-term batch scale, no large scale demonstrations have occurred as far as we know. The AlgEvolve treatment system would be considered a "new process" by DEQ and, therefore, testing through a prototype unit (pilot study) would be required to gather data which would allow DEQ to make an engineering evaluation (including reliability, consistency and operability) of the system. Testing at a design load flow rate, with multiple ranges of wastewater strengths and at summer and winter water temperatures would be required to obtain adequate data to make an engineering evaluation. The pilot testing program would take a substantial amount of time and would probably take more time than the District has available if they want to meet the compliance schedule of their discharge permit. The compliance schedule specifies that plans and specification be submitted to DEQ by July 15, 2012, that plans and

specification be approved by DEQ by December 1 of 2012, and that the system be operational by October 1, 2013.

If you have any questions regarding this letter, please give me a call.

Sincerely,



Jerry Paddock, P.E.  
Environmental Engineer  
Technical & Financial Assistance Bureau  
Phone (406) 444-5323

Cc: Shawna Verdi, President, River Rock County Water and Sewer District