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August 13, 2019

Mr. Kyle Minks
Dane County
Land and Water Resources Department
5201 Fen Oak Drive
Madison, WI 53718

Re: Springfield Nutrient Concentration System (NCS) Solids Removal

Dear Kyle,

During initial startup and commissioning of the NCS at the Springfield Community Digester, pressure at the ultrafiltration (UF) feed pump increased to a level greater than anticipated. Investigation by Aqua Innovations (Aqua) personnel found that the strainer installed at the discharge of the pump to protect the UF membranes was clogged with light fibrous material that was not removed with the other solids in the digested manure by the screw press or centrifuge and remained in the centrate. Further investigation by Aqua found that some of this material bypassed the strainer and collected on the UF membranes and in the U-bends at the ends of the UF skid. Commissioning of the NCS system was suspended because of concerns that the presence of this fibrous material in the centrate would result in frequent downtime for cleaning of the strainer, reduced capacity of the NCS system because of frequent backwashing of the UF system, and potential for damage to the UF membranes.

Aqua has considered two different technologies to remove the fibrous material from the centrate, which was not anticipated during design of the NCS system. Aqua has decided to install a Daritech rotary drum screen in the area currently occupied by the defoam centrate tank. Early operation of the system has shown that the defoam centrate tank is not required since defoaming occurs in the centrate vault. The rotary drum strainer will use a stainless steel mesh screen to remove the fibrous particles. Screened centrate will flow to the existing centrate tank, from which the UF feed pump draws centrate. The fibrous material will drop into a mixing tank to be mixed with UF concentrate before being pumped to the T-650 tank.

Strand Associates, Inc.® agrees that these modifications are needed to provide effective, long-term operation of the NCS system. Continued operation of the system as currently installed would not be practical because manual cleaning of the strainer on the UF feed pump discharge would be time consuming and require frequent downtimes. Accumulation of the material in the UF skid will also likely hamper UF performance and could reduce the life of the UF membranes.

The proposed system appears to be an appropriate solution to this issue. The Daritech rotary drum is manufactured specifically for use with manure and should, therefore, be a reliable component in the NCS system. Removal of the defoam centrate tank should not hamper operation given that defoaming can still occur in the centrate vault and the spray nozzle in the centrate tank and the recirculation pump remain in

place should they be needed. Diversion of the fibrous material to the T-650 tank seems to be appropriate because that is the destination of other waste streams generated by the NCS system. The costs, as presented, appear to be appropriate given the equipment (rotary drum strainer, mixer, pump, and tank), additional piping, controls, instrumentation and other electrical work, and installation labor required.

Please contact us at 608-251-4843 if you have any questions or would like further discussion of this issue.

Sincerely,

STRAND ASSOCIATES, INC.®

Vernon C. Witthuhn, Jr., P.E.

c: David Merritt, Dane County

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