

The  
**ALTERNATIVE/EXPERIMENTAL WASTEWATER TREATMENT TECHNOLOGIES**  
**TECHNICAL REVIEW COMMITTEE (TRC)**

**The meeting was held at**  
**95 Cripe Street, North Kingstown, RI**

**November 30, 2012**

Approved Minutes

*Present:* Nikki Andrews, Noel Berg, Russ Chateaufneuf, David Dow, Susan Licardi, George Loomis, Tim Stasiunas  
*Absent:* Ken Anderson and Dennis Vinhateiro

*Others Present:* Bob Frost (Sterling Environmental, Inc.), Brian Moore and Deb Knauss (DEM)

Call to Order: 8:55 AM

Materials Distributed:

- Draft Agenda for this meeting
- Draft Minutes of 10/25/12 meeting
- Draft monitoring requirements for N-removal technologies approved under 37.4.2 (B)(i) and (ii) [Two versions: one with notes, explanations and issues and one without]
- Maryland Department of the Environment 1/22/07 memorandum on BAT sampling protocol
- Draft approval certification for Presby Environmental, Inc. (PEI) AES (to assist discussion of its use in RI)
- Eljen leachfield design and AES leachfield design for same design flow and soil conditions & similarly loaded, for discussion
- List of TRC meetings at which PEI's AES was discussed with text from each meeting

**Review of Draft Minutes of October 25, 2012**

- Page 2, in the paragraph at the top of the page, edit the first full sentence on the page as follows: "Jay Prager, Environmental Program Manager in the Wastewater Permits Program ~~explained~~ informed Deb that influent sampling was found to be unreliable,..."
- Page 2, in paragraph 2, edit the last sentence as follows: "...revising the assumed influent concentration to a higher concentration, possibly 60 mg/L, to more accurately reflect..."
- Page 2, at the end of the third paragraph, add a note that after the meeting Russ learned that there are about 3,000 N-removal systems installed in Massachusetts, with about half of these installed in Cape Cod. [After the meeting, Russ learned that there are about 3,000 of these systems installed in MA, with about half of them installed on Cape Cod.]
- Page 2, second paragraph up from the beginning of the section on Singulair TNT: edit the last sentence as follows: "It is not clear that manufacturers are providing this kind of support to service providers, ~~this kind of manufacturer/vendor support is being practiced.~~"
- Page 4, in the last sentence of the first paragraph, correct the spelling of Dennis Fogg's name (add a second n, to his first name).

**Motion:** Tim made a motion to approve the minutes with the corrections noted.

**Second:** George seconded the motion.

**Discussion:** There was no discussion.

**Vote:** All present were in attendance at the meeting October 25th and voted in favor of the motion.

**RIDEM N-Removal Standard**

Russ had a phone conference late in October with George Heufelder; due to the anticipated poor weather associated with Hurricane Sandy MADEP staff were not in the office to participate in the conference call. Although George was very helpful, Russ has no recommendation today, on the issue of whether RI should revise the nitrogen removal standard. He wants to schedule a meeting with MADEP and George for discussion of this issue and collect more information before making a decision about possibly changing the RI nitrogen removal standard (by increasing assumed total nitrogen (TN) from 38 mg/L to possibly 60 mg/L as Maryland did and keeping the TN removal requirement at 50 percent), to account for higher wastewater strength due to lower water use in most homes.

Russ distributed data from Barnstable County Department of Health and Environment, of which George Heufelder is Director, and from the Best Available Technology (BAT) program in Maryland (MDE). The Barnstable County data is reported by the service providers. George H doesn't know which of the residences are seasonally occupied and also doesn't know that all the data are being submitted (with poor quality results being withheld). MA requires 90 percent of the systems' means to meet the N-removal standard of 19 mg/L; based on the data on the sheets Russ provided, up to 24 percent of the MA systems would be non-compliant with this standard.

Without actual septic tank effluent (STE) waste strength for a system, the percent reduction reported will always include a measure of uncertainty. But collecting representative influent samples is difficult and that this is further complicated with one-tank systems. Because these are **biological systems, we will see variations in performance for any system**. However, it is important to consider the level of management associated with each installation and if quarterly sampling is required, we can expect systems to receive more oversight and better care than if sampling is required less frequently. A counter point was offered; in RI large systems require quarterly performance monitoring and they are not all performing to the RI standard of 19 mg/L and in MA, where quarterly sampling is required, 24 percent of the systems appear to be non-complaint based on the data Russ provided this morning. The service providers may not know how to make adjustments to the systems' function to optimize their performance, or may not be making field assessment of system conditions. George explained that if dissolved oxygen (DO) and pH measurements are made in each chamber of a system, one can get a good idea of whether adjustments need to be made to optimize N-removal performance. This was done for the systems that New England Onsite Wastewater Treatment Program monitored during the demonstration projects. George noted that even with good system oversight, some systems will still perform better than others. This can be due to toxic events (a member of the household may be on medication that negatively influences the system performance); even with good management, we need to accept these systems are biological systems and that **we can't expect to have predictable and reliable performance from all of them all of the time**.

Nikki suggested that maybe we need to enforce compliance to encourage compliance. Russ stated that if a system's performance doesn't meet the RI standard of 19 mg/L TN, DEM is supposed to take action. But we know that most systems will not achieve 19 mg/L TN all the time, so how do we deal with this from an enforcement perspective? Also, the 50 percent TN removal was chosen many years ago based on **38 mg/L TN**, and this seemed to be a reasonably accurate assumed STE TN concentration for many years. Now variability is being observed often enough that state programs are re-considering whether 38 mg/L TN is still an appropriate assumed STE TN concentration. It is believed that many homes' wastewater strength is higher now because of water saving devices. Brian noted that no vendor ever cautioned us that a system wouldn't be able to treat to our standard in low carriage water conditions.

It was suggested that competition might push the industry to develop technologies that perform better. Russ explained that shortly after receiving a technology application, or issuing an approval, the manufacturer contacts DEM informing of some modification and requesting that we accommodate this in the technology review or, with a revised approval certification. He added that with the 75 percent N-removal standard in the Rules, there is already an incentive to achieve this level of treatment, but we have only one technology approved for this level of TN removal.

George suggested that we consider the parameters used to assess **municipal treatment plant performance**, like monthly maximum concentrations, etc., and that we use the MA maximum and minimum whisker bars to develop a standard. The standard might be expressed as: system performance must be in compliance with the treatment standard, X percent of the time, with some maximum applied to excursions exceeding the standard. In addition to a concentration and percent TN reduction, we need to factor in **nitrogen loading to the ecosystem with low carriage water**. Two people generating 50 gallons of wastewater a day, is a low carriage water system and we can expect some excursions above a TN concentration of 19 mg/L. But if we **calculate nitrogen** loading for this system, it may be contributing less nitrogen to the ecosystem than a neighboring system serving a home with higher water use, and TN concentrations less than 19 mg/L. We could set the standard at 19 mg/L TN, expect no system to hit its design flow and calculate pounds of nitrogen from hypothetical systems based on design flow and the maximum number of occupants. Then compare actual systems' performance to the hypothetical loading from the model standard system. Russ: three bedroom home with available occupancy of six, in RI occupancy of a three bedroom home is generally less than three people, so the actual nitrogen loading would always be less than the calculated expected nitrogen loading.

Russ: does the TRC believe that **influent TN concentrations** have changed over the last 20 years and that this has affected technologies ability to meet the current nitrogen standard? George said that 38 to 40 mg/L TN has never been a good number because this was based on municipal sewage, not actual home use and wastewater generation. Noel: the MA standard of 50 percent TN removal is based on 38 mg/L influent TN and the MA data we looked at earlier show that many systems are not meeting the standard. We know that Maryland considered this issue and decided to increase the assumed influent TN to 60 mg/L. We're asking for two years of performance data from companies but not requiring influent data, so we really don't know actual waste strength.

David suggested a possible method of developing a **nitrogen loading-based operating permit**. After one year of system use, the O&M provider, using meter readings, pump run times, number of people occupying the home and whatever other data are available, could **calculate nitrogen loading**. This could become the operating permit for that home until conditions change. This operating permit could be given to the town wastewater management program. He also suggested a possible way to provide ongoing testing and also accommodate the costs: vendors incorporate into their system purchase price, the cost for monitoring and have rolling testing, with a certain percent of the installations tested annually. Each system owner shares cost or as an alternative, add a bit to service contract cost.

Noel suggested that we measure water use and see if there is a positive correlation to TN concentration.

George: with assumptions about nitrogen loading per individual and with a final **pump** to drainfield and **pump delivery rate**, lapsed time we can calculate gallons per day out of the system. It is useful to have timed dosing so that this kind of calculation can be performed. Russ stated that some permits require water use recording, but not all of them.

#### **Norweco, Inc. Technology Application for Singulair TNT and Singulair Green TNT for Nitrogen Removal**

Deb prepared and distributed two draft documents for discussion of proposed monitoring requirements for nitrogen removal systems approved under the new provisions of the OWTS Rules that became effective July 9, 2012. Russ explained that the difference between the two documents is that one contains notes and discussion from TRC meetings that is relevant to the elements of the draft, the other draft doesn't contain this additional information. Russ and Deb met with DEM legal representation to explain that the purpose of the proposed monitoring requirements is to provide documentation of system performance, since the two new nitrogen removal application options do not require the data that is required under the application process under which currently approved nitrogen removal systems were approved. DEM Legal has since informed Russ and Deb that the state has the authority to require the proposed additional monitoring and with their support, we are moving forward with development of these monitoring requirements.

Russ explained that testing will start with the first system installed and each system installed will be tested until the required samples (proposed to be 40), will be collected from the systems installed according to proposed sampling frequency. The proposed sampling frequency is: quarterly for homes occupied year round and twice during the season of use for seasonally occupied homes. For example 10 seasonal homes would result in 20 samples after each one is sampled for one year, and five year round occupied homes would result in 20 samples after each is sampled for one year, so this group of 15 systems (10 seasonal and 5 year round) would provide the 40 samples.

Russ explained that we are thinking of requiring **24-hour composite sampling**. **Influent sampling is not included in the draft** because it is not practical to obtain an influent sample from all types of treatment systems and because of Maryland's experience with trying to collect influent samples and subsequent termination of this requirement. Russ explained that when he spoke on the phone with George Heufelder in October, George didn't think that influent sampling was necessary, but Russ stated that we don't have the thousands of data points that he does.

Discussion of when it is appropriate to sample **seasonally used systems** addressed concern that these systems be provided start-up time under actual use before the first sample is collected. Six weeks after occupancy was recommended for the time after which the first sample should be drawn from a seasonally occupied home. It was suggested that the second sample from a seasonally occupied home should be collected before the end of August. It was asked how sampling would be timed for a seasonal home that is occupied only Thursday through Sunday? It was suggested that in these cases of weekend use only, that the system not be sampled until eight to ten weeks after seasonal use begins.

George reiterated the **difficulty of obtaining an influent** sample from one-tank systems and how sampling error can result if dislodged organic/solid material is collected with an influent sample, since prior to lab analysis of the sample it is shaken and the tiny bit of solid material will result in an inaccurate result for that sample. Russ stated that the 2009 WERF report contains a picture of the septic tank effluent sampling device that was used. It includes a macerating vacuum pump, with pump delivery to a sample chamber. With any one-tank system we will always have the question "is this sample representative?" We don't know from where in the home the collected flow was generated. Even though SeptiTech is a two-tank system, it recirculates back to the building sewer, and how do we correlate an effluent sample to an influent sample? Large system's influent may be more easily sampled if they are preceded by a septic tank and a pipe. For single family homes it is a more difficult issue to resolve and it adds money, but the result of influent sampling is not certain to be valid, so is it worth the expense? George stated that he has never used a composite sampler and that time dosed systems deliver consistent, incremental small amounts of flow. Composite samples provide some information especially with larger flow systems and peak flows during the day. However, when a composite sampler is used, ~~that~~ the cover can't be bolted down tightly. This is a safety issue and the associated risk needs to be considered carefully. If there is a heavy rain while the composite sampler is in the unit, rainwater may enter the system and influence the result. Sampling location was discussed: distribution box, deep pump chamber. George explained that it would be preferable to have every system discharge to a drainfield pump basin, because distribution boxes are a difficult component from which to collect a sample.

**When to sample & what to sample for:** The sampling will likely be done when service is performed on a system, but prior to the maintenance activities. There was discussion of the constituents for which we will require sampling. The draft includes a table of constituents for consideration. These were considered relative to the purpose of the testing of a nitrogen removal system and it was decided that only BOD, TSS, pH, TKN, nitrate and alkalinity and it was noted that there is no regulatory standard for pH, TKN and nitrate. It was suggested that we consider adding daily flow to the system parameters that must be monitored. George suggested that since the relevant RI regulatory standard is TN, at a minimum we need to know TN concentration. Some test are less expensive than others and the abundance of some analytes can be helpful to understand why TN concentrations are high. George said that he would check with Jose to see which analytes should be required. George suggested including a subsection to require influent alkalinity if grab sample results indicate there is a

problem nitrifying. There was agreement that fecal coliform is not important for this purpose, so it should be removed from the list of analytes for which testing will be required.

There was discussion of the best location from which to collect samples; there was agreement that samples should be collected from a pump chamber. Tim asked if the first 20 systems installed or tested have to be time-dosed? George said if we want to know accurate flow through the systems, we need pressurized drainfields with elapsed time meter and cycle counters. Water meter data was suggested as a means for collecting flow data, but water meters don't account for other water uses at the home, such as garden and lawn watering and car washing. Brian said that most of the proposed systems will be discharging to PSNDs and BSFs. Russ added that systems discharging by gravity won't be tested. Noel suggested that we shouldn't permit gravity systems until we get the data from pressurized systems. Deb asked if there would be some maximum number of systems that could be installed before all the data have been submitted. 50 systems was recommended as the maximum number of systems that can be installed before all the data are submitted and they are determined to verify the technology's ability to meet the nitrogen standard and the group agreed.

Russ decided that we don't want to install systems not being sampled. So, **all installations will have to be time dosed until the minimum number required for monitoring is installed.** Russ asked if the group thinks that 40 samples is enough to make this determination. Nikki asked if there should be a **minimum number of year round systems tested(?)**. Suggestions included half of the systems being monitored should be occupied year round and alternatively a minimum of five of them should be occupied year round.

Noel asked if the manufacturers will be allowed to make modifications to the design after they have begun to submit data, if it indicates that the systems are not meeting the standard. Russ said we have standard language on this in the certifications, stating that any time results indicate a system is not meeting the performance requirement, modifications should be made and the system re-sampled, until it is observed to be meeting the performance requirement. George noted that in the case of Singlair TNT, the only setting that could be modified is the 60 minute on and 60 minute off aeration cycle.

Russ: if testing shows non-conformance, the system should continue to be tested until results show that it has come into compliance, and although the data indicating non-compliance will be collected, it will not be used in calculating conformance with standards if the re-sample after operational corrections are made demonstrates compliance.

Deb explained that the section "compliance assessment" is titled as such, because she prepared the section for discussion and potential decision of **how it will be determined that a technology is meeting the standard (?)**. For example, will all of the systems averages need to meet the standard, or will some percent of the system's averages be required to meet the standard? There was some agreement that it is not a bad idea to have this information available at the time that the proposed monitoring requirements are presented for review by the manufacturer, so they know at the start how the system is going to be determined to be compliant or non-compliant. Noel suggested that 100 percent of the systems averages must meet the standard. Someone suggested that we may need to be careful about setting a compliance point for them, when we haven't done this previously; what about the other systems? Brian suggested that we could ask the vendor what they think their TN removal capability is.

Russ asked for TRC opinion whether the compliance target should be in the certification or in the sampling protocol. Russ and Tim wanted to know if this would be applied to all technologies, and Deb responded, no; this is being developed only for nitrogen removal systems that are approved under 37.4.2(B)(i) or (ii), because these two new options don't require the bulk of data that the 37.4.2 (A) does. But Russ replied that the other systems currently approved under the other approval option would likely not meet the standard. George suggested that we could develop this as a new set of criteria for all the nitrogen removal technologies. Notification of this could be sent to manufacturers with pending technology renewals, informing them that the new criteria will be included in a revised certification when it is renewed. David asked if this may mean that a currently approved technology is disqualified?

We can look at all the data submitted from all the other nitrogen removal technologies, and since each is required to submit quarterly data on three residential systems, we will have 12 samples per year for each technology and use what we have as a starting point to consider setting the criteria for assessing compliance with the TN removal standard.

Russ asked the TRC if we should hold the draft TNT certification until we have a compliance point. David asked how easy is it to impose it retroactively? Could it be appealed because the certification was issued before it was developed? Tim stated that he is not speaking as an advocate for any vendor, but that approval under 37.4.2(B) was supposed to be timely and this has not been timely. David would feel better about DEM issuing the certification for TNT if the new nitrogen removal standard (provided it is changed) is in place at the time. It was noted that the MDE report for TNT's mean effluent TN concentration is 27 mg/L. On the basis of this, they'd fail to meet the current RI standard.

Tim: changing the influent concentration to 60 mg/L is a big issue. Russ thinks it should apply to all technologies. Brian said we're ultimately trying to protect the salt ponds, if we increase the standard, are we still doing this?

### **Presby Environemntal, Inc. (PEI) Application for Advanced Enviro-Septic (AES) for TSS & BOD Reduction**

Russ explained that Deb prepared a draft certification for AES to help the TRC understand it in the context of the RI approval format for an alternative leachfield, since at the last meeting it was agreed that AES should be considered as a leachfield component and not a treatment technology. She also prepared an example of an AES leachfield using the same leaching credit consideration as Eljen (as was requested at the last meeting). This resulted in 2.33 square feet per linear foot of AES trench. Because it is so late today, we need to consider this AES-related material at the next meeting.

### **Large System Compliance Issue**

Brian distributed a spreadsheet on which the permit requirements for the 28 large AX systems is reported. Most of the AX100 systems are commercial but there are some serving residential uses. On March 16<sup>th</sup>, DEM sent a letter to Orenco Systems, Inc. (OSI) seeking the reporting required by permit that they have on file for these systems. However, only some of this material was provided. So, DEM sent letters to the owners of these 28 systems on October 11<sup>th</sup> seeking copies of their service contracts and the required performance monitoring. Responses received from system owners are reported on the second page. Information provided by system owners and OSI, is currently about 50 percent of what is required and only five of the systems meet their permit limits. Brian said that most system owners who contacted DEM asked: "what do you mean DEM didn't receive that information. I thought that my service provider was doing that." It was asked if it is possible to deny the owner use of the system? Russ stated that we can do that, and the owner will be required to truck all wastewater generated off-site. Brian stated that we could issue a notice of intent to violate each system owner that is non-compliant seeking the required information, and information on service contracts and their service providers and what they have done or not done. Russ stated that because of the business relationship between vendors and O&M providers he would expect that vendors would contact the O&M providers on the phone, ask for the required information (that had not been previously submitted) and receive it. Although he acknowledged the system needs improvement since O&M providers aren't providing the information to the vendors to begin with.

George noted that in the minutes from the last meeting, Brian Moore had mentioned the idea of operating permits, which would be issued annually to the system owner. If service providers are licensed, and a license was lost because of negligence, failure to report or to perform proper service and couldn't service systems, clients would be lost to another service provider. This would be an incentive to do the work that is required. If service providers neglected responsibilities, they'd be risking denial of the renewal of their license, or even its revocation.

There was interest in whether DEM made a decision on the issue of not entertaining applications for new technologies until issues associated with reporting deficits and treatment performance of their currently approved technologies have been resolved. Deb explained that she and Russ have a difference of opinion on this and that he thinks that the service providers, rather than the manufacturer are responsible for these issues. Therefore, review of new applications should not be held pending resolution of existing issues associated with reporting and treatment performance. There was some TRC support for manufacturers being held accountable for facilitating O&M providers compliance with reporting requirements and for providing the oversight and actions necessary to optimize system performance, but the issue was not taken to a vote.

### **Adjournment and Next Meeting**

Due to the time being after 12:30, the remaining agenda items will have to be addressed at the next meeting. The next meeting was scheduled for January 11, 2013 pending availability of a meeting venue, no other issues were introduced for it, and Russ declared the meeting adjourned.