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

The meeting was held at the South Kingstown Town Hall

August 19, 2009

Approved

Present: Russ Chateauneuf, Noel Berg, Joe Frisella, Dennis Vinhateiro, Brian Moore, Susan Licardi, George Loomis, Tim Stasiunas and Ken Anderson

Absent: Dave Burnham

Others Present: Deb Knauss (DEM)

Call to Order: 8:50 AM

Materials Distributed:

- Draft Agenda for this meeting
- Draft Minutes of 7/1/09 meeting
- Geoflow Equipment list
- Geoflow e-mails: Deb Knauss and Karen Ferguson with Geoflow price list
- Draft edited SFGD cover letter and draft edited Sand Filter Guidance Document

Minutes of July 1, 2009

Motion: Joe made a motion to accept the minutes as presented.
Second: Susan seconded the motion.
Discussion: There was no discussion.
Vote: All present, who were present at the July 1st meeting voted in favor of the motion; Ken, who was not present at the 7/1/09 meeting abstained.

Time Dosing of Category 2 (non-time dosed) Treatment Systems

In the past the TRC expressed concern about system owners turning off power to these gravity flow systems to save money, which would result in discharge of untreated effluent to a reduced size leachfield. A few years ago, Peter O'Rourke visited about twenty of these systems and found that all of the systems were energized. George asked if they were pressure-dosed, because in that case they would *have* to be on; there would be no risk of a homeowner cutting power, because if the power were cut the discharge pump (on the same circuit) would fail to discharge the effluent and it would back up into the home. Russ did not know if they were pressure-dosed.

Another issue is that pressure-dosing these systems' treated effluent provides better treatment, because the distribution is better and delivered in timed doses, facilitating wetting and drying in the soil beneath the leachfield. George reported that these systems' treated effluent concentrations of BOD and TSS are 15/15 or 20/20 mg/l, which will not develop biomat so distribution without pressure-dosing will be through the first few holes in the gravity distribution line. Biomat development could be expected with BOD/TSS concentrations near 30/30 mg/L, in very tight soils and with gravity flow so that the effluent is loaded more heavily near the head of the field. He also noted that biomat development is temperature dependent; lower temperatures inhibit the growth of microbial populations that digest biomat, resulting in an accumulation of biomat; when temperatures increase, these populations will increase and will digest some of the carbon in the biomat, reducing its thickness.

Ken asked what the negative side of pressure-doing is. Reply: the extra expense: the pump vault, pump and panel would cost about $2,500. This initial capital cost represents the greatest expense; the cost to operate is not high. During the years that RI has been permitting systems that are pressure-dosed, there is no evidence of even slight risk of increased probability of problems due to the incorporation of an additional mechanical component. Without a discharge pump the leachfield has to be conventional or Eljens. If these sites require fill to meet the required water table separation distance, the fill is an additional expense that may exceed the cost of a pump chamber and associated equipment. George noted that a big advantage with pressure dosing is the option to install at a higher elevation in the profile saving money on fill and providing the advantage of Stolt and Holden's N and P removal findings and improved pathogen removal as well. Soil nearer the surface of the soil profile has better oxygenation and more microorganisms.

RI has mostly eliminated galleys because of their small foot print and deep delivery of effluent; they are used now only infrequently for repairs. Russ posed a question for future discussion: consider a galley field approved by DEM in 2004; the homeowner wants to add a bedroom. Do we deem it suitable? Previously in the late 70's leaching bed

systems were used; the 1997 Regulations eliminated them. We need to decide if galleys need to be eliminated. George suggested basing management decisions on risk: areas with deep water tables may pose no real risk if the galleys are allowed to remain in service.

Brian: last year's permitting statistics report about 50 FAST systems and 330 AXs. Roy Carpenter beach wanted a conventional system but used IA because the 50% reduction of leachfield area saved a lot of money. They used flow diffusers and dosed them (large commercial systems need flow equalization because on busy weekends, they can be expected to exceed the design flow and overwhelm the system). Russ asked if there is a reason to change the policy on use of conventional leachfields in critical resource areas if most people are choosing Category 1 systems. George replied that he has seen plans from local designers with Category 2 systems discharging to a conventional leachfield.

In Charlestown there have been complaints that they are being required to use denite but these systems are not consistently performing to the required treated effluent concentration of 19 mg/l TN. If we required the PSND it would help make the argument that these leachfields enhance the nitrogen removal. George asked if the recently approved revisions to the PSND design parameters would increase their use. Brian replied that there is resistance to pressure-dosing: any extra electrical requirements are perceived as the "Pump Monster". George: The service provider has indicators that can be evaluated (other than laboratory analytical) to figure out if a system is working properly. At a typical single family home with an AX for nitrogen removal, the service provider will look at dissolved oxygen (DO). If the DO concentration is too high in the recirculation tank, denitrification performance will suffer, so the recirculation ratio should be reduced, delivering less water to the top of the filter (optimum recirculation rage is 3:1 ($V_{recirculated}$:$V_{forward\ flow}$) to 5:1). However, without the second pump there is no way to set the recirculation ratio properly as a function of forward flow. Not requiring a discharge pump is killing our ability to properly manage these systems. Requiring people to spend a lot of money on a system and then scrimp on a second pump (about $2,500 for the pump, pump chamber and panel) we are requiring them to install a high performance system but operate it like a lawn mower. The textile filters should be required to have the ability to be managed for optimum performance.

George noted that most denite systems are AXs and discharge to BSFs. These systems use two pumps and have very low electrical use of about $12 per month. FAST uses a 1/3 HP blower and the electrical costs of this system is about $30 to $35 per month. We have to help people understand that there will be some cost, but that otherwise, they can't build or the home can't be built without spending a lot of money to get a conventional system on the lot and this will be without achieving any additional treatment benefit. Saving money is a big issue, but people need to be reminded of their location in a sensitive critical resource area and that if the quality of the resource is degraded, the property values will decline as-well. George: The PSND is a cost saving option over the BSF. The timbers and sand are expensive.

Tim: if we are trying to create the best treatment train possible, how does DEM distinguish the best of the options on repairs? And is it OK to use White Knight? Russ responded that White Knight would be discussed in a moment. Time dosing is the best method of effluent dispersal and is the most cost-efficient option when there are no conventional options for a site; there is no question that this is a superior system to gravity distribution. But is it always necessary? In RI in most cases using conventional technology is OK, presenting an acceptable risk. What are we losing with Category 2 systems discharging to a conventional leachfield that we need to require pressure dosing?

Brian: If it is a performance-based issue, why allow a choice of denite system, why not require use of the one that provides the best treatment? But this is not the case, as with the leachfield issue.

George stated that if we had a performance-based code, we could put treatment trains together for different levels of performance, but in Block Island the decision tree became too complicated; they preferred the geographical location-based requirement (North of the line, do "X", South of the line, do "Y"). It is easier for people to understand and easier to regulate. In the upper watershed with a five-acre lot and a deep water table, conventional technology could be used; base decisions about what systems-type is required on risk: on ½-acre lots the risk is higher so these sites are candidates for IA and pressure-dosing. But it is hard both to develop a rule for this type of risk-based consideration and to regulate it. However this is essentially what happens when a designer looks at a site and establishes that IA to a BSF is all that will fit. Reasonable risk prevention, could include as an option, septic tank effluent to low pressure pipe systems (shallow with bigger orifices).

Brian noted that George Heufelder has reported nitrogen removal beneath conventional trenches. Deb will get these data. George noted that we have seen between 10 and 15% nitrogen removal in conventional systems, presumably in the biomat.

Dennis agreed that one answer is a performance based standard, but one size fits all is easier to regulate. Ken: historically, there was an understanding that the nitrogen was conservative and all of it would eventually reach the water body. Now observations are in conflict with this previously held notion making nitrogen fate a complicated issue.

Motion: Noel made a motion to reaffirm the vote taken on Dave's motion at the 6/10/09 meeting with the deletion of the word "option". The motion read: "*Dave amended his motion that the TRC request that DEM require all advanced treatment systems be designed to prevent the discharge of untreated effluent and also require a pressurized orifice flow drainfield* ***option*** *for all AE systems in the state, for better dispersal of this treated effluent.*
Second: Ken seconded the motion.
Discussion: There was no discussion.
Vote: All in favor.

Russ stated that he does not know when this measure might go into effect because of the issues with which program staff are currently engaged: Charlestown's issues with the denite requirement and their cesspool phase out, holding tanks, cesspool phase out rules and the development of draft rules by the end of the year.

Russ: White Knight (WK) was mentioned by Tim earlier. There has been extensive discussion regarding its use statewide for leachfield renovation. Russ knows of one site where it was used with a galley system and the cost was $6,000. The system owner reported to the Westerly Sun that it is working fine. Tim noted that he expects there will be more applications for repair than new construction in the critical resource areas and allowing WK in these areas is denying denite opportunities.

Joe became qualified by WK to design and perform O&M. If it is considered, first they check for a leaky fixture in the house; if found, it is repaired and then they wait to see if this was the source of the problem. He wants to use it at a Honey Dew donut restaurant in North Kingstown. What is he required to do to propose its use at a commercial establishment? The WK site assessment form must be completed and confirm in the field that the permit conditions are the same.

Russ: In Charlestown, there are cesspools at about 200 homes (seasonal and year-round) that will require denite. Once these are done, it will take about 10 years for the next 150 homes to be upgraded to denite, at a rate of about 10 or 15 per year. So there is some support for upgrade at time of property transfer. If 200 homes are sold in Charlestown each year, relying on repairs for denite upgrades will not be as effective based on the numbers reported for home sales and for repair applications.

Noel suggested that the holding tank policy might be a good solution for the homes that are seasonally occupied.

PSND Draft Edits
PSNDs in areas other than critical resource areas can be designed with 2-foot vertical separation to ground water. George suggested that we may get a fight from people looking for a 1-foot separation to the water table in areas other than critical resource areas. Brian stated that the literature does not support a 1-foot separation but there is about 80 percent nitrogen removal in the first 12-inches of soil.

Ken: if we have a 3-foot to water table separation for PSNDs will it be rejected in favor of the BSF? Brian replied that designers would prefer the BSF although we want to encourage use of the PSND.

George suggested development of a class on pressurized drainfield options, PSNDs, GeoMat and perhaps at some point, LPP. Since we have new design parameters for PSNDs, GeoMat is approved as an equivalent to the PSND, and all technologies need to be pressure-dosed, although this is not a requirement in Rule, there is enough material for a 4-hour class and designers would benefit from this training since it is mostly new material.

On Page 5 of the draft, in the first sentence of the first paragraph, after "…and review of sand filter systems" delete "for use in treating residential strength wastewater and of".

George: Check for consistency in the document its glossary with the Consortium's glossary. On page 7 there is an inconsistency: RSF in one place and R.S.F. in another. Use RSF.

Sand layer issue: in vcos, cos, vg or g soils there should be a sand layer. Ls, csl and fs do not need it. On page 22, beneath Table 3, foot note 4 as presented reads: "*Sand lined shallow narrow pressure dosed trenches shall be used in these soil types (see Figure 14).(cos, vcos, gravelly or very gravelly soils)*". Edit this to read as follows: "*Sand lined PSNDs shall be used in cos, vcos, gravelly or very gravelly soils*"

George: loading rates for PSNDs and BSFs have been established based on the receiving soils capacity to accommodate hydraulic flow, so as not to overload receiving soil or BSF. Category 2 systems have no surge storage capacity, we want them to capture the surge volume and meter it out.

Edit paragraph 2 on page 23 as follows: An ~~impulse~~ event counter and elapsed time run meter shall also be used on the drainfield pump.

Deb to write a section for each pump float-tree assembly. Category 1 will be a three float system: on/off, high water or redundant off. Category 2 will be four float system: on/off, high water/low water off.

Page 25: Trenches on different elevations and zoned leachfields. …by utilizing automatic sequencing distributing valves. Use language here that is consistent with the Consortium's glossary.

Also on page 25, in the same section (Trenches at Different Elevations and Zoned Drainfields), switch the locations of the two paragraphs.

Page 28, uniformity coefficient should be abbreviated UC with no periods; this also needs to be corrected in the glossary.

Add Susan and Deb to acknowledgements, noting that the original document has been revised.

Adjournment
Motion: Dennis made a motion to adjourn.
Second: Joe seconded the motion.
Discussion: There was no discussion.
Vote: All present voted in favor of the motion.

Next Meeting
The next meeting was scheduled for October 7, 2009 at 8:30 at the South Kingstown Town Hall.

The meeting adjourned at 12:25 PM.