GEOMATRIX

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Bob and Matt,

Thank you for the opportunity, extended to us in your January 4, 2010 letter, to comment on how leaching systems are rated in CT. I have also considered the December 7, 2009 letter, sent to you by Frank Schaub, the former head of the CTDPH wastewater program who now owns a proprietary leach system company, distributed by CEHA.

I initially hesitated to write regarding this matter for concern of potential conflicts that I inherently have; upon further reflection, I decided it best to identify these potential conflicts of interest that I am aware of and respond to you. Geomatrix currently utilizes, or benefits financially from, leaching technologies with open infiltrative surfaces (IS), filter fabric IS and stone IS. We do not install cardboard or cardboard & filter fabric systems other than for testing purposes. Geomatrix also benefits financially from certain technologies that pretreat wastewater and from those employing SoilAir™. I am an owner of Geomatrix. While I have tried to set my potential biases aside and rely on concrete data and fact, some may argue that this is not possible.

As the individual who first invented and approached your Department with the basis of this "new breed of product" that has broken the ELA barrier of 20/l.f., and also having been denied approval of a product that approach an ELA of 100/l.f., I do have some thoughts on this matter.

I was initially skeptical of the DPH rating system; however, it is difficult to dismiss the empirical data and ultimate performance record over time. Geomatrix has invested millions of dollars in R&D and testing efforts; I believe that we still have the only state approved septic system test facility in CT. We have and/or are presently testing a number of the leaching systems that are in use in CT. I believe that this gives us insight into the specific processes involved with these leaching systems that few others have. It is interesting to me how well the current formula matches up to an apple to apples comparison; although there are a few discrepancies.

Based on our experience gained in rejuvenating failed leaching systems, tracking performance of systems in the field, third-party testing, in-house testing and the references/documentation detailed below, we offer the following for consideration:

- Filter fabric characteristics and performance are simple with clean water; however, our testing indicates that not all filter fabric performs the same with wastewater. In general, filter fabrics do have a tendency to restrict wastewater flows more than an IS consisting of stone or open area. When we have analyzed this further, the filter fabric retains water due to capillary forces. When something retains water, microorganisms populate it; their byproducts, such as polysaccharides, build-up on this interface and reduce the flow of water through it. We have even seen this happen on sports fields and golf greens with only irrigation water and nutrients from fertilizers; this is a far greater problem with wastewater systems if the BOD is not addressed. This effect is increasingly problematic as wastewater loading rates increase and ponding is maintained on the IS. Organic matter does not breakdown efficiently under water due to the poor transfer capacity of oxygen; there is 21,000 times more oxygen in air than water. Because of this, Geomatrix

utilizes dosing and SoilAir on our higher rated fabric leaching systems to maintain sufficient LTAR; this is based on our testing program. We are aware of other similar leaching systems that do not employ this type of provision and are puzzled by the how these products can perform properly over time; it would be interesting to see any supporting documentation that your Department may have on this.

- Storage volume is both an attribute and a liability; something that must be balanced. While historical beliefs have suggested that systems must have significant storage volume, more recent studies suggest that storing anaerobic wastewater in an infiltration structure maintains anaerobic conditions that are less desirable for treatment and hydraulic conductivity. As pointed out above, when water remains ponded above the IS, the organic matter can not breakdown and premature failure results. This is particularly apparent with systems that utilize an organic substrate in the leaching product. Time dosing has evolved to eliminate the need for excessive storage volume in the leaching system. With time dosing, water flows can be managed to allow complete infiltration and reaeration of the IS between doses. When time dosing is utilized, excessive storage volume is unnecessary and can lead to diminished LTAR. The purpose of a leaching system is to infiltrate and treat wastewater, not to retain it. Many leaching systems with a high theoretical storage volume when they are "sitting on a shelf" or are brand new, no longer have this volume five years later when they are ponded to the top.
- We have developed software that considers required hydraulic load, LTAR and storage volume; this conservative analysis tool suggests that some products have a very short life expectancy. The bottom line is that if the projected LTAR of a system is not greater than the required daily flow capacity, it is a problem.
- LTAR is impacted by oxygen. Leaching systems that operate with 20% oxygen have 2 – 5 times greater hydraulic capacity and greater treatment of wastewater constituents. Our SoilAir system creates this specific condition and has been utilized on numerous sites in CT. While rejuvenating failing wastewater systems, we are often able to eliminate the failure condition even when only ½ to 1/3 of the leach field is in use. It is common to find no visible biomat in leach fields where SoilAir is in use. I can think of nothing more important than oxygen to wastewater treatment and acceptable LTAR. I suggest that the formula utilized for estimating the performance of leaching systems must take this important variable into consideration.
- Some individuals have speculated that cardboard rapidly beaks down in a leach field; our field experience and in house testing do not support this. In apples to apples testing, the cardboard and filter fabric system ponds more and infiltrates slower than the ¾" stone system without cardboard and filter fabric. The contention that cardboard treats wastewater better before biomat develops is also misplaced. In our tests, upon startup, the wastewater is funneled by the cardboard though the bottom surface that is unmasked by cardboard and fabric; this results in less treatment, not more.
- Some individuals have speculated that sand somehow migrates through ¾" stone more than through larger stone that has been typically utilized in leaching system construction. Not only does this defy traditional soil physics, testing does not support this contention. These same individuals also speculate that a stone and fabric interface is superior to simply a stone interface; testing has not supported this hypothesis. In fact, above the interval subject to ponding during dosing, surface tension associated with the capillary rise of water in sand allows the sand stone interface to remain remarkably flat and distinct; even despite being subject to daily vibrational forces. In areas where water temporarily ponds during dosing, the sand and stone interface does mimic the stone sidewall "shape", providing additional surface area relative to the flat, straight stone/sand interface above.
- Silt and clay particles associated with dirty stone have been widely believed to result in decreased leaching system life span. Recent studies do not support this contention. Furthermore, data suggests that open bottom area is not as effective as first believed due to accumulation of TSS on the interface and subsequent persistence of wastewater ponding over it.

While I understand the temptation to speculate based on prior experiences, in my own experience the only way to know for certain is to accurately test out a theory or hypothesis. Much of what I have

envisioned is no longer so after testing. I believe that it is in the best interest of the taxpayers and environment to make changes to our ELA rating system based on fact and science, rather than speculation, opinion, current employment position and hopes.

The above referenced December 7, 2009 letter claims to promote a conservative ELA rating approach, on behalf of tax payers; at face value, I am supportive of this methodology and appreciative of the author taking the time to write to you. However, the author also suggests increasing the rating of cardboard and fabric systems, relative to other products. Regardless of the scientific data provided in support of this goal; increasing the ELA rating of any system is less conservative, not more.

Interestingly, this individual developed the original ELA rating formula when he worked for your Department; further adding to the hypocrisy and irony of this situation is the fact that a few years later this same individual took action to reduce the ELA rating of a cardboard and fabric system. Please forgive my skepticism, but it seems to outsiders that once he traded sides, and he could financially benefit from this, that he has a very different view point. This serves as a perfect example of what taxpayers in CT should not be subject to.

From a broader perspective, the above situation further illustrates the abuse that can result when a government agency does not utilize the traditional Legislative Process or Rule Making, including allowing public comment and involving our elected officials. These matters deeply affect taxpayers; transparency and fairness is critical. While the flexibility and speed of enacting “Technical Standards”, is certainly a consideration, it is particularly susceptible to abuse. This practice should be reviewed to determine appropriate safeguards. We also feel that individuals serving on this Committee should not be allowed to have conflicts of interest; it is not fair to taxpayers, the other volunteers that they serve with and the wastewater industry. We are appreciative and supportive of the fact that the past two Code Advisory Committee meetings have been open to the public.

There are some inequities in the rating system utilized by the Department; while I would support eliminating these, I am not certain that this is in the best interest of taxpayers today. I tend to advocate and utilize a scientific methodology. If cost and time were not an issue, I would advocate testing all the systems in use in CT relative to one another through third-party testing; unfortunately, this is not likely to happen today. The reality is that the formula, and potentially inequitable rating practices employed by the department, has served the taxpayers well for years, based on the empirical data. The system failure rate in CT is comparable to other states with different practices. While it would be nice to eliminate these inequities, they have effectively become part of the rating system over time. Changing this rating system, in the absence of scientifically defensible data, is not wise. In my experience, what can seem like a simple, insignificant, change can result in profound consequences when good control over all of the variables is not possessed. In the absence of sufficient funding to fully understand and test the associated systems and variables, even though some of these inequities cut against Geomatix, I would let sleeping dogs lie.

Thank you, the staff of the DPH and the Code Advisory Committee for taking the time to address this important issue. If DPH employees or any of the DPH Code Advisory Members, who do not have a conflict of interest, would like to see our ongoing testing, we would be happy to arrange for a tour. We hope that this letter and the documents referenced below are helpful. If we can be of further assistance, please do not hesitate to contact us.

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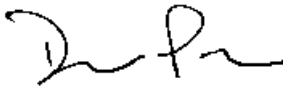
Sincerely,
GEOMATRIX SYSTEMS, LLC



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Environmental Scientist

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