Report to the General Assembly in Response to Senate Bill 1577:

Evaluation of the Need for 180-day Biochemical Oxygen Demand Sampling

December 21, 2017

Division of Onsite Sewage and Water Services,
Environmental Engineering and Marina Programs
Virginia Department of Health

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List of Acronyms

AOSS – alternative onsite sewage system or systems
AOSS Regulations – Regulations for Alternative Onsite Sewage Systems
BOD_5 – Five-day biochemical oxygen demand
COSS – conventional onsite sewage system or systems
DEQ – Department of Environmental Quality
DPB – Department of Planning and Budget
EPA – United States Environmental Protection Agency
FOIA – Freedom of Information Act
GMP – Guidance Memorandum and Policies
GPD – gallons per day
LHD – local health department
OEHS – Office of Environmental Health Services
O&M – operation and maintenance
OSE – licensed onsite soil evaluator in Virginia
OSS – onsite sewage systems
PE – licensed professional engineer in Virginia
RFP – Request for Proposal
SHADAC – Sewage Handling and Disposal Advisory Committee
SHDR – Sewage Handling and Disposal Regulations
TL-2 – Treatment Level 2 (30 mg/l or less BOD_5 and TSS)
TL-3 – Treatment Level 3 (10 mg/l or less BOD_5 and TSS)
TSS – Total Suspended Solids
VDH – Virginia Department of Health
VENIS – Virginia Environmental Information System

Executive Summary

SB 1577 of the 2017 General Assembly session required the Department of Health to evaluate the need for 180-day BOD_5 sampling for any small AOSS dispersing residential strength effluent and serving no more than three single family residences (attached or detached). A small AOSS has a combined average flow of 1,000 gallons per day or less.

For a generally approved AOSS, the AOSS Regulations, at 12VAC5-613-100.D, require BOD_5 sampling within 180 days of system start-up using methods approved by the EPA.[1] Thereafter, a grab sample is required once every five years. For a non-generally approved AOSS, the AOSS Regulations, at 12VAC5-613-100.E, require BOD_5 sampling using methods approved by the EPA within 180 days of system start-up, four times within the first two years of system operation, and annually thereafter.[2]

Sample results for all AOSS must be submitted to the LHD by the 15th of the month following the month in which the sample was taken. In addition to the sampling requirement, a small AOSS must be inspected annually and its function reported to the LHD using an electronic web-based program. VDH does not normally collect samples through complaint investigations and at this time does not perform random inspections on AOSS. Instead, VDH relies on yearly reports with sampling data from the private sector to assess and monitor performance of treatment technologies used in the marketplace.

AOSS typically utilize a treatment device that resembles a scaled-down municipal treatment plant to produce an effluent that is "cleaner" than septic tank effluent with respect to the amount of organic material, the total nitrogen load, and the number of microorganisms present in the effluent. Typically, AOSS remove 90% to 95% of contaminants before the effluent is released into the soil. Using technology to treat wastewater before it is released into the soil allows AOSS to achieve high performance levels on sites where limiting factors, such as insufficient drainfield area, soil depth and soil permeability; soil saturation; shallow groundwater; or landscape position preclude the use of COSS. There are over 20,000 AOSS in the Commonwealth. The Board of Health adopted the AOSS Regulations in 2011 to establish performance requirements for AOSS.

During consideration of SB1577 and subsequent stakeholder conversations, VDH understands there are at least six concerns regarding sampling for BOD_5.

1. Some stakeholders believe the sampling requirements are unnecessary and expensive. DPB assessed the costs for sampling during the regulatory adoption process for the AOSS Regulations and determined those costs were acceptable. For a BOD_5 sample collected during a routine visit, VDH estimates it will cost $100.00 to $150.00 (an estimated $35 to $45 of lab costs and the remaining cost attributable to collection and

[1] "General approval" means a treatment unit has been evaluated in accordance with the requirements of the AOSS Regulations and approved.
[2] "Non-General approval" means a treatment unit has not been evaluated in accordance with the requirements of the AOSS Regulations and generally approved.

delivery of the sample to a certified lab). The licensed operator is already onsite to operate the AOSS and provide the annual report on the system's function so costs for collecting the sample and delivering to the nearest lab is minimal in comparison to other costs.

2. Aside from cost, some stakeholders reported that a licensed operator would not need to collect a sample for lab testing and could instead visually inspect and smell the sample for evaluation of system performance and operation. Stakeholders asserted that using visual and smell field testing could substitute for BOD_5 sampling.

   VDH's data show that operators cannot discern whether a treatment unit is meeting the performance requirements based on sight and smell. There were approximately 6,450 AOSSs installed from July 7, 2011, to the present. VDH has received about 1,885 O&M reports with sampling data. Of the 1,885 samples, 21% of the data (392 samples) showed high BOD_5 results (greater than 30 mg/l) even though operators reported 90% of the time (354 out of 392) that the AOSS was working properly. Some stakeholders believe that high percentages of non-compliance can be addressed with more robust oversight and follow-up with property owners by VDH.

3. Some stakeholders express concern that access to sampling data could only be obtained from requests pursuant to the FOIA with an associated charge.

   Beginning December 1, 2017, VDH will start posting data online quarterly. This effort will remove the need for stakeholders to request sampling data and O&M data through FOIA.

4. Some stakeholders believe VDH does not use data from the sampling required by the AOSS Regulations; hence, sampling is unnecessary.

   As described in #2 above, VDH has used the data submitted to determine whether VDH and stakeholders can have confidence in a visual and smell test based on sampling data. VDH believes sampling results will help VDH with future regulatory initiatives to improve policy through data driven decisions.

5. Some stakeholders question the initial sample collection within 180 days of system start-up, as the licensed operator could take the sample immediately after startup, before the treatment process has been properly established. Stakeholders believed this results in meaningless data.

   VDH is addressing these concerns through a regulatory update of the AOSS Regulations.

6. Many stakeholders agree VDH must improve its programmatic oversight and enforcement and contend that this would result in more relevant data that could be used for the public's benefit. Stakeholders observe that poor sampling results could result from many different factors, including: (a) improper installation; (b) abuse of the system

by the property owner; (c) improper collection procedures; (d) mechanical failure of a treatment process, such as a blower; or (e) improper design.

VDH is addressing these concerns through a regulatory update of the AOSS Regulations.

VDH uses BOD_5 sampling data to improve its program and to ensure that AOSSs are complying with performance regulations. Many other states, including neighboring North Carolina and Maryland, also use sampling data to assess and monitor the performance of AOSS. Sampling and reporting facilitates VDH advancement of programmatic oversight and policy improvement, and confirms regulatory compliance. Conservatively, installation and design costs for an AOSS range from $10,000 to $25,000 so the O&M costs are relatively minor to protect that investment.

Stakeholders want performance regulations, not prescriptive requirements, and sampling is the best means to verify performance. If sampling were prohibited, the Board of Health would likely need to reinstate more prescriptive regulations to ensure public health is adequately protected because the industry standard is to collect samples to verify performance of advanced wastewater treatment systems.

Based on stakeholder comments and concerns, VDH recommends the following actions:

1. Revise 12VAC5-613-100.D and E to improve confidence in the BOD_5 sampling result. VDH is currently working with the SHADAC, manufacturers, operators, and other interested stakeholders to revise the AOSS Regulations. A periodic review of the AOSS Regulations concluded in 2016 resulting in many comments from stakeholders, which will be addressed during the regulatory revision process.

2. Post O&M sampling data for every AOSS online. Beginning December 1, 2017, VDH will begin posting O&M information on its website and make it accessible to stakeholders. This will facilitate efforts of owners, operators, and designers to improve the design and function of AOSS, and eliminate the need for stakeholders to request data through FOIA. Placing more information into the public domain will help Virginians make informed decisions about choosing a treatment device. Generally, property owners rely on their private consultants to offer advice and anticipate future O&M costs. Posting data online will improve decision-making and make the performance regulations more effective.

3. Continue to differentiate sampling requirements between proven and tested technology and technology that has not been evaluated by an independent 3rd party. For small AOSS, VDH requires sampling four times within the first two years of system operation and annually thereafter for "non-generally approved" (non-proven) technology, and once every five years for "generally approved" (or 3rd party proven) technology.

4. VDH should update its database - VENIS - to improve data dissemination of sampling results and streamline sampling dissemination to stakeholders. The data currently populated and retained within the VENIS database was evaluated for relevancy to O&M and sampling reporting. Data most useful to stakeholders will be extracted from the

overall database on a quarterly basis by VDH beginning December 1, 2017. Data will be posted on the VDH website for access by stakeholders. VDH anticipates significant updates to VENIS by January, 2019. These updates should allow continuous improvement of data quality, increased efficiency of information input, and less redundancy.

VDH shared the draft of this report with stakeholders engaged in the periodic review of the AOSS Regulations. Some stakeholders remain concerned about the grab samples being a poor diagnostic of the performance of an AOSS and the perceived lack of enforcement by the Department. Others advocate for a third party annual field audit of systems. These concerns continue to be debated in the AOSS Periodic Review Workgroup for possible amendment of the AOSS Regulations. (See Appendix C for Workgroup Comments on Draft Report).

Background

The AOSS Regulations describe two basic treatment levels- TL-2 and TL-3. TL-2 effluent contains no more than 30 mg/l Biochemical Oxygen Demand (BOD_5) and 30 mg/L total suspended solids; TL-3 effluent contains no more than 10 mg/L BOD_5 and suspended solids. Both levels of treatment reduce fecal coliform bacteria by several orders of magnitude. From the point of effluent application or the bottom of the drainfield trench or other excavation to the saturated soil, also known as the seasonal water table, TL-3 effluent is required when the vertical separation is from 0 to 12 inches, and TL-2 effluent is required where the vertical separation is from 12 to 18. Sampling is the only way to confirm compliance with performance requirements for treatment (either TL-2 or TL-3).

The AOSS Regulations establish two AOSS categories: "generally approved," which is a system that has been adequately tested and evaluated by a 3rd party to show it can perform in accordance with the regulations, and, a "non-generally approved" system, which is one that has not been proven by independent 3rd party evaluation and testing.

Generally and non-generally approved systems require a sample within 180 days of system start-up to verify performance. VDH estimates the cost for the lab sample is $35.00 to $45.00 (only a BOD_5 test is required, unless disinfection is needed, in which case the treatment is also tested for fecal coliform removal). Subsequently, generally approved systems are sampled once every five years after the initial sampling event to verify performance. After start-up sampling, non-generally approved systems are sampled four times with the first two years of system operation and annually thereafter. If adequate performance is verified, then the non-generally approved unit is sampled as though it were generally approved (once every five years). All systems must be properly maintained by a licensed operator.

Before 1990 the vast majority of systems installed in Virginia were of the conventional variety and many were installed with little or no separation from the seasonal water table in the coastal region of the Commonwealth. In the early 1990's, Virginia began to see an increase in the number of AOSS installed. This was driven primarily to overcome site limitations such as

shallow water tables and limited land area. Initially, AOSS were treated as experimental or they were installed through a variance from the regulations to overcome hardship conditions.

From 1990 through 2000, technology advances warranted policy and regulation changes. In 2000, the SHDR incorporated "secondary treatment." Secondary treatment was necessary when the separation distance from the trench bottom of the sewage system to saturated soils or other limiting features was less than 18 inches. This requirement applied to new construction and the repair of failing COSS.

To address economic impacts of the changes made in 2000, in 2003 the General Assembly passed Va. Code § 32.1-164.1:1, allowing an owner to obtain a waiver from any new treatment requirement that did not exist at the time the original system was permitted. This waiver effectively allows owners to bypass the Board's secondary treatment requirement and continue to disperse septic tank effluent into the soil, in many cases directly into ground water. The waiver must be recorded in the county land records and is null and void whenever the property is transferred to a new owner. At the time of property transfer, a system with a waiver must be modified to comply with all current regulatory requirements. The waiver law also applies to the treatment requirements contained in the AOSS Regulations. To date, nearly 1,500 owners have taken treatment waivers.

In 2008, the General Assembly session approved HB1166, which created Va. Code § 32.1-163.6. This legislation allowed a professional engineer to design an AOSS that met the performance requirements of the SHDR (12VAC5-610), complied with standard engineering practice, and met horizontal setbacks that protected public health and the environment. The designs did not have to comply with the prescriptive regulations normally required by the SHDR. The legislation took effect on July 1, 2008.

Soon thereafter, licensed professional engineers began proposing and designing sewage systems that would have been denied historically under the SHDR. For example, the SHDR prohibits installations into flood plains subject to intermittent flooding, into rock, into the water table, and into transported deposits with extended periods of saturation (see 12VAC5-610-593). The SHDR's regulatory prescriptions also require at least 12-inches of naturally occurring, unsaturated soil to install a sewage system.

Stakeholders soon realized the SHDR were not sufficient to implement Va. Code § 32.1-163.6. As a result, some local governments began instituting additional local ordinances to prevent systems from being installed into sensitive receiving environments where shallow groundwater or shellfish waters were found. Other groups became concerned about how the local ordinances were being implemented, resulting in three separate Attorney General's Opinions (See 2010 Op. Atty. Gen. 53; 2012 Atty. Gen. 11-100; and 2012 Op. Atty. Gen. 45). Additionally, some manufacturers of proprietary equipment became concerned about how their equipment was being used by the professional engineering community. Equally concerned were environmental groups about the potential for development in sensitive receiving environments, such as the Chesapeake Bay watershed and wetlands.

In 2009 the General Assembly amended Va. Code § 32.1-163.6 via HB2551 and SB1468. The legislation required the Board of Health to implement emergency regulations to establish performance requirements for all AOSS, including designs pursuant to Va. Code § 32.1-163.6). The legislation also required the Board to implement other mandates of the *Code of Virginia,* specifically Va. Code §§ 32.1-164.H-I (operation and maintenance of AOSSs), which the 2007 General Assembly approved (HB 3134). Other legislation approved in 2009 (HB1788) prevented a locality from prohibiting the use of AOSS and also prohibited local governments from adopting maintenance standards and requirements that exceeded those of the Commonwealth.

The Board of Health worked with a stakeholder group and the Institute for Environmental Negotiation (IEN) to develop emergency regulations, which were adopted and published on April 7, 2010. The IEN's facilitator report contains additional background information. VDH also worked with the Survey Research Center, Weldon Cooper Center at the University of Virginia to interview 671 owners of conventional and AOSS. The information obtained was utilized by the Board of Health to insure it had a complete understanding of owner experiences before final regulations were adopted. The Weldon Cooper report contains additional information.

On April 26, 2010, the Board of Health published a Notice of Intended Regulatory Action (NOIRA) informing of its intention to promulgate final regulations to replace the emergency AOSS regulations. Stakeholders had 30 days to offer comments on the NOIRA. VDH also formed a second stakeholder work group to review the emergency regulations, discuss comments on the NOIRA, and develop changes to the proposed permanent AOSS regulations. The Department of Planning and Budget (DPB) analyzed the economic impact of the proposed regulations, which VDH supported.

The emergency regulations specified TL-3 effluent with standard disinfection when an AOSS was installed less than 12 inches to the water table. TL-3 effluent means 10 mg/l or less biochemical oxygen demand (BOD_5) and total suspended solids (TSS). The Board published its proposed *AOSS Regulations* on December 6, 2010 which introduced the concept of direct dispersal to groundwater. Direct dispersal was defined as a dispersal of effluent within 6-inches of the water table. Direct dispersal required a higher standard of disinfection as well as an effluent quality of 5 mg/l or less BOD_5, TSS, and total nitrogen (TN) unless the AOSS was located within the Chesapeake Bay, in which case the TN had to be reduced to 3 mg/l or less and total phosphorus reduced to 0.3 mg/l or less.

A 60-day comment period was specified for the proposed regulations which ended on February 4, 2011. VDH received numerous comments from stakeholders. VDH formed a third stakeholder advisory group to review the comments and offer ideas for change. Staff met and discussed the regulatory activity with several legislators, including Delegates Timothy D. Hugo, Joe T. May, Harvey Morgan, and Lynwood Lewis. Staff also consulted with the Department of Environmental Quality and the Office of the Attorney General. Through this iterative process, VDH proposed several more changes that the Board of Health adopted on June 9, 2011. Following executive branch review, the final regulations took effect on December 7, 2011

and included sampling and other operational requirements for AOSS. The AOSS Regulations establish performance requirements, not regulatory prescriptions.

The Board of Health's AOSS regulations have not changed since 2011. The current regulations require sampling once within 180 days of system start-up and once every five years thereafter for technologies tested by an independent 3rd party. For systems whose performance have not been verified by 3rd party evaluation, the owner is required to sample once within 180 days of system start-up, four times within the first two years of system operation, and annually thereafter.

Despite extraordinary efforts to understand and find consensus among stakeholders, several contentious issues remain, on which VDH continues to work. Some stakeholders want less oversite, fewer prescriptions, and different sampling and reporting frequencies. Others advocate for a complete prohibition of dispersal to groundwater and wetlands. These remaining conflicts and viewpoints resulted in four bills being introduced during the 2012 General Assembly session: SB356, SB442, HB942, and HB1071; two during the 2013 General Assembly session, HB1611 and HB1726; and one in 2016, HB1080. HB1080 would have exempted all small AOSS (less than 1000 gallons per day) from effluent and groundwater sampling requirements unless the system had received a Notice of Violation from VDH.

The AOSS Regulations allow for dispersing effluent directly into groundwater without any vertical separation. In developing direct dispersal regulations, VDH considered that groundwater is protected by the Groundwater Standards found in 9VAC25-280, as promulgated by the DEQ. VDH and DEQ reached consensus to require best available technology as the performance requirement in the very sensitive receiving environment for direct dispersal. DEQ agreed to not oppose the AOSS Regulations as long as AOSS that discharged to groundwater complied with the Groundwater Standards pursuant to 9VAC25-280. Also, on December 1, 2016, the Board of Health approved fast-track amendments to the AOSS Regulations to change performance requirements for repairs and voluntary upgrades to systems currently dispersing effluent directly into the water table in order to provide relief of economic burden on homeowners and facilitate repairs of failing systems.

Conclusions

VDH's strategic vision is to shift evaluation and design services for sewage systems and private wells to the private sector in an orderly manner over a five-year period. This will allow limited VDH resources to be focused on improving public health and groundwater supplies. The strategic vision includes VDH having a more traditional regulatory role with a proper "check and balance" system.

VDH explored with stakeholders whether a licensed operator could use certain field tests or field parameters in lieu of lab sampling to ensure compliance with the performance requirements for AOSS. VDH obtained turbidity data with paired TSS and BOD data from two municipal sewage treatment plants. In both cases, TSS and turbidity were well correlated but correlation of the BOD and turbidity data was inconclusive. A review of the literature found a number of accounts of the turbidity and TSS relationship, but not for BOD and turbidity. Additionally, field

turbidimeter units typically cost about $1,000 and require periodic calibration to obtain accurate results. Given the inconsistent correlation, turbidity was dropped as a potential predictor of BOD concentration. Stakeholders also examined a number of other possibilities, but to date, could not identify any adequate field test to ensure compliance with the performance requirements.

Stakeholders want performance regulations, not prescriptive requirements, and sampling is the best means to verify performance. The industry standard is to verify performance through sampling. All wastewater treatment plants sample to confirm performance. Without data, VDH cannot determine objectively whether AOSS comply with performance requirements in the AOSS Regulations (12VAC5-613), which the Board of Health established while working through three stakeholder groups over a three-year period. Without data, VDH cannot answer basic questions about the effectiveness of the program and impacts to public health and groundwater supplies.

The Board of Health developed the minimum sampling requirements necessary to protect public health through that same three-year process that involved three different stakeholder groups and a professional facilitator. VDH is in the process of proposing amendments to the AOSS Regulations following a periodic review that concluded in 2016. VDH plans to share sampling data with stakeholders and concerns can be addressed through the upcoming stakeholder process. The Board of Health (BOH) received nine comments on the Emergency AOSS Regulations. Three commenters asked for either more frequent sampling or monitoring of additional constituents (e.g., fecal, TSS). During the proposed stage of the AOSS Regulations, the BOH received 91 comments and only one commenter asked for sampling to be eliminated. During the final stage of the AOSS Regulations development, the BOH received 10 comments and no one asked for a change to the sampling requirements.

Costs are reasonable as determined by DPB analysis. For a sample during a routine visit (as required by the AOSS Regulations), VDH estimates it will cost between $100.00 and $150.00. The lab cost is estimated to be $35 to $45, and the remaining amount is for collection and delivery to the lab. The licensed operator is already onsite to operate the AOSS and prepare the annual report on the system's function, so costs for collecting the sample and delivering it to the nearest lab are minimal in comparison to other costs. Conservatively, installation and design costs for AOSS range from $10,000 to $25,000 so the O&M costs are relatively minor considering the essential need to protect the investment in the wastewater treatment system as well as the investment in the residence, business, or other entity that it serves. Posting sampling data online would also help consumers make informed decisions about the effectiveness and costs for products available in the marketplace.

VDH's data show that operators cannot discern whether a treatment unit is meeting the performance requirements based on sight and smell. Approximately 6,450 AOSSs were installed from July 7, 2011, to the present. VDH has received about 1,885 O&M reports with sampling data on those systems. Of the 1,885 samples, 21% of the data (392 samples) showed high BOD results (greater than 30 mg/l) even though operators reported 90% of the time (354 out of 392) that the AOSSs was working properly.

VDH does not perform random inspections or conduct formal sampling during complaint investigations. VDH cannot assess any charge for sampling from a random inspection or complaint investigation without the authority to do so. VDH does not have resources to pay for sampling conducted at a random inspection or complaint investigation. Licensed operators are best equipped to collect samples and VDH does not have enough licensed operators or staff to take such samples statewide. VDH relies on yearly reports with sampling data from the private sector to assess and monitor performance of treatment technologies used in the marketplace.

The Board of Health differentiates sampling requirements between proven and tested technology and technology that has not been evaluated by a 3rd party. For small AOSS, VDH requires sampling for "generally approved" (or 3rd party proven) technology once every five years, and for "non-generally approved" (or non-proven) technology, sampling four times within the first two years of system operation and annually thereafter. All systems, proven and unproven, must sample within 180 days of system start-up. About 30% of AOSS are complying with the required 180-day sampling event. Sampling data that is collected can be aggregated to establish performance benchmarks and metrics to evaluate individual and collective system performance. This will guide future performance improvement strategies for the onsite sewage program.

Appendix A: List of stakeholders who participated in the discussion of SB 1577

Stakeholders present during the AOSS Periodic Review Workgroups that met on May 17, 2017, and September 20, 2017, where SB 1577 discussed:

Dwayne Roadcap, Director, Division of Onsite Sewage and Water Services, Environmental Engineering, and Marina Programs (DOSWSEEMP), VDH

Karri Atwood, Legal Affairs/Environmental Health Coordinator, DOSWSEEMP, VDH

Marcia Degen, Environmental Technical Services Administrator, DOSWSEEMP, VDH

Kemper Lloyd, Technical Services Engineer, DOSWSEEMP, VDH

Doug Canody, Technical Services Engineer, DOSWSEEMP, VDH

Anthony Creech, Environmental Health Coordinator, DOSWSEEMP, VDH

Curtis Moore, President, M & M Soil Consultants, Inc.

Mike Burch, President, Nature Works Inc.

Jim Bell, Executive Vice-President, Bio-Microbics, Inc.

Chris Beatley, Aftersales Coordinator, Premier Tech Aqua

Darren Mong, Sales/Marketing Manager, E-Z Treat Corporation

Joel Pinnix, President, Obsidian Onsite Services, Inc.

Nick Noble, Government Relations Manager, Orenco Systems

Joe Soulia, Government Relations, Orenco Systems

The periodic AOSS Periodic Review was also discussed at a meeting of the Sewage Handling and Disposal Advisory Committee on November 8, 2017. Summaries of discussion at those meetings along with list of attendees are available at:

April 14, 2017:
http://www.townhall.virginia.gov/L/GetFile.cfm?File=C:\TownHall\docroot\\meeting\58\25909\Minutes_VDH_25909_v2.pdf

November 8, 2017:
http://www.townhall.virginia.gov/L/GetFile.cfm?File=C:\TownHall\docroot\\meeting\58\26843\Minutes_VDH_26843_v1.pdf

Appendix B: Notes from stakeholder meetings about SB 1577

Minutes as posted to Townhall from May 17, 2017,
http://townhall.virginia.gov/L/GetFile.cfm?File=C:\TownHall\docroot\Meeting\58\26018\Minutes_VDH_26018_v1.pdf

and September 20, 2017 AOSS Periodic Review Workgroup Meetings.
http://townhall.virginia.gov/L/GetFile.cfm?File=C:\TownHall\docroot\Meeting\58\26533\Minutes_VDH_26533_v1.pdf

Periodic Review Sub-group Meeting on Sampling Requirements of the AOSS Regulations
May 17, 2017 10:30 a.m.
109 Governor Street, Richmond, Virginia 5th Floor Conference Room
(12VAC5-613-90 and 100)

Members: Anthony Creech, Curtis Moore, Joel Pinnix, Mike Burch, Doug Canody, Jim Bell, Nick Noble, Dwayne Roadcap, Karri Atwood

Introductions: Joel Pinnix, PE, represent ACEC; Curtis Moore, OSE; Karri Atwood, VDH; Anthony Creech, VDH; Doug Canody, VDH; Jim Bell, Bio-microbics; Nick Noble with Orenco Systems.

The group reviewed the current sampling requirements. Doug Canody put together a diagram, hand-out, demonstrating the requirements of the current regulations. The diagram showed the process flow of the sampling requirements, including lab and field testing, and the pathway and decision tree in order to determine the types of samples taken and the decision to be made. The red diamonds on the diagram represent decision points. Blue blocks are a process or something that has to be done.

Jim Bell asked what the Department's goal was in the 2010 legislation requirement. Mike Burch stated that the intent was for a sample to be taken within 180 days, however, he knows of one engineer who would test on day 1, plain water in it, just water and collect the data. He also stated that he had trouble getting the data, was told to go to the local counties, had to put in FOIA requests, had to constantly put in FOIA requests. Also stated Loudoun does enforce it, there are more of my systems in Loudoun, I'm not opposed to testing as long as we make use of the data; conversely, led to believe some systems trying to make their numbers look good, nothing in regulations about the O&M provider taking the sample, sometimes owner and manufacturer take early sample for better result.

Based on conversation, Karri wrote the following interests on the flip memo: 1. Access to sampling 2. O&M provider taking sampling 3. Taking a sample to early, nobody in house, regulation poorly written and abused and not a tool for VDH.

The spec home, the model home, surely we can come up with some language about 90 days within occupancy. Nick Noble noted the data has to be used in a meaningful way, if not using it

to bring system into compliance, then we need trigger for enforcement. Without enforcement, the data is meaningless, would like to continue to collect the sample, but it needs to be meaningful. Joel Pinnix noted that as a licensed operator, only O&M operator can submit data online, you can get a test or sample your own system however the only person who can report is the licensed operator. He also noted the need for education at the local level.

Conversation proceeded about how to ensure data is collected after system actually put into use, need awareness of when system goes into operation. Would like operator to collect sample after 45-90 after operation, how do we create a trigger event? Spec house not occupied for years, as a manufacturer when does a warranty start? Warranty beings from date of installation. Doug noted no connection between warranty and enforcement and occupancy permit comes from building office. Joel noted that a manufacturer will hire him to provide 2 years of O&M as part of the sale of the system. It was noted that you can't pull up historic data, unless you are using integrated 3rd party. When you are entering in the data, it is time consuming, enter files and enter all the data into the report.

Doug noted the problem with continuity, how do you educate the owner? Loudoun County has their data linked, start-up visit with 180 days, initial visit that triggers everything. When we created the regs, you need to collect more data, new VENIS would be a problem, a lot of people went to 3rd party provider, that's important to understand, when is a property due for a 5-year sample, what day and year it is due. Taking over older system, sampling is related to the data collection and dissemination, the sampling can be worthless. For the original question, very few operators 10 years ago, single family discharging systems and treatment units, they thought just because it smelled good, it was operating ok.

Joel noted the technical advisory committee before the emergency regulations were enacted, voted 15-2 to not to sample single family residences, field performance was satisfactory. A request was made from the group for the sampling data that VDH has collected. Joel stated he wanted to get rid of sampling unless data demonstrates its importance.

Nick said he filed a couple of FOIAs for all the sampling data, and the data shows patterns of treatment units not meeting limits, from enforcement and compliance lens, it shows value. Jim said that he had not seen the data and that he was bothered by the fact that sampling data is as good as the technology and the person collecting the sample. Also there has to be confidence that the sampling procedures are followed, correct location, correct process, sample preserved correctly. Nick noted it was always difficult to ensure that sampling procedures were being followed correctly; however, not sure it's worth throwing baby out with the bath water. When you look at hundreds of sample data, those things get smoothed out, there will be 1 or 2 that is three times the standard that tells you something, it is not just a sampling error. Nick also noted that if more enforcement takes place, the industry would react, manufacturers would make better systems, support our markets. If sampling data collection can be done well and used appropriately, it's a net win for the industry.

A conversation about the cost of sampling and the operators' time and expense in collecting the data began based on a complaint Dwayne received from a citizen. Curtis noted we should not write a regulation based on cost but instead on need for sampling. Jim and Nick talked about

requirements in other states. Nick said from a 30,000-foot view, in Oregon, a rule was implemented to sample system once every 5 years, randomly select 20 systems, if more than 20% out of compliance, re-sample, then the manufacturer could get involved. In North Carolina, systems have to be sampled quarterly to show compliance level for general approval, and then sample once per year for BOD, TSS, fecal at minimum. In Rhode Island, quarterly samples every year, and once per year for nitrogen system compliance. Some states require no sampling. In Massachusetts, owner pays for four samples per year, the department gets all of the data, and however, they have done no enforcement. One of the major impediments to maintaining confidence in the industry is that industry has to provide solutions on economic scale. Systems can treat for recharge and irrigation with myriad benefits; however, there isn't public confidence to install on a wider scale. Industry and regulatory community has to work together to find a way to sample systems, get meaningful data, and take enforcement when necessary.

Joel talked about that as a system designer; there are rules that stipulate minimum size requirements, 4BR house, 600 GPD system with 600 GPD treatment system. He recently met with elderly couple getting 40 GPD, system is starving, so if you pull sample there is no odor, but it's always a little bit cloudy, BOD pushing 30 or a little over, not much you can do to that system when there is a disconnect between sizing and getting engineering performance from those systems. It's going into the ground, so he doesn't believe there is an environmental or public health risk, not discharging to stream, creek or ditch. Sampling that system, with nonconforming result, what does that tell you? No action item, everything is working, but there is not enough food in the mixed liquor.

Nick noted that manufacturers test the unit to get into the market with specific effluent targets. These systems met sampling requirements on 18-20 systems, based on state requirements, at some point. If sampling data demonstrates 40% of sites not meeting limits after put into operation, then it would be a health issue, it starts to impact economics of owner, drainfield clogs prematurely, that can be a big expense. I think the performance issues, always outliers, have to come to manufacturer, but where there is abuse, such as the operators not doing their job seriously, then they must be addressed by this committee. There are widespread issues, don't want to throw baby without the bath water.

Joel said that data was not reliable, no confidence in the data, and you can't regulate confidence in the data. He stated he disagreed with VDH's approval of manufacturer approval, long history of failure, getting a number that is relatively meaningless. He believed the technical advisory committee got it right, can pull sample of effluent, you can smell and look and know that it is working properly if other components working. Getting a sample won't tell you anything as small single family residences, not a lot of adjustment to be made. Nick noted disagreement with this point but observed that is why the workgroup is working on these problems.

Karri asked Nick and Jim if they had seen other states that do enforcement well. Nick replied that he had not; however, enforcement shouldn't be a dirty word. There is huge reticence to enforce by regulating community, because they have been beat up by industry with no political will to back decisions. Nick said he believed it was a linchpin for our industry. The only way to support effluent limits is to have data to base decisions upon. Conversation about enforcement and VDH's current approach of plus one, meaning that before any enforcement is taken there must be

a bad sample and another factor. Jim talked about the Massachusetts model that within 180 days service provider checked things to see whether the unit is in compliance, and if it is no additional sample taken for another five years. Massachusetts in 1992 did an evaluation of sampling for BOD, turbidity, DO and pH, and if system does not fall within the parameters, then a sample is pulled. It's not decreasing the compliance criteria, eliminating the cost of collecting a sample, it's not the lab fees, it's the logistics that cost money. Nick noted that field indicators were not a bad way to go, there is some nuance, if you get 90 BOD on 10- 10 system, the plus one enforcement rule is not good. There has to be a component of education and knowledge, too. Possibility of drafting a regulation stating that if field indicators were off more than standard deviation, then resample.

Curtis noted that utilizing field indicators and only sampling if not within parameters would allow the possibility of eliminating 5 year and 180-day sampling events, but would be a step forward to look at the parameters every year and only a bad result would trigger a sample. It would give operators more practice in taking samples during their annual visit. Joel reiterated his point that field observations and being on site is important, and the technical advisory committee got it right Dwayne said he would send data.

A discussion occurred about operators and renewable operating permits with O&M manuals that require more than yearly visits. The group discussed how enforcement is necessary to ensure good samples were being taken and that currently there is little to no enforcement for O&M. Joel said he saw little value in trying to regulate more enforcement for O&M visits that are more than yearly as there is currently no enforcement for the yearly visit. Group also discussed the requirement of recordation of notice of an AOSS system as provided in the Code of Virginia and how to make homeowners more aware of their O&M responsibility. Dwayne and Karri said they would draft some regulatory language for the group to look at based on the Massachusetts evaluation utilizing field indicators and only sampling when items were outside the parameters.

AOSS Periodic Review Workgroup Meeting Minute
September 20, 2017
9 a.m. Monroe Building, 101 N. 14th Street, 15th Floor Training Room
Members Present: Dwayne Roadcap, Karri Atwood, Kemper Loyd, Doug Canody, Marcia Degen, Chris Beatley, Darren Mong, Mike Burch, Joel Pinnix, Nick Noble, Joe Soulia

Objective: Recommend to the Sewage Handling and Disposal Advisory Committee changes and/or revisions to the AOSS Regulations with respect to Sampling, 12 VAC5-613-90 &100; TL3 field sampling procedures, 12 VAC5-613-70; and Performance Requirements, 12 VAC5-613-80 & 90.

Sampling Procedures & SB 1577 Discussion

-VDH explains draft language for sampling, 12 VAC5-613-90 &100 and the turbidity report. Agency couldn't connect turbidity to BOD, so put together a mechanism of collecting data, if it's out of compliance (1.5xlimit), adds enforcement and verification of sampling. The time of sampling was changed to 45 to 180 days after startup to ensure system was functional at time of sampling.
-45 to 180 days sampling, first bad sample have to retest within 45 days. The change in the timing of sampling (45 to 180 days) is positive. Manufacturer brings up that 45-day resampling won't tell you anything (bad operator, bad system). Influent sampling instead of effluent sampling would be better because drugs could be taken by residents or overuse of cleaning products
Members expressed the following concerns:

1. The cost of all of the testing, is the system really impacting public health and the environment?
2. Agency didn't do anything with the data and as a manufacturer couldn't obtain the data had to go to each LHD and utilize FOIA.
3. Effluent sample doesn't really tell you anything, influent sample would tell you more but then you would have to start regulating people on medications in the home
4. Talked about possibility of utilizing a visual and odor test and whether you could tell system producing 30-30 and 60-60 through field parameters
5. Some operators are only doing a performance inspection and not maintaining the systems. These systems have to be maintained. Maintenance is not happening; the homeowners think they are but they're not.
6. Enforcement is the main difference in how different states approach the problem, look at North Carolina's enforcement letters. Prince William Health Department didn't have the money to send out enforcement letters, put a stamp on the letters for all systems that haven't submitted samples.

-Agency said they wants to keep BOD in the Regulations or have someone provide a reliable study to point to another method that the agency could replace BOD with, give agency something, a field parameter study demonstrating that system is reaching 30-30. If we accept that BOD is needed, then questions are: (1) how we do sampling and (2) how we do enforcement.

Members discussed the following concerns:

1. System start-up testing and then testing every 5 years
2. Right now we have either BOD v. field parameters. And no studies or other state doing field parameters, so as an agency, we're left with BOD.
3. Operators see problems with overdesign and intermittent usage, system isn't get fed enough.
4. Some manufacturers support field testing and more enforcement. Members stated could support sampling if there is a level playing field, and agency ensures that homeowners are protected, sampling is expensive for homeowners. Also make sure that we aren't simply penalizing people who are sampling and testing. A manufacturer expressed that they thought it was a good idea to get the sampling data, get a snapshot of how system performing.
5. One member thought that VDH created a mythical standard of TL2 v. TL3 and VDH data does not support it, VDH resources are better spent enforcing annual inspections. Does not support sampling.
6. Members talked about whether you should test just the system or the entire drainfield (soil treatment is added at this point). Need to look at what is going into the ground v. how the system is performing.
    a. If monitoring receiving environment, then more protective of public health
    b. Monitoring receiving environment won't tell you how the treatment unit is doing itself

Enforcement Discussion

VDH staff explained current approach is called plus one approach: bad sample plus another problem would lead to enforcement. The draft language adds additional sampling, may lead to additional enforcement and/or expense.

Members brought up the following:

1. If you have a bad sample you are violating the VDH mission to protect public health. Huge downside of plus one problem enforcement
2. Big economic problem for homeowners with additional sampling.
3. NC program is much more diligent in sending letters, not NOAVs.
4. When there is a bad sample, talk to operator, then talk to owner or take an influent sample
5. One member suggested putting a moratorium on sampling for five years and doing a better job on enforcement. An operator report to ensure compliance to capture the snapshot of the system.

6. An operator suggested a forceful letter to homeowner, saying these are the bad things that can happen to your system with potential financial costs included. Non-compliance can lead to system failure.
7. O&M provider is the triage for the system
8. Without enforcement there is no point in sampling
9. Is there a way to avoid a second sample if there is an obvious reason (cancer patient)
10. Goal is to not take them to court for a misdemeanor for not filing an O&M report

HB1577 Discussion-
Agency staff discussed the need for sampling, there is no other field studies that demonstrate the system is performing adequately. Manufacturers want a level playing field as long as the sampling isn't too burdensome or onerous. There is no study to allow for field testing to connect turbidity to BOD and agency needs to do a better job at enforcing the sampling. Need to know that systems are performing adequately. 180 day sample gives us some assurance that system is functioning.
Members expressed the following concerns:

1. Agency needs to do follow-up on these systems and that they are maintained and operated appropriately

2. Perhaps instead of just bad sample, if a sample is outside the standard deviation (1.5x) then goes straight to enforcement

3. Make sure there is a level playing field in whatever enforcement happens
4. One member suggested that if you do away with sampling everyone is treated equally

Discussion of 12 VAC5-613-70

TL2 or TL3
Agency staff discussed current regulations, general approval allowed only for in- state testing for units, proposed amendments to 12 VAC5-613-70 (1). Staff talked about proposed amendments, including accepting out of state testing. Concerned about how cold weather can affect the performance of systems in other areas, the proposed amendments allow for data from Plant Hardiness Zones 1a through 7b. For climates that are at least as cold as Virginia. Amendments also allow for CBOD5 to be used in place of BOD5, there are several variances granted to that effect already. Members discussed current approach of in-state testing. An engineer is hired to oversee the entire program.
Members raised the following concerns:

1. How do you get an engineer to stamp something saying the data is collected correctly in another stated and analyzed correctly?
    a. Agency replies that engineer not certifying the data process, he's certifying that he believes the data indicates it will perform to TL3 standards.
2. In last workgroup meeting, talked about TL3 testing was duplicative of NSF 360 testing, 360 testing mirrors well enough what VA does so as long as the units are in the plant hardiness zones then it would be fine from agency perspective
3. A manufacturer states that a lot of out of state testing programs, like Maryland, don't do influent samplings so you can't get a baseline when you have a recirculating

system. So many bedrooms, or so many occupants, base effluent on numbers per capita. Influent sampling is in the manufacturers interest, gives him a sound basis for ignoring the effluent data from the system. Almost like background groundwater quality monitoring

De-listing Discussion

-Manufacturer said that Oregon is dealing with the issue right now. The state made all manufacturers resubmit for approval and then sample a percentage of systems less than 10 years old and then resample if samples not good. If samples were continually not good then approval rescinded. The problem is if system malfunction is outside manufacturers control then can't help with resampling. They do this once every five years, 20 units from every manufacturer, if 20% not compliant, resample and another 20% noncompliant then they do a more in-depth review. Manufacturer submits a reapplication, reapplication fee is triple what is was, state uses the money to employ a statewide sampling procedure. One annual compliance sample and the five year sampling procedure.

Members brought up the following thoughts and concerns:

1. Needs to be a mechanism for manufacturers to work with department for noncompliance.
2. The annual grab sample not really enforced, during 5 year sampling, out of compliance, they work with you and if you can't make the compliant sample then they move to delisting
3. Manufacturer suggested based on Oregon program that recertification every 5 years for listing, at that event, test up to 20 random units (with a composite sampler) that are properly operated and maintained and higher than 20% threshold and enforcement process, and before delisting, they will sample another 20 systems. Could provide manufacturer with good product control to see exactly how system is performing.
4. Could increase confidence for industry and the public, important to have carrots and sticks
5. De-listing if product substantially changes, a manufacturer doesn't support retesting every five years. Maybe do it one time for a baseline and anyone wanting TL3 approval has to do the same thing.
6. One member advocated for greater enforcement instead of sampling
7. If you sample you discover problems and can work with agency to fix problem to greatest extent possible
8. 5 year window for re-testing, if you've had TL3 approval, then you need to resubmit. Some manufacturers think it is unfair that they have to retest under the new protocol. They report it is unfair because they produced a robust data set already under old protocol. It's a long process with considerable expense. For new treatment units it's a reasonable request. Allow out of state data so service providers can collect data. Treatment unit hasn't changed.
9. Mechanism to maintain approval needed. If manufacturers had to collect data like the Oregon approach only once to maintain approval. Or use data just recently submitted to another state to maintain approval.

10. Possibly for renewal of listing, maybe just submit one sampling event from 20 units from similar climates like proposed language in 12 VAC5-613-70 9(1)(a-c).
    a. A manufacturer asked if you have 20 years worth of data and system hasn't changed, how much more sampling do you need?
11. Operator in favor of retesting, sampling and compliance, however not in favor of more data with no consequence. If system is a functioning and approved system, why would we retest?
12. Maryland uses composite sampling which would be in the plant hardiness zones
13. How do we make it a level playing field?
    a. Maybe differentiate between manufacturers who did quarterly testing in Va v. those who didn't. Just need a third party testing within last number of years in a similar climatic zone, should be considered and given some weight.

TL3 Standard

Members expressed the following thoughts and concerns:

1. Some members thought TL3 should stay in the Regulations. Requiring disinfection, increased turbidity impacts disinfection, on tight soils 30 30 units that is putting out 50 50 it impacts the life of a drainfield
2. Nutrient reduction, groundwater contamination increases with density of systems
3. What are other states doing on a 10-10 standard?
    a. Florida has 10-10 in certain areas of watersheds, for shallow groundwater.
    b. Washington very similar to Virginia, they have a tier with 10-10.
    c. In states that don't have a tier then proximity to lake or stream, Pennsylvania also has a 10-10 standard.
    d. Carolina the residential units are 15, Vermont has some higher standards. NY has it and Hawaii. Hawaii has a lot of government funding to reach 10-10. Out in western states water reuse is a big issue, its NSF 350, 5 average and have 1 out of compliance of 10.
4. VDH does not have a problem with keeping TL2 and TL3 standards.

Appendix C:

Summary of Comments from AOSS Periodic Review Workgroup Members on SB 1577 Draft Report

Summary of Comments:

VDH shared the draft report with the AOSS Periodic Review Stakeholder Group which is charged with making recommendations for amendment to the AOSS Regulations, including sampling requirements. The workgroup members are AOSS operators, designers, manufacturers, soil scientists, and agency personnel. The majority of the group conveyed that sampling was acceptable as long as VDH used the results to actively enforce the regulations for non-complying systems. There was the general sentiment that VDH has not used its data for enforcement purposes in the past, allowing failing systems to continue to operate.

An identified problem discussed by the workgroup is the AOSS Regulations requirement that an initial grab sample be taken within 180 days of system operation. Manufacturers stated that if the system did not have sufficient time to operate, i.e. taking a sample on day one, the sample would be useless information. The workgroup discussed a proposed revision that would change the initial sampling period to between 45 and 180 days of operation to allow sufficient time for system start-up.

Some members expressed that they thought the initial grab sample was an ineffective way to analyze whether a system is working properly. They stated that several reasons could lead to a bad sample including improper usage by the homeowner or improper maintenance. To address these concerns, some members advocated for an audit process utilizing an independent third party, paid by the manufacturers, to randomly select systems for 24-hour composite sampling. Other members emphasized that the cost for sampling was relatively low compared to the cost of the system, noting that the homeowner should be assured that the purchased system, often at costs of between 20,000 to 50,000, is operating properly. All members, however, stated that data collected must be used by VDH and not result in a meaningless exercise with financial consequences for homeowners.

The periodic review of the AOSS Regulations is ongoing and revisions are being actively considered by the workgroup. Sampling is the subject of many of the proposed revisions to the AOSS Regulations. Currently, there are no consensus views on how best to amend the sampling requirements. Everyone does agree, however, that VDH needs to do a better job at enforcement to ensure systems are operating properly. Copies of complete stakeholder comments on the draft report are available upon request from the Division of Onsite Sewage and Water Service, Environmental Engineering, and Marina Program; (804) 864-7454.