

Approved Minutes of the Technical Advisory Committee Meeting

February 25, 2025

Participation by videoconference

Attendees:	Eric Desatzian	Bruce Douglas*
	Steve Revell*	Sheri Young*
	Jeffrey Williams	Craig Jewett*
	Roger Thompson*	Ernie Christianson*
	Craig Heindel*	Julia Beaudoin*
	Terry Shearer	Kevin Eaton
	Tom DeBell*	Denise Johnson-Terk
	Gunner McCain*	Jared Willey*
	Ken White*	Mark Bannon*

*Technical Advisory Committee members or substitutes

Scheduled Meetings:

All meetings are scheduled as virtual meetings.

March 11, 2025	2-4 PM
April 15, 2025	2-4 PM
May 20, 2025	2-4 PM
June 17, 2025	2-4 PM
July 15, 2025	2-4 PM
September 16, 2025	2-4 PM
October 21, 2025	2-4 PM
November 18, 2025	2-4 PM
December 16, 2025	2-4 PM

Agenda:

The proposed agenda was accepted as drafted.

Minutes:

The draft minutes of the last meeting, on December 17, 2024, were reviewed and approved online. The meeting scheduled for January 21, 2025 was cancelled.

Innovative/Alternative Technologies:

Bruce reported that the Perc-Rite® Drip Dispersal System has been approved for use as a filtrate treatment and dispersal system. The approval for use as a filtrate system requires that additional ASTM-33 sand be placed under the drip dispersal lines. The application rate remains the same as for non-filtrate dispersal systems. The resulting system is similar to the GeoMat™ Flat Leaching System with 6” of specified sand and the EcoFlo® Linear Biofilter Pressurized System with 6” of specified sand. A lysimeter pan must be installed under the piping in any of these systems to allow for collection of samples that can be analyzed for compliance with the permits if a problem is identified. Routine testing is not required.

Bruce noted that review of the Sludge Hammer™ is continuing. This is an aeration system that is installed in the septic tank.

Systems Freezing:

Sheri asked Jared if he had seen any freezing problems. Jared said there have been few frozen systems, but they all appeared to be caused by non-compliant installations.

Legislative Update:

Bruce reported that there is movement on the process to allow a municipality to take delegation for issuing permits for projects connected to both municipally owned water and wastewater systems. The municipality would perform technical reviews and issue the approvals while sending information to the Department of Environmental Conservation for inclusion in the State database and posting online. The ability to take delegation for projects without both municipal water and wastewater systems will be discontinued. Jared noted that several small communities will meet the requirements for delegation in the future. While the large municipalities already employ staff that does technical reviews, smaller municipalities may not, and may decide not to take delegation. Sheri asked about the impact on Regional Office workload. Bruce estimates only about 50-100 projects per year will be subject to the delegation process out of about 3,000 permits per year so the effect will be small. Bruce also mentioned that the additional staff that was recently added under the American Rescue Plan Act (ARPA) are temporary and will be available for only two more years.

A bill has been introduced to the Vermont Legislature that would ban land application of biosolids and septic waste over concerns that long lasting contaminants, such as polyfluoroalkyl substances (PFAS) are included in the waste. There are concerns about the impact on municipal wastewater treatment facilities due to the concentrated nature of the waste from septic tanks.

Overshadowing Subcommittee:

Bruce reported on the work of the Overshadowing Subcommittee. Overshadowing occurs when an isolation distance around a water source or a wastewater disposal system extends onto a neighboring property. In some cases, the overshadowing limits installation of water or wastewater systems on the neighboring property. The Department of Environmental Conservation is reviewing the existing requirements to determine if any changes should be made to reduce the impact on neighboring property owners. Bruce, Steve, and Mark attended the initial meeting. Tom will join the group.

A report that was prepared by the Technical Advisory Committee and issued on January 15, 2010 is the starting point and will be reviewed for possible updates. The report is available online at:

<https://dec.vermont.gov/sites/dec/dwgwp/rotac/pdf/pdf/2011.01.15.tacovershadowingrep.pdf>

The isolation distance around a water source has the most impact on neighboring development and the TAC discussed ways in which the isolation distance can be reduced. The WW Rules allow for a reduction in isolation distance when it can be demonstrated that it will take two years or more for effluent from a wastewater disposal system to reach a water source. While there are situations where a groundwater flow analysis demonstrates that the groundwater flow is away from the water source, the more common basis for a reduction is that the soil is so slowly permeable that it would take at least two years to reach the aquifer from which the water is drawn.

Drilled Wells:

The issue of how far into bedrock must a drilled well be constructed was discussed. The 2019 WW Rules require that all bedrock wells have at least 20' of casing with at least 10' of the casing in competent bedrock. The requirement for 10' of casing in bedrock is to decrease the chance of groundwater just following down the well casing and potentially contaminating the water coming from the bedrock.

There was also discussion about how to deal with a situation where a permit has been issued that requires a well drilled into bedrock but during the well drilling process it is determined that there is sufficient water available above the bedrock. The horizontal isolation distances between wells drilled into unconsolidated material and wastewater disposal systems are greater than for bedrock. A revision to the approval can be based on the fact that the larger isolation distance for a non-bedrock well can be met, or the site conditions support a reduction down to the requirements for a bedrock well. The WW Rules state that an impeding layer of soil, as defined in the WW Rules can be the basis for the reduction. The difficulty is in determining that the required thickness and horizontal extent of the impeding layer exists. See §1-912(e)(3)(A). The group will discuss situations where the unconfined layer of soil is deep, 100' or more, and determine if in addition to soil type, a thick vertical layer is protective. The

issue was discussed extensively in 2012 and 2013. Excerpts from the TAC minutes and 2013 Annual Report are attached.

The TAC also discussed situations with an existing drilled well that does not meet the requirement of at least 10' of casing into competent bedrock. Jeff said that casing extensions can be done by placing a sleeve, typically a 5" pipe, inside of the existing pipe and then sealing the two together. The use of down well cameras was discussed with reports of good visual clarity that can determine if there is any leakage around the casing. Craig J. asked about pumping at a high rate that would accommodate an increased used and then doing water quality testing. Bruce said that testing only gives a point in time answer, and by itself would not demonstrate that the water source is protected. Bruce also noted that there might be contamination of an existing water source caused by an increase in wastewater disposal.

Bruce said the several fact sheets are about to be posted on the DEC website. Craig H. asked that these be copied to all TAC members.

The next TAC meeting will be March 11, 2025.

2-28-2025 Notes related to well isolation reductions based on soil type.

July 2012 TAC Minutes

Hydrogeology Subcommittee re: Proposed Simplified Procedure to Reduce Minimum Separation Zone between Drilled Wells and Leachfields

Craig gave an overview of the draft procedure (dated 6-12-2012). He noted that this procedure is intended to be a "simplified method" as opposed to a full hydrogeologic study of the site, and one that can be used by non-hydrogeologists on systems with a design flow of 1,350 GPD or less. Ernie noted that he would prefer the upper threshold to be 1,440 GPD so it matches a certain class of water system in the existing Water Supply Rules. Craig also explained that this draft procedure includes a standardized method of identifying whether a "continuous impeding layer" exists, as referenced in the Water Supply Rule [App. A, Section 11.4.2.0.2(a)]. There is an existing procedure in the Water Supply Rules that can be used to justify a reduction in separation distances [App. A, Section 11.4.2.0.2]. The two-year time-of-travel concept that is incorporated into the existing rules was used by the Subcommittee as the basis for this draft procedure [App. A, Section 11.4.2.1]. To put this procedure in context, Mark and Craig noted that the existing Wastewater System and Potable Water Supply Rules allow leachfields where there is only a thin layer of permeable soil, as little as 4', below the bottom of the leachfield, over bedrock. In

this currently allowed scenario, the vertical travel-time downward through the high-permeability overburden will be much less than 2 years – generally a few minutes, hours, or days. The Subcommittee suggests that it might be a good idea to reconsider this issue in the future. Craig noted that this draft procedure primarily focuses on vertical travel-time downward from the vicinity of the leachfield, down to the top of the aquifer proposed to be tapped by a drilled well (regardless of whether that aquifer is a sand-and-gravel aquifer (“unconsolidated”) or a bedrock aquifer.

Mark reviewed the details of the draft procedure. Subcommittee member Steve Revell, saying, noted that there could be a lot of questions from the full TAC as the Subcommittee found there were several issues that were hard to decide. The procedure could be applied to existing wells when considering installation of a wastewater system but only if the well construction complies with the draft procedure. Most drilled wells for single family residences are not grouted as specified in the draft procedure.

Ernie asked about the requirement to grout the well to a depth of at least 50’ and wondered if this might result in more grouting than necessary. Ernie gave an example of a gravel well that is 20’ deep. The soil profile is 4’ of sand, 8’ of clay, and 8’ of gravel with a water table at 12’. In this case the well only need be grouted to a depth of 12’. As drafted, the procedure would require a well that extends through the same soil profile into bedrock at 20’ to be grouted to a depth of at least 50’.

Roger asked if there is consensus that 8’ of low-permeability material is sufficient for the protection of the underlying aquifer.

Craig explained the Subcommittee’s calculations to arrive at this 8-foot minimum thickness of low-permeability materials. The Subcommittee started with a Darcy equation for groundwater velocity:

$$V = \frac{(k)(i)}{n}$$

where k is saturated hydraulic conductivity, i is the hydraulic gradient (in this case the vertical hydraulic gradient, and n is the porosity of the low-permeability material.

The Subcommittee applied this equation to vertical saturated flow downward through an impeding layer of low-permeability material, using an estimated K-sat. value of 0.01 ft/day for soil textures described in the draft procedure (generally clays, silts, and silt or clay loams). This is a typical value for clays and silts

such as glacial lake or marine bottom sediments, and for tills, used by DEC in other evaluations related to two-year time-of-travel calculations, and by the WSD in source protection area calculations. The hydraulic gradient was assumed to be 0.40, and the porosity was assumed to be 36% (a reasonable value for low-permeability materials, which can range from 30% to 40% or higher. In the past, very conservative analysis of vertical time-travel downward through impeding materials have typically used a hydraulic gradient of 1.0 (the maximum likely gradient). Craig and Steve indicated that in their experience, field testing on sites with slow-permeability overburden materials typically had hydraulic gradients in the range of 0.1 to 0.4.

The calculation of vertical saturated groundwater velocity then appears as:

$$V = \frac{(0.01)(0.40)}{0.36} \quad \text{therefore } V = 0.0111\text{ft/day}$$

At that velocity, to achieve at least two years of travel time (730 days), 8.1 ft. thickness of low-permeability material is needed.

Claude asked about situations where there is an unconfined aquifer overlying a confined aquifer and the proposal is to complete the well in the underlying confined aquifer. Craig suggested that these situations could support a reduction in isolation distance, and the existing rules allow for a reduction, but the analysis should require a site-specific hydrogeologic evaluation that is not included in the simplified approach in the draft procedure unless the impeding layer between the two aquifers, and the well design, meet the requirements in the draft procedure.

Ernie asked about the grouting of the annular space around the well casing and if grouting can be done when the well is drilled using the concentric method. Craig said this was discussed in the Subcommittee: when the well is drilled through a clay layer, the expectation is that the clay will be saturated for most or all of its thickness, and therefore it will be plastic enough that it will quickly settle tightly against the well casing. However, to provide multiple barriers the Subcommittee included the grouting requirement in all situations. So, in all situations, including drilling through a clay impeding layer, to meet the criteria in the draft procedure the casing must be sealed by grout. In the concentric drilling method, this can be accomplished with minor cost and time by sprinkling bentonite around the outside of the casing as the casing is advanced into the well bore.

Peter asked about the vertical travel rate under leachfields constructed in sand. Craig replied that travel time in 4' of sand or gravel required above bedrock in the current rules would be minutes or hours at

the most. Peter also asked about the fate of nitrates discharged from a leachfield. The nitrates are only slowly converted to nitrogen during passage through the soil.

Peter asked if till soils would be classified as low-permeability under the draft procedure (and therefore meet the phrase “impeding layer” in the current WSR). Craig said they would and that was the intent of the Subcommittee, though Ernie and Roger said that some ablation tills might be a concern. This needs to be evaluated and clarified.

Mark suggested that the procedure could be used to reduce the overshadowing issues because a neighbor would be able to install a well closer to a proposed leachfield. This would have an impact on the neighbor, as they would have to agree to grout their well. However it might be a reasonable approach if it allowed both landowners to develop their property.

Ernie said he is concerned about stating that three test pits are sufficient to evaluate the site. The Subcommittee said that three is the minimum number and agreed to look at the issue some more. The best approach will be to discuss the proposal with the regional office staff in advance and agree on the number of test pits needed, just as with a seasonal groundwater monitoring program where the number of monitoring wells can be agreed upon in advance, because each case will be site specific.

Roger asked again if there is consensus about relying on 8’ of slowly permeable soil. Ernie said he wanted to review the issue with his staff before committing to the concept. Steve Rebillard said that based on his work in Alaska he would be very comfortable with relying on 8’ of low-permeability materials (“impeding layer” per WSR). Scott asked how long it would take to get feedback from the Regional Office staff and Ernie said a couple of weeks or less.

November 2012 TAC Minutes

Process for Reduction in Well Isolation Distances:

Steve said that there was no decision to report from the subcommittee looking into this issue. Ernie said that there was a meeting at Mark’s office where the problematic issue of the type, number, and location of test pits needed to support a reduction in isolation distance was discussed. Steve noted the issue of confined space restrictions for deep test pits which Ernie thought had been resolved by using an approach where the hole is entered and evaluated when the hole was only 4’ or 5’ deep. After the detailed soil evaluation at that depth, the hole would be dug to the full required depth and the soil evaluation would be made by looking at the material removed from the hole. Ernie suggested that the subcommittee meet to work on this issue. Mary will arrange for a time and location.

December 2012 TAC Minutes

The subcommittee working on the separation of wells from leachfields has met a few times. They developed a proposal for a prescriptive site evaluation that might be used to support a reduction in horizontal isolation distance. The sticking point has been how many test pits are required and where they need to be located in order to verify the nature of the soil between the well and the leachfield. Ernie wants the subcommittee to meet and work out these details. Ernie would like to see this included as an appendix in the next set of rules.

October 2013 TAC Minutes

The reduction of isolation distances between water and wastewater systems was also discussed. The draft rules propose to allow for a reduction when there is a continuous impeding soil layer, at least 8' thick, that separates the zone where wastewater is discharged from the aquifer where water is withdrawn. Jeff said that in some cases this layer exists but it is 100' below grade. There was discussion about how it could be determined that this layer is continuous and protective of the drinking water. Jeff said that there is well information and well driller knowledge that can be used to make this decision. Ernie expressed some concern about this approach except for cases where there are a lot of wells with uniform results, such as might be found in some Addison County clay soil areas. Mark asked if soil texture can be determined with ordinary well drilling techniques. Jeff said that a well driller can collect a sample of the well discharge and make this determination. Other members are not convinced of this because the materials could be sorted into finer and coarser material while being flushed from the well. Anne asked if grouting by itself, without any impeding layer, justifies a reduction in isolation distance. Rodney and Roger said no. There are situations where artesian conditions exist within the bedrock where grouting might justify a reduction in isolation distance.

November 2013 TAC Minutes

The existing rules require that the impact of a new well on an existing well be determined when within a specified distance. This is usually done by pumping from one well while monitoring the water level in an adjacent well. Ernie said that the distances seemed quite large and wondered why these distances were chosen. Scott said that they were determined based on a large amount of pump testing data that has been accumulated for public wells. Craig and Steve said that their work supported using the 200' distance that is in the current rules for wells that must supply 1.9 GPM or less.

The TAC also discussed the proposal to allow for a reduction in isolation distances when it is determined that the source aquifer is protected by a soil layer with lower permeability (confining layer). One method of making this determination is to compare the elevation of the water level in the well under pumping conditions to the elevation of the bottom of the confining layer. If the water level is above the bottom of

the confining layer, the well is considered to be under artesian pressure which reduces the chance that contamination can move down into the source aquifer. The TAC supports the concept of reducing the isolation distance when the water level in the well under pumping conditions is at least 8' above the bottom of the confining layer.

2013 Annual Report

The TAC continued the discussion from last year of when it might be acceptable to reduce the prescriptive isolation distances between wells and sources of contamination, particularly between wells and leachfields. It was decided that when there is a soil layer with slow vertical permeability, with a thickness of at least 8' that extends over the full distance between the well and the leachfield, the isolation distance may be reduced to a minimum of 75' for a new source. In addition to situations where the existence of the slowly permeable soil layer can be determined by digging test pits, the TAC also supports this isolation reduction when a well is drilled through a slowly permeable soil layer that is at least 8' thick and the water level in the well under pumping conditions is at least 8' above the boundary between the source aquifer and the bottom of the slowly permeable soil layer. The TAC recommended that the wells for each situation be grouted.