

**ANNUAL REPORT OF THE
TECHNICAL ADVISORY COMMITTEE
FOR 2016**

Established by Act 133 of the 2001 Adjourned Session

REGARDING OVERSIGHT AND IMPLEMENTATION OF THE

**WASTEWATER SYSTEM AND POTABLE WATER SUPPLY
RULES**

August 22, 2017

Members of the Act 133 Technical Advisory Committee:

Mark Bannon, P.E., Professional Engineer
John Beauchamp, Water Treatment Design Specialist
Peter Boemig, P.E., Professional Engineer
Gail Center, Vermont Department of Health
Claude Chevalier, Licensed Well Driller
Ernie Christianson, Regional Office Manager, Drinking Water and Groundwater Protection Div.
Mary Clark, Drinking Water and Groundwater Protection Division
Craig Heindel, Hydrogeologist
Gunner McCain, Licensed Designer
Rodney Pingree, Section Chief, Drinking Water and Groundwater Protection Division
Stephen Revell, Licensed Designer, Hydrogeologist
Scott Stewart, Hydrogeologist, Drinking Water and Groundwater Protection Division
Denise Johnson-Terk, Licensed Designer, Town Official
Christine Thompson, Director, Drinking Water and Groundwater Protection Division
Roger Thompson, Licensed Designer
Justin Willis, Licensed Designer
William Zabiloski, Asst. Regional Engineer, Drinking Water and Groundwater Protection Div.

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January 15, 2017

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Annual Report of the Technical Advisory Committee

Purpose:

The Technical Advisory Committee was created by Act 133 of the 2001 Adjourned Session of the Legislature and incorporated into the Vermont Statutes as Chapter 64, Section 1978(e)(2) which appears as:

The secretary shall seek advice from a technical advisory committee in carrying out the mandate of this subdivision. The governor shall appoint the members of the committee and ensure that there is at least one representative of the following entities on the committee: professional engineers, site technicians, well drillers, hydrogeologists, town officials with jurisdiction over potable water supplies and wastewater systems, water quality specialists, technical staff of the agency of natural resources, and technical staff of the department of health. Administrative support for the advisory committee shall be provided by the secretary of the agency of natural resources.

Section 1978(e)(3) required the preparation and submission to the legislature of an annual report on several topics: the implementation of this Chapter and the rules adopted under this Chapter; the number and type of alternative or innovative systems approved for general use, approved for use as a pilot project, and approved for experimental use; the functional status of alternative or innovative systems approved for use as a pilot project or approved for experimental use; the number of permit applications received during the preceding calendar year; and the number of permit applications denied in the preceding calendar year, together with a summary of the denial. This report is a summary of the work by the Technical Advisory Committee and the recommendations made by the Committee during 2016.

Technical Advisory Committee Members:

Members of the Technical Advisory Committee are recommended by the Secretary of the Agency of Natural Resources and appointed by the Governor. The full list of Technical Advisory Committee Members, and their contact information, is attached as Appendix A.

Executive Committee and Subcommittees:

The TAC has an Executive Committee with three members and three alternates that are available to answer questions or provide testimony to the Agency or the Legislature. There were also 4 standing subcommittees during 2016. The list of Subcommittees and members is included in Appendix A. In addition special subcommittees were appointed to address a specific topic such as review of a particular advanced treatment system. The members of these subcommittees are included in the monthly minutes of the Technical Advisory Committee which are available

online at <http://wastewater.vt.gov/wastewaterdisposaltac.htm> under the heading “Technical Advisory Committee.”

Meetings:

Five meetings were held by the TAC in 2016 on March 15, April 12, May 18, June 28, and December 20.

The meetings were held in conference rooms at the National Life Building and at the DEC Annex Building in Montpelier. Meeting attendance ranged from 10 to 14 with an average attendance of 12 people.

The full minutes of each meeting are attached as Appendix C and are available on-line at <http://wastewater.vt.gov/wastewaterdisposaltac.htm> under the heading “Technical Advisory Committee.”

Activities of the Technical Advisory Committee (TAC):

- 1. General Comments:** The Technical Advisory Committee and the Department of Environmental Conservation (DEC) continued to be active during 2016. There was limited work on updating the Wastewater System and Potable Water Supply Rules by the TAC because the draft rules have been undergoing a detailed review by DEC technical and legal staff. This review is nearly complete and the TAC looks forward to a quick final review and commencement of the formal rule adoption process.

Other topics include use of surface water sources for potable water systems, Innovative/Alternative Systems, an updated Well Driller Reporting Form, updated electronic application forms, installer training and licensing, and water quality testing for all new sources.

- 2. Surface Water Sources:** H.595 was passed during the last legislative session and this bill requires the Secretary of the Agency of Natural Resources (ANR) to adopt rules by July 1, 2017 that allow for the use of surface water as a source for a potable water system. The bill also establishes parameters for the rules limiting the use of a surface water source. The source may supply water only to one, owner-occupied, single family residence and prohibits use as a home occupation if such use would require use of the potable water supply by any member of the public. The bill further requires that the potable water system using a surface water source be designed by a Professional Engineer and that a treatment system be part of the design. The bill also authorizes the ANR to adopt criteria that determine which surface waters may be used for a potable water supply. Within these limits the bill directs the ANR to establish requirements for the design and operation of the potable water system.

The TAC received input from DEC staff involved with public water systems, lakes and pond regulations, and potable water supply permitting. Staff from the Vermont

Department of Health also provided information. Additional information was supplied by certified Water Treatment Specialists and Licensed Designers and Professional Engineers working with potable water systems.

During initial discussion, it was clear that surface water quality varies to a greater extent and much more quickly than does groundwater quality. Temperature changes, rainfall runoff, and wind direction cause rapid changes in both biologic and chemical quality. Spills and unexpected discharges are of concern because there is the potential for rapid movement of contaminated surface water into the potable water system. Pesticides, fertilizers, and manure are possible contaminants from agricultural and residential areas. The use of lampricides, may also be of concern.

Because it is not practical to require a water treatment system that can treat for every contaminant, limitation of the possible water sources is important. The water quality of larger water bodies is less affected by point discharges and temperature changes than smaller water bodies. The Lakes and Ponds Section of DEC stated that turbidity levels seem to be the best single indicator of water quality. Turbidity is also a major design factor in water treatment because high turbidity interferes with disinfection methods and may clog the filtration units in a matter of days. The Lakes and Ponds Section classifies water into three categories based on turbidity levels. The TAC supports limiting surface water sources to those waters with the lowest level of turbidity.

Discussion then moved to treatment systems. The TAC believes that there are treatment systems, that when operated in accord with their design requirements, are capable of treating common pathogens including bacteria and viruses. The designs recommended by the design professionals include one or more levels of filtration prior to disinfection. Filtration systems using fine particles of carbon are capable of removing many organic contaminants. One water treatment specialist has about a dozen surface water treatment systems installed using multiple filters that remove increasingly smaller particles, followed with a powdered carbon filter and an ultraviolet disinfection unit. These systems cost between \$15,000 and \$20,000 with annual inspection and maintenance costs of \$1,000. There are no practical treatment systems that will protect against all of the contaminants that could possibly be in a surface water source.

The Department of Environmental Conservation circulated draft rules to the TAC for comment. The draft rules propose performance standards for virus, giardia lamblia, and cryptosporidium reduction. The rules also require filtration prior to disinfection using chlorine or ultraviolet light. Additional treatment is required for turbidity and cyanobacteria if the intake is less than 20' below the low water level of the lake. As drafted, it will be the responsibility of the Professional Engineer to select the particular equipment and to specify how to install the equipment. The Professional Engineer will provide an operation manual for each system. The draft rules do not require routine testing and maintenance of the system or the submission of annual reports. The responsibility for understanding the operational requirements and the treatment limitations of the system will rest with the landowner. The draft rules propose that prior

to any transfer of the property the water treatment system shall be inspected by a professional engineer. The Professional Engineer shall certify that all components of the approved treatment system are functioning as designed. The purchaser shall sign a statement acknowledging the requirements related to the treatment system and the potential risks associated with a surface water source.

3. Innovative/Alternative Systems: The DEC continued to review Innovative/Alternative (I/A) system applications during 2016.

The DEC asked Andrew McBrearty, P.E., of F.R. Mahony and Associates, to attend a TAC meeting and present their request for approval of the Amphidrome Wastewater Treatment System. This system uses a Biologically Active Filter and operates as sequencing batch reactor. The TAC found the proposal generally acceptable. DEC issued an approval for general use on March 23, 2016.

There is a wide range of currently approved advanced treatment systems, dispersal systems, product substitutions, outlet filters, and associated products. A full list of products is available at:

<http://wastewater.vt.gov/wastewaterdisinnovativelist.htm>

This website also provides a list of I/A distributors and service providers.

4. Electronic Applications: On April 29, 2016 the DEC started requiring that all permit applications under the Wastewater System and Potable Water Supply Rules be made in an electronic format. At that time, the Department switched from eDEC to ANR Online and offered training sessions on the new submittal process. At the time of the switch from eDEC to ANR Online the Department received about 20% of the Wastewater System and Potable Water Supply Permit applications electronically. Between May 1, 2016 and December 31, 2016 the Department received 88% of the applications electronically. The Department granted a waiver to six Designers that did not have the capacity to electronically submit an application. One major advantage to the DEC is a reduction in administrative time because much of the application information flows directly into the Regional Office Tracking system.

Regional Office	# of Electronic Applications	Total Applications	% of Applications Made Electronically
Barre	373	441	84.58%
Essex Junction	373	401	93.02%
Springfield	370	392	94.39%
Rutland	313	356	87.92%
St. Johnsbury	167	218	76.61%
Total	1596	1808	88.30%

The TAC asked about the need to specify the well isolation distances when the well type, such as bedrock or shallow aquifer, determines the isolation distance. The TAC noted that the electronic applications can be a good source of information and asked about including items such as well pump size and the depth of installation. The TAC decided that this information cannot be relied on in the future because these mechanical components are replaced overtime and therefore should not be required as part of the application process.

Also discussed was the use of the School Property Account Number (SPAN). The DEC's desire is to develop a process that would allow for electronic records searches using the SPAN with the intent of making the tool available to individuals submitting Wastewater System and Potable Water Supply Permit applications. Permit applications now require the SPAN be included. The TAC supports this because it is another way to find information about properties where the property has been transferred and the new owner's name is unknown. A process to allow for the information to be available outside the electronic firewall is being investigated. The SPAN will be requested in more cases in the future, including on a revised well completion report.

5. **Testing of New Groundwater Sources:** H.595, passed in the 2016 Legislative session, directed the Secretary of ANR to seek recommendations from the TAC on whether and how to test new potable water sources.

The current Wastewater System and Potable Water Supply Rules require testing of all new potable groundwater sources except those that serve only one single family residence on its own lot. The question therefore was whether or not to require testing for new water sources serving these single family residences.

The TAC discussed this issue at several meetings. The core issue was whether the benefits of testing justified a mandate to test all new potable water sources serving one single family residence. Benefits include additional data points for a groundwater quality map of Vermont and ensuring that a current owner and future owners of the property would have access to at least one water quality test of the water source. Concerns include the cost of testing, delays in property development, impact on the DEC staff related to tracking and enforcement requirements, and the substitution of government action for personal responsibility.

The TAC was divided over this issue and issued a report to the DEC giving an analysis of the two options. This report is included as Appendix D.

6. **Installer Training:** The DEC, in cooperation with The National Onsite Wastewater Recycling Association (NOWRA) and the Vermont Technical College (VTC) arranged for a two day installer training program. The training was done on May 16th and 17th at VTC. The instructors were Dr. Sara Heger, P.E. and Tim Fritts. Dr. Heger is a researcher and instructor at the University of Minnesota. Mr. Fritts is the Vice-President of the Residential Sewage Treatment Company in Grandview, Missouri as well as a past-

president of NOWRA. Because the DEC is considering licensing installers, Dr. Heger and Mr. Fritts were invited to meet with the TAC to share their views on what does and does not work when providing installer training programs.

Dr. Heger said that training is most effective when there is a mandatory licensing program. While certification programs are useful, they tend to reach those installers already inclined to update their knowledge and to provide high quality installations. Mr. Fritts said that the best results occur when the installers want to do the training and testing sessions. One state uses the incentive of allowing those installers who complete a voluntary program to do the final inspections which saves time for the installer and the landowner.

There is a range of licensing and testing options among different states. Several states offer at least two levels of licensing or certification. Continuing education is often required. The quality of installers work is mostly monitored by other installers with the regulators following-up on complaints. The TAC asked if installers do the pre-installation field stakeout and learned that in many states they do. The TAC expressed some concerns about this as the Licensed Designers find that a pre-construction meeting with the installer allows them to discuss any site specific issues and confirm the points when the installation work must be inspected.

There is support in DEC for an installers licensing program and there will be work on designing a program. Legislative approval will be required in order to establish a licensing program for installers.

7. **High-Strength Wastewater:** Dr. Heger and Mr. Fritts also have experience with high-strength wastewater and the TAC asked for their advice. Mr. Fritts said there is and will continue to be a need for systems that treat for high-strength wastewater. This is in part driven by the fact that municipal sewerlines are not automatically being extended to newly developed areas. Mr. Fritts noted that NSF, International (formerly known as the National Sanitation Foundation) is developing a test protocol that will allow a system manufacturer to have a certification that their system can treat high-strength wastewater. Mr. Fritts noted that once the wastewater strength exceeds a biological oxygen demand (BOD) of about 400 mg/l it is usually less expensive to add a treatment system rather than increase the size of the leachfield. It was noted that operation and maintenance are key factors and that a supply of licensed service providers is required. If a product relies on an NSF certification to treat high-strength wastewater, the system must be inspected every six months.
8. **Well Driller's Reporting Form:** Whenever a drilled well is constructed, the licensed well driller is required to attach a tag with an identification number and to submit a written report to the Agency of Natural Resources. The Agency enters the information into a data base that can be used by staff and by the public. This information is a valuable resource for landowners and design professionals.

The TAC discussed possible changes to the information included on the form including use of the School Property Account Number (SPAN). The SPAN will be a useful method for tracking a well, however it will require extra work by the Licensed Well Driller because the landowner or town officials must be contacted to obtain the number. Also discussed was the proposed use of decimal degrees when recording the GPS location. Allowing for the continued use of the degrees, minutes, and seconds description was discussed but for consistency in the electronic tracking systems all new locations will use the decimal degree approach.

An additional suggestion related to documenting when the static water level is measured. After the yield test is performed, whether by pumping or with compressed air from the drill rig, it takes a while for the water level to fully recover to its static level. Knowing the relative time between the end of pumping and measuring the water level can indicate if the measured static level reflects full well recovery.

Under the updated reporting process, an identification number will be assigned when a previously unrecorded well is hydrofractured. A number will also be assigned when a previously unrecorded well is abandoned even though in some cases a well tag cannot be affixed to the well casing. These steps will make the electronic tracking system more useful.

APPENDIX A

Technical Advisory Committee Members as of December 1, 2016

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Executive Committee

Steve Revell, Ernest Christianson, Roger Thompson

Alternates –Claude Chevalier, Craig Heindel

Subcommittees:

Hydrogeology

Craig Heindel, Bill Zabiloski, Mark Bannon, Scott Stewart, Steve Revell, Mary Clark,
Roger Thompson, Peter Boemig, Ernie Christianson,

Bottomless Sand Filters

Peter Boemig, Mark Bannon, Mary Clark, Denise Johnson-Terk, Craig Heindel, Ernie Christianson

Seasonal High Water Table Monitoring

Craig Heindel, Steve Revell, Roger Thompson, Ernie Christianson, Bill Zabiloski, Mary Clark

Well Driller's Reporting Form

Rodney Pingree, Craig Heindel, Claude Chevalier, Peter Boemig, Mary Clark, Ernie Christianson

Surface Water Sources

Tim Raymond, John Beauchamp, Ray Soloman, Peter Boemig, Mark Bannon, Claude Chevalier, Perry Thomas, Mark Clark, Scott Stewart, Rodney Pingree, Chris Russo, Ernie Christianson

Appendix B

Performance Standards for Regional Office Permits

Performance Standards for Permits Issued During 2007-2016

	# of Permits Issued	# of Permits Meeting PEP Standards	% of Permits Meeting PEP Standards	Average DEC Days
2007	3746	3691	98.5%	16.8
2008	3435	3418	99.5%	12.3
2009	2691	2672	99.3%	11.8
2010	2621	2600	99.2%	11.9
2011	2289	2279	99.6%	13.2
2012	2472	2444	98.9%	12.7
2013	2449	2400	98.0%	14.0
2014	2503	2417	98.4%	12.6
2015	2367	2299	97.1%	11.8
2016	2647	2491	94.1%	16.2

Note: The performance standard for DEC days is 30 days for one-lot subdivisions and projects with a design flow of 500 GPD or less. The performance standard for other projects is 45 days.

Failed System Replacements for 2016

Permits Issued to Repair Failed Wastewater Systems	Applications Denied
422	4*

* Reasons for denials:

Denials were issued for applications that were incomplete and failed to demonstrate compliance with the Wastewater System and Potable Water Supply Rules when submitted.

Innovative/Alternative (I/A) Wastewater System Summary 2007 to 2014

Year	Overall Number of I/A Systems Permitted
2007	137
2008	796
2009	538
2010	457
2011	424
2012	513
2013	521
2014	612
Total	3998

Innovative/Alternative (I/A) Wastewater System Summary for 2015 and 2016

Year	Number of I/A General Use Systems Permitted	Number of I/A Pilot Use Systems Permitted	Number of Experimental Use Systems Permitted
2015	594	0	1
2016	526	0	0

Innovative/Alternative Permits in 2016

I/A Manufacturer	Number of General Use I/A Products Permitted (excluding dispersal products)	Number of General Use I/A Dispersal Products
Advanced Aeration Group	0	
Advanced OnSite Solutions	9	
American Manufacturing		1
Anua	0	
Aqua Test	0	
Aquapoint 3	1	
Bio-Microbics	12	
Cromaglass	2	
Delta Environmental Products	11	
Ecological Tanks	0	
Eljen Corp	0	
FujiClean	0	
Hydro-Action	3	
Infiltrator Systems		92
Jet	29	
Norweco	10	
Orenco	35	
Premier Tech	27	
Presby Environmental		293
SeptiTech	1	
Total	140	386

Innovative/Alternative (I/A) System Inspection Reports Received

Year	I/A Reports Received
2012	52
2013	693
2014	891
2015	914
2016	960

Licensed Designer Program Education Opportunities

	DEC Sponsored Classes	Licensed Designers Trained
2010	5	120
2011	4	110
2012	7	215*
2013	12	273*
2014	12	173*
2015	13	222
2016	4	106**

* DEC co-sponsored with the Vermont Technical College and the University of Rhode Island courses in:

- “Innovative/Alternative Technologies” and “Bottomless Sand Filters” in 2012;
- “Pumps and Pump Controls” and Identifying and Managing High Strength Wastewater” in 2013, and
- “Managing High Strength Wastewater” and “Microbiology” in 2015

** DEC co-sponsored with the Vermont Technical College and the National On-Site Wastewater Recycling Association (NOWRA) one course on the design, construction and inspection of soil-based wastewater systems.

Low Income Loan Program

During calendar year 2016, the On-Site Loan Program made seven loan awards for a total of \$131,412 in new loan commitments. All seven loans were for replacement of failed wastewater systems. The program has partnered with the Opportunities Credit Union to underwrite and service the loans made under this program.

Appendix C

Approved Minutes of the Technical Advisory Committee Meeting

March 15, 2016

Attendees: Roger Thompson
Mary Clark
Ken White
Denise Johnson-Terk
Chris Russo
Scott Stewart
Ernest Christianson
Claude Chevalier
Gunner McCain
Andrew McBrearty
Rodney Pingree
Craig Heindel
Steve Revell
Peter Boemig
John Beauchamp

Scheduled meetings:

April 12, 2016 1-4 PM Annex Building 190 Junction Road, Montpelier
May 18, 2016 AM with exact time TBD ANR Regional Office, 111 West Street,
Essex Junction
June 10, 2016 PM with exact time TBD Essex Junction

Agenda:

The agenda was reviewed and accepted.

Minutes:

The minutes of the previous meeting, November 17, 2015 were reviewed and approved by email so they could be included in the annual report for 2015.

Meeting Schedule:

Additional meetings were scheduled as noted above.

Innovative/Alternative Systems:

Mary introduced Andrew McBrearty, P.E., from F.R. Mahony and Associates of Rockland Massachusetts. The company developed the Amphidrome Wastewater Treatment System. The Amphidrome System uses a Biologically Active Filter and operates as a sequencing batch reactor. The system operates by cycling between aerobic and anaerobic conditions. The cost for the basic single family residential system is \$7,500 plus the cost of the required tanks and installation. The estimated electrical cost is about \$200 per year. The required annual inspection cost is about \$300. The reactor tank is specific to the system and it may need to be obtained directly from the company. The company will work with local concrete casters for the needed tankage and the company has the required tanks available in fiberglass that can be easily transported. The company, or a certified installer, does the installation inspection and start-up procedure. Until a local installer is approved the staff from the company, which is located in Massachusetts, would do the work. Because the designs are very case specific, the plans for each proposed installation are reviewed at the home office. The systems include electronic monitoring equipment and the timing for the aerobic and anaerobic cycles can be adjusted to ensure proper operation of the system. The Amphidrome System has been in use for many years and has been approved for use in Massachusetts, Delaware, New Jersey, and North Carolina.

Mary will review the application for general use approval and contact the company for additional information if needed.

Well Completion Form:

Whenever a drilled well is constructed, the licensed well driller is required to attach a tag with an identification number and to submit a written report to the Agency of Natural Resources. The Agency enters the information into a data base that can be used by staff and by the public. This information is a valuable resource for landowners and design professionals. The form is in the process of being updated. Rodney reviewed the proposed changes which include a section on abandoned wells and a request that the SPAN (School Parcel Account Number) be included. Craig asked about situations where the well is located on a different parcel than the building it serves. The SPAN for the parcel where the well is located should be used. Claude noted that including the SPAN will be extra work for the well drillers because the homeowner or the town must be contacted to get the information. The assigning of the SPAN varies from town to town. In some cases the number is derivative so that it can easily be followed back to the original if the parcel has been subdivided, but in other towns an entirely new number is assigned. Craig asked if the SPAN can be added to the ANR Atlas. The hydrofracturing will be added to the heading on the form as one of the activities to be reported.

Ken noted that the new form asks for the GPS location to be expressed in decimal degrees. In the past the use of degrees/minutes/seconds has been acceptable. Rodney said that going forward the data must be in the decimal degree format.

Craig discussed the section of the report related to yield testing and wondered if the water level that existed under maximum pumping conditions could be obtained. In most cases the well yield is measured with a “blow test” and the water is expelled from the well down to the bottom of the drill bit. Craig said it would be helpful to note the date when the static level was measured. If done just as the drilling is completed, the well may not be fully recovered to the static level.

Ken said that Ken Yeltsy, from the Water Supply Section, had suggested placing a well tag on previously unrecorded wells when the well is hydrofractured. An identification number should also be assigned to the location when a previously unrecorded well is abandoned, even a tag cannot be placed on the well casing due to removal or burial.

Electronic Application Forms for Regional Office Permits:

Ernie said that the Agency is rolling out an updated electronic application form and process. The Agency has accepted electronic applications for several years and has been working to increase their use. The new form and process will be mandatory within a few months. The Regional Offices will go online with the new forms sequentially. The Agency is doing outreach to notify all licensed designers and will provide several training sessions during the implementation of the new system.

H.595:

Ernie discussed this bill which proposes to allow for the use of surface water as the potable water supply for certain buildings. The Legislature is actively considering the bill which just passed the House and has been forwarded to the Senate. The TAC discussed the issues related to use of surface water and how to ensure there is limited public risk. There are major concerns about designing a treatment system for surface water because the surface water quality can vary in extreme ways in very short periods of time depending on uncontrollable factors such as wind direction. The systems can also be affected by the location of the intake pipe with shallow intakes being at a higher risk. Scott raised strong objections to any use of surface water for non-community systems for several reasons including the difficulty in designing a system that treats for all possible surface water contaminants and concerns about detecting break through without a licensed operator providing continuous monitoring. TAC members generally share these concerns and discussed where the balance between protecting public health and allowing an owner of a single-family residence to use surface water. Several TAC members would allow use of a surface water system to serve an individual single-family residence provided that the system includes a process of initial filtration, disinfection, and final carbon particle filtration. The

applicant would be required to acknowledge in the permit application that there is an elevated risk when using surface water and that maintenance and operation of the system is required and accepted. The permit would include clear language placing any future owner on notice of the operation and maintenance requirements.

Ernie asked if the TAC would support the bill and the response was not in the current form. The issues should be reviewed in depth and if approved should clearly state the requirements for system design and oversight.

Executive Committee: Steve Revell, Ernest Christianson, Roger Thompson
Alternates – Chris Thompson, Spencer Harris, Claude Chevalier, Craig Heindel

Subcommittees:

Hydrogeology

Craig Heindel, Bill Zabiloski, Mark Bannon, Scott Stewart, Steve Revell, Mary Clark, Roger Thompson, Peter Boemig, Ernie Christianson, Spencer Harris

Bottomless Sand Filters

Peter Boemig, Mark Bannon, Cindy Parks, Mary Clark, Denise Johnson-Terk, Craig Heindel, Ernie Christianson

Seasonal High Water Table Monitoring

Craig Heindel, Steve Revell, Roger Thompson, Ernie Christianson, Bill Zabiloski, Dan Wilcox, Mary Clark

Well Driller's Reporting Form

Rodney Pingree, Craig Heindel, Claude Chevalier, Peter Boemig, Mary Clark, Ernie Christianson

Approved Minutes of the Technical Advisory Committee Meeting

April 12, 2016

Attendees:	Roger Thompson	Justin Willis
	Chris Russo	Peter Boemig
	Gunner McCain	Scott Stewart
	John Beauchamp	Ken White
	Darlene Autery	Ernest Christianson

Scheduled meetings:

May 18, 2016 AM with exact time TBD ANR Regional Office, 111 West Street,
Essex Junction

Agenda:

The agenda was reviewed and time was assigned for discussion of the revisions to the Wastewater System and Potable Water Supply Rules.

Minutes:

The minutes of the March 15, 2016 meeting were reviewed and amended. Ken asked that the notes related to well tracking numbers be corrected to state that the proposed changes include adding a well identification number to a previously unrecorded well location when the well is hydrofractured. An identification number should also be assigned to a well that has been abandoned, even though it may not be possible to place a tag on the well casing if the casing is removed or buried.

Ernie asked about the TAC support for H.595 which deals with the use of surface water for potable water supplies. Ernie said that he had received comments from several TAC members indicating support for the concept of allowing surface water sources for individual single-family residences, though the support included concerns about how comprehensive the treatment system should be and how to ensure proper operation and maintenance of the system. After brief discussion the statement in the draft minutes that the TAC did not support the bill as drafted is retained. The Committee hopes that if the bill proceeds there will be better legislative direction on what parameters should be considered when drafting rules to implement the legislation.

Span (School Property Account Number) Tool:

Chris said that she is working on the details of allowing a Department developed tool to search for SPAN to be posted and made available outside of the electronic firewall. The SPAN was discussed in the March TAC meeting as part of a general discussion on the Draft Well Completion/Abandonment Report. The SPAN is being requested on the Well Completion/Abandonment Report in the new Wastewater Tracking System. The TAC had noted at the previous meeting that this information would be very useful to applicants and consultants, however the time involved in researching the number, which may involve searching town files, will limit their ability to provide the Department with the number if the number is not readily available from the landowner.

Electronic Applications:

Ernie said that there are ongoing updates to the new electronic application process currently being implemented sequentially by the regional offices. With a process that covers so many projects, some of which have unique features, these small changes are expected. The TAC asked about the need to identify isolation distances for wells in the application form when the distances are determined by the well type which is specified in the application form. There was also discussion about how to ensure that when a drilled well is designed, with its isolation distances being based on drilled into bedrock, the well is actually drilled into bedrock or the permit is revised to allow for a well not drilled into bedrock. There was discussion about the need for the designer who signs the installation certification statement to obtain a copy of the well drillers report in order to determine if the well was drilled into bedrock.

John said that it would be helpful if applications included information such as pump depth and pump size because this information is needed when designing some water treatment systems. One comment was that this information is often out of date after the water system has been in use for several years and that allowing a change in use that requires more water or installation of a treatment system would likely need verification of the system at that point in time. Roger asked about potential well casing leaks from rusting of the casing when the well has been installed for many years. Ken said that based on a lot of down-well camera inspections this has not been a problem so far. Ken also noted that excessive rusting is often associated with stray electrical current. Older wells were often used as the main ground for the electrical system and if the building electrical system is sending any current into the equipment ground cables it can affect the well casing.

TAC Membership:

Ernie said he would like to request that Ken be appointed to the TAC as a representative for the well drillers which was supported by the Committee. Ernie suggested Jeff Cueto as a possible replacement for Kim Greenwood as a surface water specialist which was supported by the Committee.

Ernie also expects that a subcommittee will be needed in the future to advise on the alternative toilet and gray water bill.

H.595:

Ernie discussed the “as passed the House” version of the bill currently under review by the Senate Natural Resources Committee. There are proposals to attach a provision that would require the testing of all new groundwater sources. The Committee noted that there are many questions about when and how to test because the water quality for initial withdrawals often varies from the quality after the well is used for a period of months. The general sense of the TAC is to not support a proposed requirement for water quality testing for a source serving a single-family residence prior to occupancy.

The bill also includes a provision to reduce the trigger for erosion control permitting from one acre of disturbed area to one half acre.

Wastewater System and Potable Water Supply Rules:

Ernie introduced Diane Sherman, an Agency attorney, who is working with Ernie to review the draft rules. This process is expected to be completed in the next few months when the rules should be ready for approval by the DEC Commissioner and ANR Secretary. This will be followed by the formal rule adoption process.

Ernie reviewed some organizational changes suggested by Diane to drop unneeded references and to reduce repetitive statements in certain sections. Ernie said he has been continuing to make readability edits throughout the document. Ernie will circulate a revised draft as soon as he and Diane complete their review.

Ernie also discussed the issue of replacement areas when subdividing lots with existing buildings other than a single-family residence or a duplex when the design flow exceeds 560 GPD. Ernie suggested that all areas within 1000 feet of the building be evaluated for use as a complying replacement area before allowing a variance in the design of the replacement area. Gunner thought that building with larger design flows should look for a complying replacement area even if the distance to the area is large. After some discussion Ernie proposed removing the 1000 foot limitation.

Executive Committee: Steve Revell, Ernest Christianson, Roger Thompson
Alternates – Chris Thompson, Spencer Harris, Claude Chevalier, Craig Heindel

Subcommittees:

July 19, 2016	1-4 PM,	The Annex, Montpelier
August 16, 2016	1-4 PM,	The Annex, Montpelier
September 30, 2016	2 PM	ANR Regional Office, 111 West Street, Essex Junction

Licensed Designer Training:

Mary arranged for Dr. Sara Heger, P.E., and Tom Fritts to meet with the TAC. Dr. Heger is an engineer and a researcher and instructor in the Onsite Sewage Treatment program at the University of Minnesota. Tom Fritts, is the vice-president of the Residential Sewage Treatment Company in Grandview Missouri as well as a past- president of the National Onsite Wastewater Recycling Association (NOWRA) and an experienced trainer. Sara and Tom, representing NOWRA had just completed a two day training session in Vermont for installers of wastewater disposal systems. Vermont is considering licensing installers and the TAC wanted to get their perspective on licensing installers.

Sara said that she believes mandatory licensing of installers is required to ensure that all installers participate in training sessions. Certification programs are useful but tend to reach the installers who are already disposed to building their knowledge base and keeping up-to-date. She said that Minnesota has operated their licensing program since 1996 and has different training programs for different categories of installers. There are 3 full-time staff working in the program. They find that the National Institute of Health (NIH) training is useful but the existing test is not up-to-date. The examination is a closed-book exam.

Tom said that the best results with a licensing or certification program occur when the people want to do the training and testing sessions. He said that one state allows certified installers to do the final inspection which avoids any delays in completing the installation.

The NIH certification program requires training and testing as well as at least five years of experience in installing systems. Mary asked if any states have recently required installers to be licensed. Tom said that New Jersey started about 3 years ago.

Ernie asked if Vermont were to require licensing of installers would there be a grandfather approach to cover existing installers. Some existing installers might have limited reading and test taking skills. Sara noted that some states provide assistance to deal with these issues. Steve asked if installers are allowed to do final inspections will they also be allowed to defer this to licensed designers. One question was if all people working for a company would need to be a licensed installer. Sara said that Minnesota allows one licensed installer to be responsible for all company employees.

The TAC also asked about levels of certification and learned that several states offer at least two levels and that continuing education is often required. Tom noted that Missouri has two levels of certification and requires 12 hours of continuing education. Chris asked how the quality of the installers work is ensured and the response was that it mostly depended on complaints from other installers who want to be on a level playing field. Justin asked if licensed installers are generally allowed to do the preconstruction stakeout and was told that many states allow installers to do this. Justin said that he thinks it is important for the designer to do the stakeout because this is when the designer get to talk with the installer about the important issues for that particular design. Steve and Gunner agree with Justin. Roger asked if there is any information about how many problems are occurring with unlicensed installers that would be avoided with a licensing program because starting a new licensing program is a significant investment and should have a payoff. Justin asked Sara if Minnesota has a time of sale inspection and they do. Ernie asked if the time of sale inspection also focused on the water supply but it mostly deals with the wastewater system.

High-Strength Wastewater:

The TAC also asked Sara and Tom for their observations on dealing with high-strength wastewater. Tom said up until about 10 years ago his company mostly worked on single family residences but they have now transitioned to working with larger systems. These systems range from 1,500 GPD to more than 500,000 GPD and they mostly involve high-strength wastewater. This is a growing business partly because the municipal sewer line extensions that were routinely constructed in the past are no longer being built. Therefore many new businesses that would have been on the municipal system must now build their own wastewater system. Tom noted that NSF is developing a test protocol for wastewater treatment systems. This will allow a system manufacturer to have a certification that their system can treat high-strength wastewater. The two main ways to dispose of high-strength wastewater are to increase the size of the disposal field or to add a treatment system. Tom said that once the wastewater strength exceeds a biological oxygen demand (BOD) of about 400 mg/l it is usually less expensive to add a treatment system. It was also noted that operation and maintenance is key and a supply of licensed service providers is important. Chris asked if the NSF certification of systems approved to treat high-strength wastewater includes inspection requirements. If the product is advertised and sold as NSF approved it must be inspected every six months.

Agenda:

The agenda was accepted as drafted.

Minutes:

The minutes were accepted with the edits suggested by Chris.

Drinking Water and Groundwater Protection Division Director:

Bryan Redmond has been appointed to replace the retired Christine Thompson as Director of the Drinking Water and Groundwater Protection Division. Bryan was previously the On-site Loan Program Lead working in the Agency Facilities Division and was responsible for administering the financial assistance program for replacing failed private wastewater disposal systems.

Wastewater System and Potable Water Supply Rules (Rules):

Ernie reported that Diane Sherman, ANR attorney, is still reviewing the draft rules.

Steve raised the question of whether the use of the Munsell Soil Color Chart should be required and recommended against it. Steve said that if it will be required it should be required for all soil evaluations included those using the perc test approach instead of the soil description method. He also noted that if the Munsell Soil Color Chart is required there should be a training program as part of the implementation. This issue will be added to the agenda for the next TAC meeting for discussion and decision.

Ernie also reviewed H.595 that requires adoption of rules to allow surface water to be the source for a potable water supply. This bill has been signed by the Governor. Ernie noted that there are several issues to be resolved in drafting rules including: whether a permit is required for the construction of the system, whether a permit is required for construction of a water treatment system for the surface water, will the installation of treatment systems for drilled wells be affected, and who will be allowed to design the water treatment system. The current Rules require a permit for construction of a potable water supply except when the new system will be a replacement for an existing system that serves only one single family residence on its own individual lot. The current Rules also provide that installation of water treatment systems does not require a permit when treating for a specified list of contaminants. One difference is that all surface water sources are presumed to be contaminated or at such risk for contamination that every system will require a water treatment system. Roger asked if the permit trigger will be the construction of the surface water source or the treatment system. Ernie said he would like the TAC to help with a draft of the rules.

Meeting Schedule:

The following dates, times, and locations were selected:

- June 28, 2016 1-4 PM Annex Building, Montpelier
- July 19, 2016 1-4 PM Annex Building, Montpelier
- August 16, 2016 1-4 PM Annex Building, Montpelier

Executive Committee: Steve Revell, Ernest Christianson, Roger Thompson
Alternates – Chris Thompson, Spencer Harris, Claude Chevalier, Craig Heindel

Subcommittees:

Hydrogeology

Craig Heindel, Bill Zabiloski, Mark Bannon, Scott Stewart, Steve Revell, Mary Clark, Roger Thompson, Peter Boemig, Ernie Christianson, Spencer Harris

Bottomless Sand Filters

Peter Boemig, Mark Bannon, Cindy Parks, Mary Clark, Denise Johnson-Terk, Craig Heindel, Ernie Christianson

Seasonal High Water Table Monitoring

Craig Heindel, Steve Revell, Roger Thompson, Ernie Christianson, Bill Zabiloski, Dan Wilcox, Mary Clark

Well Driller's Reporting Form

Rodney Pingree, Craig Heindel, Claude Chevalier, Peter Boemig, Mary Clark, Ernie Christianson

Approved Minutes of the Technical Advisory Committee Meeting

June 28, 2016

Attendees:	Roger Thompson	Bryan Redmond
	Gunner McCain	Craig Heindel
	Rodney Pingree	Chris Russo
	Mary Clark	Perry Thomas

Ernest Christianson

Peter Boemig

Scott Stewart

Darlene Autrey

Scheduled meetings:

July 19, 2016	1-4 PM,	The Annex, Montpelier
August 16, 2016	1-4 PM,	The Annex, Montpelier
September 30, 2016	2 PM	ANR Regional Office, 111 West Street, Essex Junction

Lake Water Systems:

Perry Thomas, of the Lakes and Ponds Section attended the meeting to provide information about various surface water bodies in Vermont. Ernie asked if there is a base line definition of a surface water source. Perry said the federal definition of a lake is a body of water with a surface area of at least 1 hectare, that is at least one meter deep at mean water level, and has at least ¼ acre of open water. Water bodies that have vegetation over the whole surface are considered to be wetlands.

Craig passed along comments from John Beauchamp that John has designed surface water systems provided that the surface water has relatively low turbidity on a year round basis and the intake is at least 20' below the water surface. These systems have not been evaluated for treatment against blue-green algae contamination. John is concerned about systems with shallow intake points as they tend to have higher turbidity and high turbidity can plug filtration systems in just a few days. John uses several physical filtration units that remove increasingly smaller particles, followed by powder activated charcoal, followed by additional physical filtration and an ultraviolet disinfection unit. One filter removes particles down to 0.2 microns. John has about a dozen system installed with an installation cost of \$15,000 to \$20,000 plus about \$1,000 in annual maintenance costs. This is about the same cost of a well drilled into carbonate formations with a treatment system. Rodney asked if, with equal cost, the drilled well should be preferred. Craig said that the drilled wells are often very low yield.

Perry discussed surface water quality and said that turbidity is the single best indicator of surface water quality. The state has a limited data base that could be a starting point. Craig asked about residual effects of green-blue algae after a bloom has dissipated having read that there is evidence that contamination can remain in the water.

Rodney asked if an encroachment permit is needed to place an intake pipe into a lake. Perry said that pipes of 2" or less would not require a permit. Craig asked if a federal permit would ever be

needed and Perry responded that only Lake Champlain is subject to direct federal regulation but that the small pipes normally used would be exempt.

Ernie asked about the extent of water quality testing in Vermont. Perry said that many, but not all, lakes are tested. The amount of testing is guided by the level of concern for a particular lake and when a lake shows signs of stress, the amount of testing is increased. Peter asked about the specific contaminants that are tested. This varies from lake to lake. Craig asked about Lake Champlain and Perry said that there are 30 separate zones that are monitored. The zones are chosen primarily on their usefulness in testing for compliance with the Total Maximum Daily Load (TMDL) limits which are set to protect surface water quality.

Peter asked if a site specific sample could be collected and correlated with other lake monitoring data. The data that Perry shared shows a lot of variance so any correlation would be limited. Gunner said that because water quality changes so quickly and extensively it seems hard to plan ahead. Ernie noted that one positive note is that with all of the regulatory changes to reduce contamination water quality should only get better.

Craig said that any subcommittee working on this issue should include someone from Perry's section. Other thoughts include looking at the monitoring data for public community systems, determining if there is reliable treatment for cyanobacteria from blue-green algae, and adding Ray Solomon to the subcommittee.

Craig suggested that a discussion paper be developed that would explain why a particular level of treatment and oversight would be suitable for a surface water supply or for a drilled well. The paper should state the risks that are known and methods for minimizing the risks along with the associated costs.

The following people were suggested as members of the subcommittee: Gail Center, John Beauchamp, Ray Solomon, Brian Locarno, Peter Boemig, Mark Bannon, and Claude Chevalier.

Executive Committee: Steve Revell, Ernest Christianson, Roger Thompson
Alternates – Chris Thompson, Spencer Harris, Claude Chevalier, Craig Heindel

Subcommittees:

Hydrogeology

Craig Heindel, Bill Zabiloski, Mark Bannon, Scott Stewart, Steve Revell, Mary Clark, Roger Thompson, Peter Boemig, Ernie Christianson, Spencer Harris

Bottomless Sand Filters

Peter Boemig, Mark Bannon, Cindy Parks, Mary Clark, Denise Johnson-Terk, Craig Heindel, Ernie Christianson

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Surface Water Sources

Tim Raymond, John Beauchamp, Ray Soloman, Peter Boemig, Mark Bannon, Claude Chevalier, Perry Thomas, Mark Clark, Scott Stewart, Rodney Pingree, Chris Russo, Ernie Christianson

Approved Minutes of the Technical Advisory Committee Meeting

December 20, 2016

Attendees:	Roger Thompson	John Beauchamp
	Sille Larsen	Peter Boemig
	Claude Chevalier	Ernest Christianson
	Tim Raymond	Sarah Vose
	Steve Revell	Mary Clark
	Scott Stewart	Craig Heindel
	Chris Russo	Justin Willis

Scheduled meetings:

January 10, 2017 1-4 PM Winooski Rm. at National Life Bld.

Minutes:

The draft minutes of the June 28, 2016 meeting were approved.

Surface Water Sources:

Ernie circulated a draft of the proposed rules for limited use of surface water sources prior to the meeting. Ernie discussed some of the main concepts used in drafting the proposed rules. One underlying thought is that it is not possible to develop and implement a water quality testing program that would cover every possible contaminant or that would predict how the water quality might change in the future. The nature of surface water is that water quality is subject to temperature changes, rainfall events, wind direction, and unpredictable discharges from humans to a greater degree than groundwater sources. Therefore, the proposed rules are based on testing for a representative suite of possible contaminants along with limitations on which surface waters may be used for a source. A second underlying concept is that a surface water source can only be used for an owner-occupied single-family residence with the owner taking responsibility for being informed about the risks of surface water sources and for operation of the water treatment system. As part of this second underlying concept the proposed rules do not require routine testing or submission of testing results to ANR, but do require a time of sale inspection to ensure that all of the components required in the ANR permit are present and in proper operation.

Ernie then proceeded with a section by section review of the proposed rules. There were many editorial comments and a few sections were found to be unclear. Ernie will revise the document as needed. John noted that the proposed rules do not impose the same requirements that would be imposed for a public water system using surface water. One major difference is the requirement for a licensed operator and routine water quality testing.

Testing of New Water Sources:

The legislature is also interested in whether all new water sources should be tested for quality. Under current rules all water sources are tested except for single family residences so the question is whether new sources for single family residences should also be required to do water quality tests. It is estimated, based on well driller registration forms, that about 800 additional water sources would need to be tested. The cost for a basic suite of potential contaminants is about \$150.00. The Vermont Department of Health has indicated that they have the capacity to do the additional testing. There is a current program that provides an informational brochure to licensed well drillers that they are to provide to the well owner. The brochure explains why a well should be tested, the cost of testing, and how to submit samples for testing. It is not known if the process is functioning well. This change would only affect single family residences with individual water supplies because all other sources are currently required to test the water prior to use.

The legislature has requested that the Secretary of the Agency of Natural Resources seek recommendations from the Technical Advisory Committee (TAC) about testing all new groundwater sources. Ernie circulated a draft report prior to the meeting indicating that there is majority approval of the draft language while outlining general areas of agreement and disagreement. Ernie asked for TAC approval of the draft language which led to discussion of how the TAC should make the decision and how the results should be reported. It was decided that this is a significant question related to human health risks and therefore worthy of a more formal process. It was decided that the decision should be postponed until the next TAC meeting which is scheduled for January 10, 2017. Ernie will circulate a revised draft incorporating the TAC comments and notify the TAC members that this issue will be discussed at the next meeting so that all who wish to participate in the decision can participate. Assuming there is a quorum at the meeting, the decision will be based on the vote of those present or connected by speaker phone. Ernie will arrange for the speaker phone connection upon request.

Executive Committee: Steve Revell, Ernest Christianson, Roger Thompson
Alternates – Claude Chevalier, Craig Heindel

Subcommittees:

Hydrogeology

Craig Heindel, Bill Zabiloski, Mark Bannon, Scott Stewart, Steve Revell, Mary Clark, Roger Thompson, Peter Boemig, Ernie Christianson

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Appendix D

REPORT BY THE TECHNICAL ADVISORY COMMITTEE ON TESTING OF POTABLE WATER SUPPLIES

A Recommendation on Whether and How to Test for Contamination in Groundwater Sources
Used by Potable Water Supplies Permitted Under 10 V.S.A. Chapter 64

2016 Act 154, Section 4

Submitted to the
House Committee on Fish, Wildlife and Water

Agency of Natural Resources
Department of Environmental Conservation

January 13, 2017

Introduction

This Report provides recommendations from the Technical Advisory Committee (TAC) on Wastewater Systems and Potable Water Supplies as requested by the Secretary of the Agency of Natural Resources (ANR) regarding the 2016 Act 154 Sec. 4. The report was prepared in a series of meetings and electronic exchanges by the TAC members in the Fall of 2016 and January 2017.

The complete wording of Sec. 4 of Act 154 with a portion of Act 163 of the 2012 Legislative session referenced in this report can be found in Attachment A of this report. A portion of the existing Vermont Water Supply Rule and practice for testing of potable water supplies discussed by the TAC can be found in Attachment B of this Report.

Note, the regulatory phrase “Potable Water Supplies” used in Act 154 refers to water supplies that are not Public Water Supplies (those that are regulated under 10 VSA Chapter 56). Potable Water Supplies are individual water supplies serving single-family residences or water systems with fewer than 15 connections or serving less than 25 people (with some exceptions).

Act 154 requests that the TAC address the following:

- (1) whether the State should require testing of groundwater sources used by potable water supplies permitted under 10 V.S.A. chapter 64;
- (2) if testing is recommended:
 - (A) in what situations or upon what occurrences should testing be required;
 - (B) from what component of a potable water supply the sample should be taken, including whether a sample from the wellhead of the potable water supply is sufficient;
 - (C) who should be authorized to take the sample; and
 - (D) what parameters or contaminants should be tested for in groundwater;
- (3) any additional issues or requirements that the Technical Advisory Committee deems relevant to the testing of groundwater sources used by potable water supplies permitted under 10 V.S.A. chapter 64.

Executive Summary

1. TAC members are unanimous in stating that it is in the best interest of landowners, and the public in general, that the drinking water quality of all potable water sources be tested.
2. The TAC notes that essentially all potable water supplies that are NOT an individual water source serving one single-family residence already, to some degree, require testing during the permitting process for a “Wastewater System and Potable Water Supply Permit” (WW Permit) issued by the Department of Environmental Conservation (DEC) (see Appendix B).
3. The difference of opinion by the TAC presented below pertains to whether the State should require a landowner to conduct water quality testing of a new individual water source proposed to serve one single-family residence.
4. All TAC members concur it is important that the ANR Secretary and Legislature be provided with the two strongly-held opinions and the justifications offered by the TAC members rather than simply providing the TAC’s majority opinion. Therefore, this report contains Opinion A

and Opinion B and justifications for the different conclusions reached by Opinion A and Opinion B without concluding which opinion is recommended. A list of appointed TAC members and which each opinion that member supported is provided at the end of this Report.

5. Regarding Item #1 of Act 154, “(1) whether the State should require testing of groundwater sources used by potable water supplies permitted under 10 V.S.A. chapter 64”:
 - Opinion A: Eleven members of the TAC support the continued exemption for testing of potable water supplies serving one single family residence while continuing testing of all other potable water supplies.
 - Opinion B: Four members of the TAC support testing of all potable water supplies including testing of one supply serving one single family residence.
6. Regarding Item #2 of Act 154, “if testing is recommended:”, the Recommendations Section of Opinion B in this report provide those answers. TAC members who support Opinion A are in general concurrence with the Opinion B recommendations regarding details of testing protocol if water quality testing of all potable water sources is adopted.
7. Regarding Item #3 of Act 154, “any additional issues or requirements that the Technical Advisory Committee deems relevant”, the TAC members are in agreement with these additional issues which are included in the Recommendations section of each Opinion below.

Discussion

Since the adoption of Rules for the construction of a single-family residence, the DEC policy is to not regulate the water quality of one potable water source serving one single-family residence unless the source is proposed in a location with water quality that is known to exceed the primary drinking water standards for one or more primary contaminants. The basis of this policy is the expectation that a water-source owner will maintain the source in a manner that protects the residents from health-related issues.

Uranium, radium, arsenic, and radon, are naturally occurring contaminants that, when exceeding drinking water standards, may lead to health problems including cancer. Therefore, the Vermont Department of Health (VTDoH) encourages vigilance and water testing so individuals know and understand the health risks due to naturally occurring pathogens and carcinogens in their drinking water.

The TAC recommends the State support and maintain a searchable database and/or publicly-viewable maps of water quality testing results.

In Vermont, the VTDoH reports that approximately 5 percent of homeowners have tested their water. Of this group, based on VTDoH data, select wells in eight towns in Rutland County were found to have water quality results that exceeded the arsenic drinking water standard of 10 parts per billion. This statistic demonstrates there is a benefit to testing beyond the current requirement. Knowing the contaminant level for these constituents and other contaminants in their drinking water that affect human health is a benefit for landowners to make informed decisions to protect their family’s health.

The Vermont Department of Environmental Conservation Water Resources Section reports an average of 2000 to 3000 new wells are drilled each year. It is estimated that 70 to 80 percent of these wells serve one single-family residence. There is no estimate for the number of new shallow or dug wells or springs installed each year as these do not require reporting to the State.

The TAC members are aware that lending institutions in Vermont generally require bacteriological analysis on existing potable water supplies prior to providing mortgages.

It is recognized that a secondary benefit of required testing is the results will provide significantly more groundwater quality data that does not now exist for many areas of the State. Landowners considering new water sources would then have additional information about potential groundwater quality concerns in their areas.

Provisions of Act 163 of the 2012 Legislative session required licensed well drillers, at the time of drilling a new well, provide educational materials that states the benefits for testing a well to the well owner. However, the installation of certain wells, such as a dug well, well point, and spring, do not require a licensed well driller and the owners of these types of wells are not being provided the educational materials at the time of installation. Additionally, the Act requires a landowner, as part of a contract to convey a lot with a potable water supply, to provide the educational material to the buyer. The TAC was informed, anecdotally, that there may be a problem with the implementation of Act 163; the educational materials may not be provided to the well owner upon completion of drilling a well or to a buyer prior to purchasing property served by a potable water supply.

Opinion A

Opinion A includes the recommendation to continue with this current policy (voluntary water quality testing, with provisions for public education on the topic of drinking water quality and health risks) and to not require testing of one water source serving one single-family residence unless the water source is located in an area of a known contaminant that exceeds a primary drinking water standard.

Opinion A: Issues Considered Regarding Required Water Quality Testing

1. Whether a homeowner should be required by the State to incur the costs for testing of their potable water supply. The legislature, when deciding to allow the use of surface water as the potable water source for one single family residence, understood there is the potential for the quality of surface water to change, either naturally occurring contaminants or by the introduction of chemicals, and periodic testing will not necessarily detect the change in quality. The legislature decided the decision should be left to the homeowner whether or not to accept the risk.
2. There is no scientific study showing there is a health-related problem with water from potables supplies that justifies the expense of mandatory testing to the homeowner.
3. Act 163 of the 2012 Legislative session stated “noncompliance with the requirements of this section shall not affect the marketability of title of a property.” The TAC believes

non-compliance with such a requirement requiring water quality testing is likely to negatively affect marketability of title of a property if a quality testing condition is not complied with. And, so all properties are notified that testing of a new water source is required, the statute may need to be changed to require a permit for the replacement of all potable water sources.

4. A potable water supply source serving one single-family residence may be replaced without the need of a permit from DEC (see 10 V.S.A. § 1974). There are legal issues to address such as who is responsible to inform landowners that the new well must be tested and who is responsible if testing did not happen.
5. The timing of sample collection is important if required testing is adopted. Taking a water sample immediately upon completion of the source may not represent the water quality for the residence after regular use. The water treatment specialist and hydrogeologists on the TAC note that, as a well is initially pumped, the quality can change in the first few months of use.
6. In addition to comment 5 above, the water sample will only represent the water quality at the time of the test. Water quality may change over time so relying on one sample may give an inaccurate picture (negative or positive) of the water quality of that source. A one-time test does not address contamination over time.
7. The installation of a treatment device/system to reduce contamination is only useful if there is periodic sampling of the water to ensure the device/system is properly treating the water. Additionally, levels of contamination may change following initial water quality testing which may require adjustments to the treatment device/system to properly reduce the contamination the device/system it intended to treat or provide different treatment for a contamination not found in the initial water test.
8. The operation of the treatment system is only useful with proper maintenance to repair or replace parts. Without proper maintenance, water treatment systems will not provide the protection they are designed to provide. Most TAC members' experience with owner-operated and maintained water treatment systems is not generally favorable. Because of the potential of insufficient staffing, there may not be the proper oversight to ensure periodic inspections and repairs to the systems.
9. Landowners that have water treatment systems may have a false sense that the system is, in fact, providing the water quality they think they are receiving if the treatment system is not properly maintained. A one-time test and a lack of maintenance may exacerbate this false sense.
10. Scheduling sampling, laboratory turn-around times, and enforcement of results may be a burden to property transactions.
11. Required testing would be an additional expense to homeowners and it may be very difficult and expensive to test for all potential contaminants that may pose a risk to human health.

Opinion A: Recommendations

1. Water quality testing of a new potable water source proposed to serve one single-family residence beyond what is current practice should not be required.

2. Water quality testing of water sources serving more than one single family residence is currently required and should continue to be required.
3. If testing is required, decide which Program (DEC, VT Department of Health, or other) will be responsible to implement testing requirements and enforcement, and if that Program has the financial, managerial and technical capacities to manage the additional responsibilities.
4. If testing is required, decide if enforcement action is to be taken when it is found the water quality testing was not conducted in the required time frame.
5. If testing is required, decide if, instead of enforcement, it is acceptable to state in statute that failure to comply with the water quality testing is not an enforceable action and shall not affect the marketability of title of a property.
6. Decide if the Program that will receive and review the water analyses needs to require a homeowner to incur the cost to install water treatment if contamination is found.
7. Decide if it is legal and appropriate for the responsible Program (most likely the Department of Health or the DEC) to do nothing more than compile the testing data.
8. Recommends the State develop and maintain a publicly-available searchable database of water quality results and/or publicly-viewable maps of areas where contaminants are found to exceed primary drinking water standards.
9. Determine if the water quality informational materials, and the language to be added to a seller's property information report (both required by Act 163) are being successfully provided to all owners of new wells and new property purchasers. If not, develop some measures to improve these outcomes. For example: provide the informational materials to all lawyers, lending institutions, home inspectors, and private testing laboratories.

Opinion B

There is a benefit to determine if there are locations in Vermont where water quality exceeds primary drinking water standards through testing of water sources. There is also a heightened awareness of health risk from regulated chemicals entering groundwater sources, such as PFOA found in potable water supplies in Bennington County. When a landowner is alerted to the detection of a regulated chemical in their area, the landowner can, at a minimum, request results for the regulated chemical when testing their well for the contaminants in Tables A11-5 and A11-7. Based on the current lack of water quality testing for single-family residences, water sources and the risk of short and long term exposure from known chemicals in Vermont, Opinion B is to require testing of all new potable water sources.

Opinion B: Issues Considered Regarding Required Water Quality Testing

1. All other water systems in the state: duplexes; mobile home parks; schools; offices; and public buildings; with the exception of one potable water source serving one single family residence, are required to test and submit the results of their water quality to the state for decades. The Drinking Water and Groundwater Protection Division (DWGPD) and VDoH have the infrastructure (database) and technical expertise to review the water quality results from single family home source if they were required to test for the constituents listed in Tables A11-5 and 7 of the Water Supply Rule.

2. The Health Department Laboratory indicated to TAC that it is ready and willing to expand its capacity to test private water supplies if demand significantly increases. The Laboratory analyzed almost 5500 Kit A (water bacteria) samples, Kit IB (lead and copper) samples and Kit C (inorganic chemical tests) samples and almost 200 organics samples. If requiring water quality testing is adopted, there will potentially be 1400 or more samples that will need analysis yearly as a result of new wells being drilled or installed.
3. The contaminants listed in Tables A11-5 and A11-7 are the ones that potable water supplies are required to test for except for a supply serving one single family homes unless the source is in an area of known contamination.
4. Water quality testing provides data. Without conducting water quality analysis, there is no accurate way to determine the size, extent or risk associated with either the acute or chronic chemicals of concern. Required testing of groundwater at the time a new source is developed would identify areas that have elevated levels of naturally-occurring chemicals in groundwater. The TAC did not have a sufficient discussion to provide an opinion whether or not to recommend requiring water quality testing at the time of sale of a building, structure or campground served by a potable water supply.
5. There was much discussion regarding the timing of taking water quality samples to be representative of the long-term water quality. The TAC agreed testing should occur following proper flushing (which should be after several volumes of water are removed or after a pumping test) and disinfection of the water source. The TAC members are not unanimous regarding whether it is appropriate to collect the water sample only after the driller's 3-hour "blow test".
6. Testing of smaller public water supplies (Transient Non-Community and Non-Transient Non-Community supplies) finds that water quality typically remains consistent with the initial testing.
7. Existing single family sources may never be tested due to exemptions from needing a permit when constructed and buyers not being provided educational materials at the time of conveyance.
8. There is an exemption in the Wastewater System and Potable Water Supply Rules (WW Rules) allowing a landowner to replace a potable water supply that serves one single family residence.
9. There is an exemption in the WW Rules allowing the owner of a potable water supply to install a water treatment system with no sampling, monitoring or reporting requirement.
10. If water quality testing is required, an additional benefit may be that it reduces the need to expend state and well driller resources currently used to (a) educate home owners on the value of testing their water; (b) manage the well drillers to provide educational forms to new well owners, and (c) ensure the drillers are downloading these forms from the VT Department of Health website for dissemination when they need them. We believe, with required testing, there will be greater value in assisting homeowners to properly manage a water treatment system that will directly prevent known public health risks as opposed to just encouraging homeowners to test their water, which, by itself, does not directly protect public health and does not address actual water treatment responsibilities.

Opinion B: Recommendations (based on Act 154 numbering)

1. Require testing for all new potable water supplies, including a supply to serve a single-family residence, for the parameters listed in Tables A11-5 and A11-7 of the Vermont Water Supply Rule. The cost of one-time testing is an order of magnitude less than the cost of a new well.
2. (A) Testing should be required upon completion of developing a new potable water supply.
(B) The water sample should be collected from the water source/well head, if possible, or the closest plumbing fixture, such as a sink faucet. For existing homes where a replacement of a failed source is needed, samples should be taken at a point of use (specifically sink faucet or hose bib). Generally, the water quality samples can be taken once the well pump has been installed. Water quality testing for public water supplies and, potable water supplies not serving one single family residence, is required prior to use of the supplies. Opinion B is not proposing a timeframe for testing one potable water supply serving one single-family residence.
(C) The permit-holder, landowner or purchaser should be responsible for collecting and submitting the water sample to state certified laboratories within laboratory specified timeframes.
(D) The current parameters listed in Tables A11-5 and A11-7 of the Vermont Water Supply Rule which are the same as all the other non-single family home Potable water sources are required to sample.
3. Additional issues:
 - Testing should occur following proper flushing (which should be after several well or spring volumes are removed or after a 3 hour “blow” test or pumping test) and disinfection of the water source.
 - Evaluate the impact of the increased workload and resource needs on the program with jurisdiction.
 - Determine how to notify a landowner who installs a new well that does not require a permit or a well driller, that, upon completion of construction, requires a water quality test.
 - Decide what enforcement action, if any, is to be taken against the permit holder or landowner (of the water source) if it is found the water quality testing was not conducted in the required time frame and determine the personnel and resources needed to take on additional enforcement actions if this is considered a violation. Currently, enforcement action for a violation of the WW Rules or a WW permit condition is taken against the landowner. The requirement to test a new well should be on the permit-holder and/or the landowner.
4. Determine if the water quality informational materials and the language to be added to a seller’s property information report (both required by Act 163) are being successfully provided to all owners of new wells and new property purchasers. If not, develop measures to improve these outcomes. For example: provide the informational materials to all lawyers, lending institutions, home inspectors, and private testing laboratories.

Technical Advisory Members

Supporting Opinion A:

Mark Bannon – Professional Engineer, Bannon Engineering
John Beauchamp – Water Treatment Specialist, Vermont Water
Peter Boemig – Professional Engineer, SVE Associates
Claude Chevalier – Licensed Well Driller, Chevalier Drilling Company
Ernest Christianson – Regional Office Program Manager
Craig Heindel – Hydrogeologist, C.P.G., Waite-Heindel Environmental Management
Gunner McCain – Designer B with Water Certification
Roger Thompson – Designer B with Water Certification
Steve Revell – Hydrogeologist, C.P.G., Lincoln Applied Geology
Justin Willis – Designer B with Water Certification, Willis Design Associates
Denise Johnson-Terk – Colchester Wastewater Official and Health Office

Supporting Opinion B:

Mary Clark – Indirect Discharge & UIC Program Manager
Rodney Pingree – Water Resources Section Chief
Scott Stewart – Division Hydrogeologist
Sarah Vose – State Toxicologist, Department of Health

Appendix A

Act 154, Sec. 4 and Act 163, Sec. 2 and Sec. 5

Act 154, Sec. 4, of the 2016 Legislative Session

(a) The Secretary of Natural Resources shall seek the recommendations of the Technical Advisory Committee on Wastewater Systems and Potable Water Supplies regarding whether and how to test for contamination in groundwater sources used by potable water supplies permitted under 10 V.S.A. chapter 64. The recommendations shall address:

(1) whether the State should require testing of groundwater sources used by potable water supplies permitted under 10 V.S.A. chapter 64;

(2) if testing is recommended:

(A) in what situations or upon what occurrences should testing be required;

(B) from what component of a potable water supply the sample should be taken, including whether a sample from the wellhead of the potable water supply is sufficient;

(C) who should be authorized to take the sample; and

(D) what parameters or contaminants should be tested for in groundwater;

(3) any additional issues or requirements that the Technical Advisory Committee deems relevant to the testing of groundwater sources used by potable water supplies permitted under 10 V.S.A. chapter 64.

(b) The Secretary of Natural Resources shall submit the recommendations of the Technical Advisory Committee to the House Committee on Fish, Wildlife and Water Resources and the Senate Committee on Natural Resources and Energy on or before January 15, 2017.”

The 2012 Legislative session passed Act 163 requiring “a licensee drilling or developing a new water well for use as a to potable water supply, as that term is defined in subdivision 1972(6) of this title, shall

provide the owner of the property to be served by the groundwater source informational materials developed by the department of health regarding:

(1) the potential health effects of the consumption of contaminated groundwater; and

(2) recommended tests to detect specific contaminants, such as arsenic, lead, uranium, gross alpha radiation, total coliform bacteria, total nitrate or nitrite, fluoride, and manganese.”

Act 163, Sec. 2 and Sec. 5, of the 2012 Legislative session

Sec. 2. 10 V.S.A. § 1396 is amended to read:

§ 1396. RECORDS AND REPORTS

(d) On or after January 1, 2013, a licensee drilling or developing a new water well for use as a potable water supply, as that term is defined in subdivision 1972(6) of this title, shall provide the owner of the property to be

served by the groundwater source informational materials developed by the department of health regarding:

- (1) the potential health effects of the consumption of contaminated groundwater; and
- (2) recommended tests to detect specific contaminants, such as arsenic, lead, uranium, gross alpha radiation, total coliform bacteria, total nitrate or nitrite, fluoride, and manganese.

Sec. 5. DEPARTMENT OF HEALTH; EDUCATION AND OUTREACH ON SAFE DRINKING WATER

(a) The department of health, after consultation with the agency of natural resources, shall revise and update its education and outreach materials regarding the potential health effects of contaminants in groundwater sources of drinking water in order to improve citizen access to such materials and to increase awareness of the need to conduct testing of groundwater sources. In revising and updating its education and outreach materials, the department shall update the online safe water resource guide by incorporating the most current information on the health effects of contaminants, treatment of contaminants, and causes of contamination and by directly linking users to the department of health contaminant fact sheets.

(b) The department of health, after consultation with representatives of licensed real estate brokers, as that term is defined in 26 V.S.A. § 2211, shall propose language to be added to a seller's property information report regarding the requirement under 27 V.S.A. § 616 that a seller of real property with a potable water supply that is not served by a public water system provide the buyer informational material regarding the potential health effects of the consumption of contaminated groundwater and the availability of test kits provided by the department of health.

Appendix B

Rules and Current Practice

Potable water supplies are regulated by the WW Rules. The design criteria for potable water supplies (called non-public in the Vermont Water Supply Rule) are in Appendix A, Part 11, of the Vermont Water Supply Rule. The provisions for testing of potable water supplies are found in subsections of Section 11.7.0(a) of Part 11. These provisions state:

- (1) “Non-Public water systems requiring permits shall initially monitor for all the contaminants identified in Tables A11-5 and A11-7”;
- (2) “The Secretary may waive these monitoring requirements for Non-Public water systems upon review of either information readily available or submitted by the applicant, which shows a high likelihood of proposed sources being in compliance with the standards contained in Tables A11-5 and A11-6; and
- (3) Individual water systems serving a single-family home are not required to conduct initial testing unless there is reason to suspect existing contamination.”

(Table A11-5 lists the secondary contaminants as Chloride, Sodium, Iron, Manganese, Odor, and pH. Table A11-7 lists the primary contaminants as Arsenic, Nitrate, Nitrite, Total Coliform Bacteria, and Uranium.)

The Drinking Water and Groundwater Protection Division, Regional Office Program (administrator of the WW Rules) requires owners of all new potable water supplies that serves more than one single-family residence to analyze the water for the contaminants listed in Tables A11-5 (primary contaminants) and A11-7 (secondary contaminants) prior to use of the source., Also, the Program does require analysis of the water quality of a potable source that will serve one single family residence if the source is to be located in an area of a known contaminant that exceeds primary drinking water standards.

The WW Rules, Subchapter 3, § 1-304(a)(22), provides an exemption that allows an owner of a single family residence on its own lot to replace the water supply serving that single family residence without obtaining a WW Permit. This exemption applies to lots that are exempt or have a permit subject to the WW Rules. Notification to the Regional Office Program is not required for wells that are installed under this exemption.