

State of Vermont
Agency of Natural Resources
Department of Environmental Conservation

Water Supply Division

Environmental Protection Rules

Chapter 24

Groundwater Withdrawal Reporting and Permitting Rules

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Subchapter 1 – Purpose and authority

§ 24-101. Authority

These rules are adopted under the authority of the Secretary pursuant to 3 V.S.A. § 808, 10 V.S.A. § 1392(d), 10 V.S.A. § 1417(c) and 10 V.S.A. Chapter 48, Subchapter 6.

§ 24-102. Purpose

Consistent with the requirements of 10 V.S.A. Chapter 48 it is the purpose of this rule to protect and manage groundwater resources. This rule provides the regulatory framework for the withdrawal of more than 57,600 gallons per day of groundwater for commercial and industrial uses. Additionally, this rule requires any person who withdraws more than 20,000 gallons per day of groundwater for certain uses to report that withdrawal to the secretary.

§ 24-103. Severability.

The provisions of any section of these rules are severable. If any provision of these rules is ruled invalid or if any application of these rules to any person or circumstance is invalid, the invalidity shall not affect other provisions or applications that can be given effect without the invalid provision or application

Subchapter 2 – Definitions

§ 24-201. Definitions.

As used in these rules, the following terms shall have the specified meaning or the meaning given to them in 10 V.S.A. § 1416 . If a term is not defined it shall have its common meaning:

- (1) "Agency" means the agency of natural resources.
- (2) "Aquifer" means a water bearing stratum of permeable rock, sand, gravel or other soils.
- (3) "Area of contribution" means the geographic area supplying groundwater to a point or points of groundwater withdrawal, groundwater discharge to the land surface, groundwater discharge to significant wetlands, or groundwater discharge directly to surface water.
- (4) "Area of influence" means, the geographic area where the piezometric surface of the groundwater is lowered due to influence of a groundwater withdrawal. Impacts on surface water, including changes in flow or water surface elevation are included in the area of influence. This is not the same as the area of contribution to a point of groundwater withdrawal.
- (5) "Baseline withdrawal" means highest amount withdrawn by a person within a twenty four hour period from January 1, 2005 through December 31, 2010.
- (6) "Bottled water" means any non-carbonated, non-flavored water placed in a sealed container for sale or distribution to the public with the express or implied intent of providing water for human consumption.
- (7) "Bottled water system" means a public water system that bottles drinking water for public distribution and sale. A domestic bottled water system is a bottled water system with at least one source located within Vermont. An imported bottled water system is a bottled water system with all sources located outside of Vermont.
- (8) "Bulk water" means drinking water delivered to consumers or water purveyors by means other than pipeline or bottled water.
- (9) "Effluent water resource" means the reach of a water resource where the piezometric surface of the groundwater is higher than the surface water elevation at that location at that time (e.g. a gaining stream).
- (10) "Estimated yield" means an estimate of the maximum short-term withdrawal rate that a source or an existing source can produce (e.g. driller's estimated yield).

- (11) “Existing source” means a location where a person withdraws, or is permitted to withdraw groundwater or surface water for any purpose in existence at the time a proposed source applies to the Secretary for a permit, amendment, or renewal.
- (12) "Farming" means farming as the term is defined in 10 V.S.A. § 6001(22).
- (13) “Flowing artesian well” means a well that intersects groundwater with a piezometric elevation above the top of the well casing. If the well is left uncapped, groundwater will flow freely from the well at a rate dependent on the elevation of the piezometric surface and the physical properties of the aquifer.
- (14) "Groundwater" means water below the land surface in a zone of saturation, including springs. This term does not include surface water.
- (15) “Influent water resource” means the reach of a water resource where the piezometric surface in groundwater is lower than surface water elevation at that location at that time (e.g. a losing stream).
- (16) “Interference” means the measurable or predicable impact to a water resource or an existing source caused by a withdrawal from a proposed source.
- (17) “Monitoring well” means a device used to monitor the depth or elevation of the piezometric surface, or groundwater quality.
- (18) “Ownership or legal control” means an easement, right of way, deed or other legal document that creates an enforceable permanent property interest that transfers all development rights to the applicant within the source isolation zone of the proposed source.
- (19) “Permanent legal access” means an easement, right of way, deed or other legal document that creates an enforceable permanent property interest that provides access to the tract of land for the purposes of construction, operation and maintenance of the proposed source and control of land use activities surrounding the source.
- (20) "Person" means any individual, partnership, company, corporation, cooperative, association, unincorporated association, joint venture, trust, the state of Vermont or any department, agency, subdivision, or municipality, the United States government or any department, agency, or subdivision, or any other legal or commercial entity.
- (21) “Place of business” means one or more contiguous parcels of land owned or controlled by the same person.
- (22) “Proposed source” means the location proposed to be permitted under these rules.
- (23) “Public water supply” means a public water supply as defined in 10 V.S.A. § 1671.

- (24) “Pumping test” means a method to test a well in order to determine aquifer characteristics, source interference, safe yield, area of influence, and other aquifer parameters.
- (25) “Pumped well” means a well with a pump or other device used to mechanically extract groundwater.
- (26) “Qualified professional” means a person with training or experience in hydrogeology, surficial geology, and bedrock geology sufficient to adequately prepare the hydrogeologic studies and analyses required by these rules.
- (27) “Safe yield” means an amount of groundwater that can sustainably be withdrawn from a proposed source that will not cause an undue adverse effect on existing sources or water resources.
- (28) "Secretary" means the secretary of the agency of natural resources or the secretary's duly authorized representative.
- (29) “Significant wetland” means a wetland defined as a “significant wetland” under the Vermont wetlands rule.
- (30) "Spring" means a location, whether developed (e.g. by a spring box or tile) or undeveloped, where groundwater flows naturally to the surface of the earth prior to the development of the spring. For purposes of these rules, developed spring is considered a well when groundwater is withdrawn from the source at a rate greater than its overflow discharge.
- (31) "Surface water" means all rivers, streams, creeks, brooks, reservoirs, ponds, lakes, springs and all bodies of surface waters, artificial or natural, that are contained within, flow through or border upon the state or any portion of it.
- (32) “Tract of land” means one or more contiguous parcels of land owned or controlled by the same person.
- (33) “Undue adverse effect” means an effect from the withdrawal of groundwater that meets the undue adverse effect criteria of § 24-511.
- (34) “Water budget” means an assessment of the water resources and existing sources, including the water inputs (precipitation, regional flow of surface water or groundwater, and anthropogenic recharges) and outputs (evapotranspiration, runoff, existing sources and surface water and groundwater flow out of the area being assessed). A water budget shall be calculated using climatic normals (e.g. precipitation, evapotranspiration, and temperature).
- (35) “Water resource” means groundwater, surface water, and significant wetlands.

- (36) "Well" means any hole drilled, driven, bored, excavated, or created by similar method into the earth to locate, monitor, extract, or recharge groundwater. This term does not include springs.
- (37) "Wetlands" means those areas of the state that are inundated by surface or ground water with a frequency sufficient to support significant vegetation or aquatic life that depend on saturated or seasonally saturated soil conditions for growth and reproduction. Such areas include but are not limited to marshes, swamps, sloughs, potholes, fens, river and lake overflows, mud flats, bogs, and ponds, but excluding such areas that grow food or crops in connection with farming activities.
- (38) "Withdrawal" means the intentional removal of groundwater by any method from a source or sources.

Subchapter 3 – Groundwater Withdrawal Reporting

§ 24-301. Groundwater reporting requirements.

- (a) Any person withdrawing more than 20,000 gallons per day of groundwater, averaged over a calendar month at a single tract of land or place of business shall file a groundwater report with the Secretary on or before September 1 for the preceding calendar year. The following are exempt from the reporting requirement:
 - (1) a groundwater withdrawal for fire suppression or other public emergency purposes;
 - (2) a groundwater withdrawal reported to the agency of natural resources under any program that requires the reporting of substantially similar data;
 - (3) a groundwater withdrawal for domestic, residential use;
 - (4) a groundwater withdrawal for farming;
 - (5) dairy processors and milk handlers licensed in accordance with 6 V.S.A. § 2721;
 - (6) a groundwater withdrawal for public water systems, and
 - (7) a groundwater withdrawal for closed loop, standing column, or similar non-extractive geothermal heat pumps.

- (b) The groundwater report shall be submitted on a form prescribed by the Secretary and shall, at a minimum, include:
 - (1) A map with the withdrawal location or locations if the report covers more than one existing source.
 - (2) The average daily rate of withdrawal from each existing source.
 - (3) The metered or estimated frequency, in number of days and amount, that a withdrawal exceeded 20,000 gallons per day from each existing source. If an estimate is used it shall use the methods established in § 24-302.
 - (4) The estimated yield of each existing source.
 - (5) The use or uses of the water withdrawn from each existing source.
 - (6) The metered or estimated total of withdrawal per month at a single tract of land or place of business. If available, a person shall provide metered data from the existing source or sources. In the case of a person who bulks or bottles water, that person shall provide metered data from a meter, separate from the master withdrawal meter, to measure the amount of water delivered to the bulk water

hauling connection or to the bottling line. If metered data is not available and an estimate is used it shall use the methods established in section § 24-302.

- (7) Where feasible, the distance of each withdrawal from the nearest surface water and significant wetland.
- (8) Whether the groundwater source is a spring, a free flowing artesian well, or a pumped well.
- (9) Any other additional information the Secretary deems appropriate as a part of this reporting requirement.

§ 24-302. Methods of estimating water withdrawals

(a) Any of the following methods may be used to estimate the total of withdrawal per month at a source:

- (1) permitted wastewater discharge plus consumptive use;

Note: an example of this approach could include the person's wastewater discharge permit amount plus a metered or calculated process amount that is not discharged (for example the water used in brewing beer or bottling water);

- (2) well pump rating in gallons per minute multiplied by the number of minutes the pump runs per cycle times the number of cycles per day;

Note: For example, a well pump that is rated at 75 gallons per minute X 30 minutes/cycle X 10 cycles/day = 22,500 gallons per day);

- (3) flow from springs may be measured by use of a weir, or a calibrated bucket and stopwatch; or

- (4) other methods as approved by the Secretary in writing.

(b) Any of the following methods may be used to estimate the amount of water delivered to the bulk water hauling connection or to the bottling line:

- (1) for bulk water hauling, calculate the volume of the bulk hauling container multiplied by the number of containers filled per year;

- (2) for bottling lines, calculate the volume of the bottles filled multiplied by the number of bottles filled per year; or

- (3) other methods as approved by the Secretary in writing.

Subchapter 4 – Groundwater Withdrawal Permitting

§ 24-401. Permit required.

- (a) New withdrawals. On and after July 1, 2010, no person shall make a new groundwater withdrawal for commercial or industrial uses of more than 57,600 gallons a day from any source on a single tract of land or at a place of business without first receiving a groundwater withdrawal permit. New groundwater withdrawals for bottled or bulk water uses that meet the jurisdictional requirements of this subsection shall comply with subsection (d) of this section.
- (b) Increased withdrawal from a previously permitted source. On and after July 1, 2010, no person shall increase a groundwater withdrawal for commercial industrial, bottled or bulk water uses to an amount greater than 57,600 gallons a day from any source on a single tract of land or at a place of business without first receiving a groundwater withdrawal permit. Increased withdrawals of groundwater for bottled or bulk water uses that meet the jurisdictional requirements of this subsection shall comply with subsection (d) of this section. The expansion of a withdrawal includes:
 - (1) an additional withdrawal from one or more new source; or
 - (2) an increase in the rate or quantity of a withdrawal from an existing source above the maximum rate set forth in any permit previously issued under this section.
- (c) Previously unpermitted withdrawals for commercial, industrial, bottled or bulk water withdrawal. For a commercial or industrial withdrawal in existence prior to July 1, 2010, no person, shall increase their withdrawal, without first receiving a groundwater withdrawal permit if either of the following occur:
 - (1) If the withdrawal is increased by 57,600 gallons per day; or
 - (2) If the withdrawal is greater than 57,600 gallons per day and withdrawal is increased to an amount 25 percent or greater of the baseline withdrawal.
- (d) A bottled water supply shall obtain a source permit under the Vermont Water Supply Rule using the requirements of this Groundwater Withdrawal and Permitting Rule. A bottled water supply shall continue to be required to obtain a construction and an operating permit under the Vermont Water Supply Rule.
- (e) Circumvention. The Secretary may require a person to obtain a permit under this subchapter when the Secretary, in his or her discretion, determines that a withdrawal, subdivision of land, transfer of property, or other action circumvents the requirements of this rule.

§ 24-402. Exemptions from the permitting requirements.

The following are exempt from the permitting requirements of this section:

- (1) a groundwater withdrawal for fire suppression or other public emergency purpose;
- (2) a groundwater withdrawal for domestic, residential use;
- (3) groundwater withdrawal for farming;
- (4) dairy processors and milk handlers licensed in accordance with 6 V.S.A. § 2721;
- (5) a groundwater withdrawal for public community water systems;
- (6) a groundwater withdrawal for transient noncommunity systems, unless more than 57,600 gallons per day is used for commercial, industrial, bottling, or bulk purposes.
- (7) A groundwater withdrawal for nontransient noncommunity systems, unless more than 57,600 gallons per day is used for commercial, industrial, bottling, or bulk purposes.
- (8) a groundwater withdrawal for the investigation or remediation of a release of a hazardous material that is being supervised by the Secretary under 10 V.S.A § 6615b or 10 V.S.A. chapter 159 subchapter 3; and
- (9) a groundwater withdrawal for closed loop, standing column, or similar non-extractive geothermal heat pumps

§ 24-403. Pre-application public informational meeting.

- (a) Informational meeting required. At least 30 days before filing an application for a permit under this subchapter, the applicant shall hold an informational meeting in the municipality in which the withdrawal is proposed. At the informational meeting the applicant shall describe the proposed project and provide attendees with the opportunity to comment on the proposed project.
- (b) Notice. Notice for the informational hearing shall be provided by posting the time and location of the meeting in the municipal offices, notifying adjoining landowners, the municipal legislative body in the municipality where the facility is located, and any person on a list of interested persons maintained by the Secretary of the meeting, and by publishing in a local newspaper. Notice shall be provided at least 10 days before the meeting. The applicant shall also notify the Secretary of the time and location of the meeting at least ten days before the meeting.

§ 24-404. Groundwater withdrawal permit application.

- (a) The applicant shall submit an application to the secretary with a form prepared by the secretary. At a minimum, the application shall include the following:
- (1) The name, mailing address, and daytime telephone number of the applicant. If the applicant is not the property owner of the property where the proposed source is located, the property owner shall be a co-applicant on the permit.
 - (2) The GPS location of the proposed source.
 - (3) The requested withdrawal rate from proposed source, including estimates of the projected mean and peak daily, monthly, and annual withdrawals.
 - (4) The use of the proposed withdrawal.
 - (5) If applicable, the previously assigned permitted production rates, established safe yields, or the known withdrawal rates of the applicant's other existing sources on the same tract of land or at the same place of business.
 - (6) The location of proposed return flow for the withdrawn water, if applicable.
 - (7) The estimated amount of water that will not be returned to the watershed where the proposed source is located.
 - (8) A certification that the applicant has met the pre-application public informational meeting requirements of § 24-403.
 - (9) A description of the alternate means considered for satisfying the applicant's purpose for the withdrawal. The alternatives analysis shall examine whether it is possible to connect to a public community water system and shall examine conservation measures to be implemented to reduce water consumption.
 - (10) Include the relevant portions of the municipal plan and regional plan, if any, that address the use of groundwater.
 - (11) A map that shows that the location of the proposed source complies with siting criteria pursuant to § 24-501.
 - (12) A source construction plan that provides the information required by § 24-502.
 - (13) A initial conceptual hydrogeologic model of the source prepared in accordance with § 24-503.

- (14) The estimated area of influence and a description of how it was estimated using the initial conceptual hydrogeologic model.
 - (15) A preliminary inventory of existing sources and uses in the estimated area of influence completed in accordance with § 24-504;
 - (16) A preliminary inventory of surface water and significant wetlands in the estimated area of influence, completed in accordance with § 24-505.
 - (17) A preliminary inventory of contamination sources completed in accordance with § 24-506.
 - (18) An estimation of withdrawal effects prepared in accordance with § 24-507.
 - (19) A description of the source testing program design prepared in accordance with § 24-508.
 - (20) Any additional information the Secretary determines is necessary to conserve groundwater or to protect human health or the environment.
- (b) Notice of application. Prior to determining an application administratively complete, the applicant shall provide documentation of compliance to the secretary of the following notice requirements:
- (1) Send a complete copy of the application to each of the following:
 - (A) The clerk, legislative body, and conservation commission in the municipality in which the project is located.
 - (B) The clerk of adjoining municipalities.
 - (C) The regional planning commission of the area where the project is located.
 - (D) Any public water system permitted by the agency of natural resources in the municipality where the proposed withdrawal is located.
 - (2) Send a notice of application to all landowners and mobile home park residents within the area of influence of the proposed source or within one quarter mile downstream from a proposed source that is a spring. Notice to the officers of a condominium association shall be deemed sufficient under this subdivision for notice to residents of a condominium. A notice of application shall include, at a minimum, the address of the proposed withdrawal, the use of the proposed withdrawal, a map of the estimated area of influence, where full copies of the application may be reviewed,

how to submit comment on the application to the agency of natural resources.

- (3) At the time the application is submitted, publish notice in a newspaper of general circulation in the area of the proposed withdrawal. The notice shall provide the following information:
 - (A) The location and proposed withdrawal rate of the proposed source.
 - (B) Locations where copies of the application may be obtained.
 - (C) That a public comment period is open for 30 days from the submittal date of the application and that comments shall be directed to the water supply division of the Agency.
- (4) A copy of the notice required under subsection (b)(3) of this subsection shall be posted in the municipal clerk's office of the municipality in which the proposed source is located.
- (c) Web posting. The Secretary may, dependent upon the level of public interest associated with a project, post application materials, meeting notices, regulatory determinations, and other information relevant to the proposed withdrawal's application on the agency web site.

§ 24-405. Application review; source construction approval

- (a) After the close of the 30 day comment period, the Secretary shall review the application materials and comments received pursuant to § 24-404 to determine:
 - (1) The application contains all information required by § 24-404.
 - (2) The Secretary determines that source construction plan is consistent with the requirements of § 24-502.
 - (3) All public notification requirements specified by §§ 24-403 and 404 have been satisfied.
- (b) After conducting a review of the application the Secretary shall do one of the following:
 - (1) Notify the applicant that its source construction plan is acceptable and that source construction may commence. Proposed source construction shall be in accordance with the approved construction plan. The applicant shall provide prior notification to the Secretary of the date and times that the proposed sources will be installed and shall provide the Secretary with site access to observe the installation.

- (2) Notify the applicant of deficiencies in the application materials, with the proposed source placement, or with the source construction plan and that modifications are to be made to the application materials prior to the Secretary determining that plan is acceptable.
- (3) Notify the applicant that the site is not suitable for a permit under this rule and deny the permit application. The following factors shall make a site not suitable for further consideration:
 - (A) The proposed source does not meet the siting criteria of § 24-501; or
 - (B) The siting or construction of the proposed source presents a high risk of impact from a potential or actual source of contamination.
- (4) Notify the applicant that the site may not be suitable for a permit under this rule because the site or the final proposed withdrawal appear to present a high risk of an undue adverse effect.

§ 24-406. Approval to conduct proposed source testing

- (a) After the requirements of § 24-405 have been reviewed the Secretary shall do one of the following:
 - (1) Notify the applicant that the application and withdrawal testing program design is acceptable and that source withdrawal testing may commence.
 - (2) Notify the applicant of deficiencies in the program design identified through the source construction or in public comment, which must be resolved before source withdrawal testing may commence.
 - (3) Notify the applicant that the site is not suitable for a permit under this rule because the site or the final proposed withdrawal appears to present a high risk of an undue adverse effect.
- (b) After the applicant receives approval pursuant to subsection (a) of this section, the applicant shall:
 - (1) Complete withdrawal testing in accordance with the approved proposed source testing plan.
 - (2) Refine the initial conceptual hydrogeologic model and area of influence for the proposed source in accordance with § 24-510.
 - (3) Update and revise the contamination source inventory and the inventory of existing sources and surface waters and significant wetlands if greater than 90 days old.

- (4) Describe impacts to existing sources, surface water, and significant wetlands.
- (5) When an undue adverse effect is predicted to occur as a result of the proposed rate of withdrawal, the applicant shall, in the application and final report:
 - (A) Reduce the proposed rate of withdrawal to a level where no adverse effect is anticipated; or
 - (B) Design mitigation measures for review and approval by the secretary.

§ 24-407. Draft final report; public comment period and informational meeting

Notice. Prior to submitting a final report to the Secretary, the applicant shall provide documentation of compliance to the secretary of the following notice requirements:

- (1) Send a complete copy of the draft final report to each of the following:
 - (A) The clerk, legislative body, and conservation commission in the municipality in which the project is located.
 - (B) The clerk of adjoining municipalities.
 - (C) The regional planning commission of the area where the project is located.
 - (D) Any public water system permitted by the agency of natural resources in the municipality where the proposed withdrawal is located.
- (2) Send a notice of draft final report to all landowners and mobile home park residents within the area of influence of the proposed source or within one quarter mile downstream from a proposed source that is a spring. Notice to the officers of a condominium association shall be deemed sufficient under this subdivision for notice to residents of a condominium. A notice of draft final report shall include, at a minimum, the address of the proposed withdrawal, the use of the proposed withdrawal, a map of the estimated area of influence, where full copies of the application may be reviewed, the conclusions reached by the applicant in the final report on whether the proposed withdrawal may cause an undue adverse effect and how the applicant plans to respond to those conclusions, and how to submit comment on the draft final report to the agency of natural resources.

- (3) At the time the draft final report is submitted, publish notice in a newspaper of general circulation in the area of the proposed withdrawal. The notice shall provide the following information:
 - (A) That a public comment period is open for 30 days from the submittal date of the draft final report and that comments shall be directed to the water supply division of the Agency.
 - (B) The time and location of a public meeting to be held on the draft final report and the proposed withdrawal.
- (4) A copy of the notice required under subsection (3) of this subsection shall be posted in the municipal clerk's office of the municipality in which the proposed source is located.

§ 24-408. Determinations for issuance groundwater withdrawal permit

- (a) The secretary shall issue a groundwater withdrawal permit only if:
 - (1) The information provided in the application and final report is complete and correct.
 - (2) The information provided in the application and final report demonstrates that the proposed source satisfies all the following:
 - (A) is planned in a fashion that provides for an efficient use of water.
 - (B) results in a safe yield.
 - (C) will not have an undue adverse effect on existing sources or uses of water.
 - (D) is consistent with the regional and town plan;
 - (E) will not have an undue adverse effect on a public water system permitted by the agency.
 - (F) will not have an undue adverse effect on significant wetlands under the Vermont wetland rules or on other water resources hydrologically interconnected with the well or spring from which the proposed withdrawal would be made.
 - (G) will not violate the Vermont water quality standards.
 - (H) For a proposed source with the purpose of bottled water or bulk water:
 - (i) Meets the water quality parameters established within the Vermont Water Supply Rule.

- (ii) Meets Agency protocols for groundwater under the direct influence of surface water, if applicable.
 - (iii) The Source Protection Area has been publically noticed and the area approved.
 - (iv) Requirements for the Source Isolation Zone have been satisfied.
 - (v) An agricultural lands certification has been completed by the applicant, if applicable.
 - (vi) The Source Protection Plan has been approved.
- (I) addresses any other concern that the secretary has identified as necessary for the conservation of water or protection of human health or the environment.

§ 24-409. Groundwater withdrawal permit.

Each permit issued by the Agency for a groundwater withdrawal pursuant to this section shall specify the following information:

- (1) The name, mailing address, and daytime telephone number of the permittee.
- (2) That the permit is valid for a period of years, not to exceed 10 years.
- (3) The maximum permissible water withdrawal rate, including any seasonal variation or limitations upon the withdrawal rate. In the case of springs, the permit may also require a minimum stream flow.
- (4) That groundwater withdrawals for drinking water supplies, farming, or dairy processing shall be given priority over the proposed source during times of shortage.
- (5) The stated use of the withdrawal.
- (6) A schedule for monitoring and reporting production from the proposed source or sources.
- (7) A requirement that in the event there are changes to the permittee's address and contact information, the permittee shall provide updated information to the secretary within ten days of the change.
- (8) A requirement to report to the secretary as specified in § 24-513 whenever an undue adverse effect has occurred or is occurring.

- (9) A requirement to resolve undue adverse effects in accordance with § 24-513 if one has occurred.
- (10) Other conditions, as needed, to ensure the conservation of groundwater and the protection of human health and the environment.

§ 24-410. Permit amendments.

(a) Major amendments.

- (1) Applicability. Major amendments may include:
 - (A) A proposed increase in the permitted rate of the withdrawal; or
 - (B) A proposed change in the location of the withdrawal.
- (2) Application. An application for a major amendment to a permit shall be treated as a new application. An application for a major amendment shall be reviewed by the secretary in the same manner as a new application.
- (3) Approval. On approval of a major amendment, the secretary will issue an amended permit for the source.

(b) Minor amendments.

- (1) Applicability. Minor amendments may include:
 - (A) A change in the owner of the source or a change to the permittee;
 - (B) A change to any required monitoring that is part of the permit;
 - (C) A change to the use of the withdrawal;
 - (D) A decrease in the permitted rate of withdrawal;
 - (E) The replacement of an existing well at the same location, at the same depth and for the same rate of withdrawal.
- (2) Application. The applicant shall submit an application to the secretary on a form provided by the secretary.
- (3) Notice. The applicant shall provide notice of the minor amendment to all other landowners and mobile home park residents in the area of influence, or in the case of springs, one quarter of one mile downstream from the source and post a copy of the minor amendment in the town clerk's office of the municipality where the project is located. The notice shall provide the following information:
 - (A) The location and a brief description of the proposed amendment.

- (B) Locations where copies of the application may be obtained.
- (C) That a public comment period is open for 30 days from the date of the application and that comments should be directed to the water supply division of the Agency.
- (4) Informational meeting. The secretary may, on his or her motion or by a petition by a member of the public, call a public informational meeting. This meeting shall be noticed at least 10 days before the meeting in the same manner as subsection (b)(3) of this section.

§ 24-411. Notices of closure and conversion.

- (a) Notice of closure. A permittee shall file a notice of closure when the permittee permanently ceases the operation of a source. The permittee shall notify the secretary that the closure plan has been properly implemented, and upon receipt of that notification the permit issued under this rule shall be considered voluntarily revoked. Prior to closing the source, the permittee shall submit a source closure for the Secretary's approval that contains the following:
 - (1) Prior to closing, all water source or holes shall be cleared of any pumps, wires, piping, or other materials that may interfere with effective closing.
 - (2) Wells shall be completely filled with grout using a tremie pipe. Acceptable grout materials include cement, bentonite chips, or 15 percent by volume bentonite grout slurry.
 - (3) Developed spring sources shall be closed and returned to predevelopment conditions or closed in accordance with agency guidelines.
 - (4) A timeframe for the implementation of the closure plan, which shall not be later than one year following the cessation of operating the source.
- (b) Notice of conversion. A permitted source shall file a notice of conversion when the permittee converts a source permitted under this rule to a different use that is not subject to a permit under this rule. Upon the day a notice of conversion is received, the permit shall be considered voluntarily revoked.

§ 24-412. Renewal of groundwater withdrawal permits.

- (a) Any permittee wishing to renew a groundwater withdrawal permit shall submit an application for a permit renewal at least one year prior to its expiration date.
- (b) Minor renewals.
 - (1) If no change to the approved withdrawal rate is proposed at the time of permit renewal, the renewal application shall include:

- (A) The name, mailing address, parcel ID number, and daytime phone number of the permittee;
 - (B) The permittee's written certification that no change to the previously-approved withdrawal rate is being sought;
 - (C) An updated inventory of contaminant sources within the area of influence of the withdrawal;
 - (D) An updated water user and resource inventory within the area of influence of the withdrawal;
 - (E) An updated map identifying any new tracts of land within the area of influence of the withdrawal that have been formed since original issuance of the permit, or most recent renewal and a description of the water source or sources for the new tracts of land; and
 - (F) Where monitoring has been performed as part of the permit: A written summary of observations of impacts and any modifications to the impact monitoring program since issuance of the permit; and a written summary of the volume of groundwater produced by the withdrawal since issuance of the permit.
- (2) The minor renewal application may reference information already contained in the secretary files if the information has not changed since the most recent permit was issued and meets the current criteria outlined in these rules.
- (3) Notice. The applicant shall provide notice of the minor renewal to all other landowners and mobile home park residents in the area of influence, or in the case of springs, one quarter mile downstream from the source, and post a copy of the minor renewal in the town clerk's office of the municipality where the project is located. The notice shall provide the following information:
- (A) The location and a brief description of the proposed renewal.
 - (B) Locations where copies of the application may be obtained.
 - (C) That a public comment period is open for 30 days from the date of the application and that comments should be directed to the water supply division of the Agency.
- (4) Informational meeting. The secretary may, on his or her motion or by a petition by a member of the public, call a public informational meeting. This meeting shall be noticed at least 10 days before the meeting in the same manner as subsection (b)(3) of this section.

- (5) A renewed permit shall be valid for a period of no more than 10 years, provided, however, that there shall be no limit on the number of renewals that a permittee may request.
- (c) Major renewals. Any renewal that is not a minor renewal is a major renewal. Major renewals shall be treated as a new application. An application for a major renewal shall be reviewed by the secretary in the same manner as a new application.

§ 24-413. Revocation.

- (a) General. The Secretary may revoke a permit either in response to a petition or on his or her own motion.
- (b) Bases for revocation: The bases for revocation are:
 - (1) violation of a permit condition;
 - (2) false or misleading information submitted in support of the permit;
 - (3) violation or failure to comply with the provisions of these rules or authorizing statutes;
 - (4) the permitted withdrawal is causing an undue adverse impact; or
 - (5) a petition to revoke submitted by the permittee.
- (c) Petition for revocation. All petitions for revocation shall be addressed to the Secretary, shall be copied to the permittee and shall include:
 - (1) the name, address, and telephone number of the petitioner;
 - (2) the signature of the petitioner;
 - (3) identification of the specific statutory provision, rule, or permit condition that form the basis of the petition;
 - (4) a statement of the petitioner's interest in the matter and the petitioner's contentions, including the alleged basis for the revocation of the permit; and
 - (5) a statement that a copy of the petition for revocation has been sent by the petitioner to the permittee.
- (d) Party Status. The Secretary shall determine the right of the petitioner or other persons requesting party status to participate in the proceedings. In determining party status, the Secretary shall consider whether the person is aggrieved. For purposes of this subsection, "person aggrieved" means a person who alleges an injury to a particularized interest protected by this rule, attributable to the

activities authorized under the permit that can be redressed by the Secretary. The secretary and the municipality in which the project at issue is located are automatically parties in a revocation proceeding.

- (e) Interested Person Status. Any person who is interested in the revocation proceeding may submit comments on the revocation to the Secretary. Interested persons shall not have Party Status and shall not be allowed to participate in any hearing that takes place on the revocation.
- (f) Notice of revocation hearing. Notice of a petition for revocation of a permit shall be sent to the permittee, the municipality in which the project is located, and all other parties who would receive notice under § 24-404(b). The notice shall be issued at least two weeks prior to hearing and shall include the following information:
 - (1) the legal authority for revocation;
 - (2) a brief statement of facts upon which the proposed action is based;
 - (3) a statement that the Secretary will hold a hearing for the purpose of determining whether the permit shall be revoked; and
 - (4) the date, time, and place where the hearing will be held.
- (g) Hearing. The hearing in a contested case shall be conducted by the Secretary. Any party to the revocation proceedings shall either appear in person shall be represented by an attorney, or appear at the proceeding with an attorney. The burden of proceeding and of proving that the permit should be revoked shall be upon the party petitioning for revocation. The admissibility of evidence in all revocation proceedings shall be determined under criteria set forth in 3 V.S.A. § 810. Upon the request of a party, a hearing shall be transcribed by a qualified stenographer or recorded on an electronic sound device at the election of the party. If transcription by a stenographer is requested, the request shall be in writing and filed at least 10 days before the hearing. Costs shall be borne by the requesting party. The requesting party shall provide one copy of the transcript to the Secretary without cost; other parties wishing a copy shall reimburse the requesting party on a prorated basis.
- (h) Examination of evidence, decision and order. The examination of evidence, decision and order shall be governed by the provisions of 3 V.S.A. §§811 and 812. The final decision shall be made within 30 days after the close of the hearing. This decision shall constitute the final decision of the Secretary. Prior to making a final decision, the Secretary shall consider comments submitted by Interested Persons. Copies shall be sent to the permittee, other parties, the legislative body of the municipality, and all affected municipal and regional planning commissions.

- (i) Voluntary revocation. Notwithstanding the other provisions of this section, the permittee may voluntarily waive the right to have a hearing, in which case the permit may be administratively revoked by the Secretary

§ 24-414. Variances.

- (a) To request a variance, applicant shall submit the following information in writing to the Secretary:
 - (1) The name, mailing address, and daytime telephone number of the person requesting the variance and, if the person is other than an individual, the name and daytime telephone number of an individual who can be contacted regarding the request;
 - (2) Identification of the source to which the variance request relates by applicant name and municipality and, if a permit has already been issued, the permit number and date of issuance;
 - (3) Identification of the specific section of the rule for which the variance is being sought. Variances under this rule are limited to variances from: (1) the setback requirement of § 24-501(b); (2) the source construction standards of § 24-502(c); and (3) the source testing requirements of § 24-509;
 - (4) A full explanation of why a variance is necessary, including the likely consequences if the variance is not granted;
 - (5) A full explanation of the alternative that will be implemented in lieu of the rule requirement with a full explanation of how the alternative will be as protective of human health and the environment, including groundwater quantity, as adhering to the rule;
 - (6) Whether the variance is needed for a limited time and, if so, what that time period is; and
 - (7) A full explanation of how the benefits of granting a variance are consistent with the intent of this rule and 10 V.S.A. Chapter 48.
- (b) Notice. Prior to a variance request to the Secretary, the applicant shall provide documentation of compliance to the secretary of the following notice requirements:
 - (1) Send a complete copy of the variance request to each of the following:
 - (A) The clerk, legislative body, and conservation commission in the municipality in which the project is located.
 - (B) The clerk of adjoining municipalities.

- (C) The regional planning commission of the area where the project is located.
 - (D) Any public water system permitted by the agency of natural resources in the municipality where the proposed withdrawal is located.
 - (E) All landowners and mobile home park residents within the area of influence of the proposed source or within one quarter mile downstream from a proposed source that is a spring. Notice to the officers of a condominium association shall be deemed sufficient under this subdivision for notice to residents of a condominium.
 - (F) At the time the notice is provided to the public, publish notice in a newspaper of general circulation in the area of the proposed withdrawal and that a public comment period is open for 30 days from the submittal date of the application and that comments shall be directed to the water supply division of the Agency.
- (2) A copy of the notice required under this subsection shall be posted in the municipal clerk's office of the municipality in which the proposed source is located.
- (c) The Secretary after considering all comment shall grant a variance if the Secretary finds that:
 - (1) The alternative proposed, if any, will be as protective of human health and the environment, including groundwater quality and quantity, as adhering to the rule; and
 - (2) The benefits of granting a variance are consistent with the intent this rule and 10 V.S.A. Chapter 48.
 - (d) In granting a variance, the Secretary shall impose such conditions, including time limitations, as the secretary deems necessary to ensure that the criteria specified in subsection (c) of this section will be met.
 - (e) No variance shall be granted if the effect of the variance would be to waive or modify a statutory requirement. The Secretary shall issue a written decision on a request for a variance. If the variance is denied, the denial shall specifically set forth the reason for the denial.

Subchapter 5 – Technical standards

§ 24-501. Siting sources.

- (a) An applicant shall have permanent legal access over the land surrounding the source sufficient to ensure access to the source, maintenance of the source, and protection of the aquifer from a direct discharge to the withdrawal point.
- (b) A source shall be located at a distance sufficient to ensure that the source does not result in the migration of fertilizers or pesticides used on agricultural crop land. In no case may a source be nearer than 50 feet from the property line when the adjacent property is used as agricultural crop land;
- (c) Proposed sources shall be located where they will not be subject to damage from vehicles or similar hazards.
- (d) Proposed sources developed for the purpose of bottled or bulk water shall have ownership or legal control to Zone 1 of the source protection area established for that source.

§ 24-502. Proposed source construction plan

- (a) Plan required. A proposed source construction plan is required prior to the installation of the proposed source to protect the groundwater and other water resources. The source construction plan shall include the following:
 - (1) A erosion prevision sediment control plan that describes measures to prevent erosion and control sediment;
 - (2) Measures to be put into place that prevent unpermitted discharges to surface waters;
 - (3) A groundwater contamination prevention plan that provides specific measures to prevent groundwater contamination including:
 - (A) The source construction and techniques that will be used.
 - (B) The proposed site grading and runoff control designed to prevent runoff and surface water infiltration at the proposed source.
 - (C) Measures that ensure that all source construction shall be thoroughly cleaned and decontaminated before use.
 - (4) A proposed source drilled, driven or bored greater than 20 feet deep shall be installed by a Vermont licensed well driller who shall file a report with the secretary within 90 days of completion in accordance with the well driller licensing rule.

- (b) Construction standards for springs. The following are acceptable materials in the construction of a spring source: grouted concrete tiles; concrete cast in place; or metallic or plastic casing. The applicant shall demonstrate the long term structural integrity and the chemical inertness of the material proposed for use.
- (c) Construction standards for wells.
 - (1) Casing. The casing and liner material used on all water sources shall be of such strength and composition as to prevent the movement of water or contaminants into or out of the water source in the interval cased. The casing or liner shall not distort, collapse, crack, or disintegrate during placement or under normal conditions. The casing and liner shall be adequate to provide for the installation, removal, and maintenance as appropriate of caps, pitless adapters, screens, pumps, pipes, wires or other devices that may be used. Any casing that is driven shall be protected with a firmly attached drive shoe or equivalent. All steel casing shall have full circumferential welds or threaded coupling joints.
 - (2) Grout.
 - (A) Grouting or the use of a grout mixture is required and under the following conditions:
 - (i) Filling the annular space as required in subsection (d)(4) of this section.
 - (ii) Plugging abandoned wells.
 - (iii) As needed in the construction or closure of monitoring wells.
 - (B) A grouting material or mixture shall:
 - (i) Allow negligible movement of all fluids in the annular space.
 - (ii) Support and secure the casing.
 - (iii) Provide negligible shrinkage, breakage, or deterioration of the grout after placement.
 - (3) Annular space. The annular space shall be grouted for the full length of the unscreened portion of the casing, or the portion thereof below the frost line or pitless adaptor, so that no fluids may move in the zone needing to be grouted.

Note: Under most conditions, driven steel casing shall be considered to have no annular space provided no pilot hole larger than the casing has been drilled below the depth of the pitless adaptor or the frost line.

- (4) Finishing.
 - (A) Each well shall be finished to prevent damage to the well and minimize the potential for contamination.
 - (B) The well casing shall extend not less than 18 inches above existing grade, or at least 12 inches above the pump house floor or concrete apron surface. The well shall be covered with a temporary or permanent tight fitting cap or protective structure which cannot be removed or opened without the use of tools, a key, or a combination.
 - (C) If a proposed source will have an underground enclosure it shall be designed to prevent intrusion by persons or animals and shall be passively drained to prevent any ponding of water in the enclosure. The source shall be capped with a water tight cap meeting the Standard for Watertight Well Caps (PAS-2) adopted by the Water Systems Council, Chicago, IL. A sanitary seal shall not be used. Any source that is buried in a pit, or underground enclosure shall be separately vented. The wiring for the pump shall either be sealed for water tightness where it enters the cap or be contained in a watertight conduit system.
 - (D) No water source shall be finished, vented or capped in a manner that has any similarity to any oil or gas filling pipe unless specifically and permanently labeled to prevent confusion.
- (5) Flowing artesian wells.
 - (A) All flowing artesian wells shall be constructed, finished, and capped in a manner to prevent depletion of the aquifer, loss of artesian pressure, and erosion of the aquifer confining materials or the land surface. For flowing artesian wells required to be grouted, cement grout is preferred.
 - (B) Permanent casing and grout shall be provided.
 - (C) Flowing artesian wells shall not discharge to the ground surface or to a water resource.
- (6) Source identification. Proposed sources shall be adequately and permanently identified and marked with a well tag.

- (d) Construction standards for monitoring wells. The proposed source construction plan shall describe the installation method or methods and specifications for monitoring wells. The plan shall state whether the monitoring wells are temporary or permanent.
- (e) Construction standards for bottled and bulk water systems. A proposed source with the purpose of bottled or bulk water shall be constructed in accordance with the Vermont Water Supply Rule, Appendix A, Subchapter 12 (construction requirements for public water systems).

§ 24-503. Initial conceptual hydrogeologic model and area of influence.

- (a) The initial conceptual hydrogeologic model of the withdrawal shall be developed by a qualified professional and identify the sources of information used to develop the model. The initial conceptual hydrogeologic model shall be based on information including:
 - (1) An inventory of existing sources and uses prepared consistent with § 24-504.
 - (2) A inventory of surface waters and significant wetlands prepared consistent with § 24-505.
 - (3) An inventory of contamination sources prepared consistent with § 24-506.
 - (4) Hydrogeologic mapping information such as surficial material, lineament, and bedrock or other remote sensing analysis.
 - (5) Geophysical data, if available.
 - (6) Available climatological data including precipitation data from National Oceanic and Atmospheric Administration and United States Geological Survey stream gauging flow data.
 - (7) Other data as appropriate.
- (b) Where dated environmental data is used to develop the initial conceptual hydrogeologic model, such data shall be adjusted to account for any major land use changes that have occurred.
- (c) The initial conceptual hydrogeologic model shall be based on the operation of the withdrawal at the proposed rate without any recharge to groundwater from rainfall or snowmelt over a period of 180 consecutive days.
- (d) The initial conceptual hydrogeologic model shall include:
 - (1) A description of the geology and geomorphology of the region including the governing hydrogeologic characteristics of the bedrock and surficial

- geologic formations, including Natural Resource Conservation Service soil maps, as applicable.
- (2) Generalized geologic cross-sections through the region, including at least one through the site of the proposed source, based on available information such as well logs, geologic reports, maps, and subsurface data.
 - (3) An estimated delineation of the area of influence.
- (e) The estimated extent of the area of influence and each of its components shall be presented on a United States Geological Survey topographic map or maps at a scale of 1:24,000 or 1:25,000, or at a scale that gives greater detail:
- (f) A description of the hydrogeologic cycle and a water budget for the area of influence shall be prepared that describes:
- (1) The amounts and timing of precipitation, runoff, infiltration, evapotranspiration, change in storage, based on available climatological data including climatological normals.
 - (2) The distribution and availability of water necessary to maintain natural resources, existing water uses, and the proposed withdrawal.
 - (3) The locations and amounts of water use, consumption, discharge, and recharge of water to and from the area of influence.
 - (4) A description of the likelihood that the proposed source will create an undue adverse effect, considering the water budget, recharge and discharge rates, change in storage.
- (g) A preliminary description of the groundwater flow regime for the area of influence that describes hydraulic boundaries, recharge characteristics, and the interaction of surface waters and significant wetlands associated with the withdrawal shall be prepared that includes:
- (1) Hydrogeologic conditions, in any unconfined, confining, or semi-confining layers of the overburden, and in the bedrock aquifer.
 - (2) A description of groundwater flow both in horizontal and vertical directions, under ambient and conceptual operating conditions.
 - (3) Hydrogeologic influences of regional groundwater flow from all aquifers and surface water bodies, or other water resources in hydraulic communication with the proposed source.
 - (4) Preferential groundwater flow pathways caused by the properties of the deposits or bedrock.

- (h) The initial conceptual hydrogeologic model shall identify data needed to refine the model to complete the report required in § 24-512. Where data gaps are identified during the development of initial conceptual the hydrogeologic model, the model shall:
 - (1) Identify the data gaps and their significance to understanding the potential impacts of the proposed withdrawal.
 - (2) Estimate the reasonably suspected hydrogeologic scenario associated with the withdrawal that could occur given the known and unknown model parameters.

§ 24-504. Inventory of existing sources and uses.

- (a) The inventory of existing sources and uses in the estimated area of contribution for bottled water or bulk water sources and in the area of influence for all other sources shall:
 - (1) Identify information sources and describe efforts to collect information pertaining to existing sources and uses within the area of contribution or area of influence as the case may be.
 - (2) Be used to estimate withdrawal effects in accordance with § 24-507, and to develop notice to interested persons required by subchapter 4 of this rule.
- (b) The inventory of existing sources and uses shall be based on the following:
 - (1) Agency records of existing sources and uses.
 - (2) Published reports.
 - (3) Municipal and public inventories, tax maps, and records.
 - (4) A visual or windshield survey conducted by a qualified professional.
 - (5) Other records, as available.
- (c) The inventory shall identify the use, the purpose of the use, an estimate of the quantity of the use, the tax map and the parcel ID number of the tract of land on which the use occurs, and the name and mailing address of each property owner and operator for each of the following:
 - (1) Public and potable water supply withdrawals and impoundments.
 - (2) Users of groundwater and surface water, whether permitted or not permitted. Users of groundwater and surface water include withdrawals,

recharges, permitted surface water discharges, and underground injection control authorizations.

- (3) Areas served by public or private sewer and the locations of the discharge.
 - (4) Any other existing source and water uses that might be influenced by the withdrawal.
- (d) To the extent the information is available in records of the Agency, provided by source owner, or otherwise known, the inventory of water sources pursuant to subsection (c)(1) of this section shall include the following information:
- (1) The installation date of the source and the name and license number of the well installer.
 - (2) The type of source and its specifications, including overall depth, casing depth, depth to water in the source, depth to bedrock, water source diameter, and water source yield.
 - (3) Well pump size, depth, and age.
 - (4) The total number of existing sources on the property.
 - (5) The number of individuals served by the source.
 - (6) A description of water treatment equipment installed, if any.
 - (7) A description of water quantity or water quality problems with the source.
- (e) The complete inventory of water resources and uses in the area of influence shall be presented on a USGS topographic map at a scale of 1:24,000 or 1:25,000, or at a scale that gives greater detail
- (f) The map required by subsection (e) of this section shall include a map legend that specifies the title, date, and scale of the map and includes a north arrow.

§ 24-505. Inventory of surface waters and significant wetlands.

- (a) The inventory of surface waters and significant wetlands in the estimated area of influence shall:
 - (1) Identify information sources and describe efforts to collect information pertaining to surface waters and significant wetlands within the area of influence.
 - (2) Be used to estimate withdrawal effects in accordance with § 24-507 and develop the notice to interested persons required by subchapter 4.

- (3) If the applicant is denied access, the inventory shall be based upon data collected from other information sources.
- (b) The inventory of surface waters and significant wetlands shall be based on the following:
 - (1) Agency records of existing sources and uses.
 - (2) Published reports.
 - (3) Municipal and public inventories, tax maps, and records.
 - (4) A visual or windshield survey conducted by a qualified professional.
 - (5) Other records, as available.
- (c) The inventory shall identify the type and location of each water-related natural resource in the area of influence, including surface waters, significant wetlands, springs, vernal pools, and any other water-related natural resources that might be influenced by the withdrawal. The inventory shall:
 - (1) provide the tax map and parcel ID number of the tract of land on which the surface water or significant wetland lies, and the name and mailing address of each property owner operator;
 - (2) Describe the current regulatory status of the surface water or significant wetland (e.g. permits issued, if any);
 - (3) Describe the designated uses of the surface water as provided in its classification in the Vermont Water Quality standards; and provide a list of existing uses of surface water, as identified in accordance with the Agency's anti-degradation implementation policy or rule, whichever is effective.
- (d) The complete inventory of water resources and uses in the area of influence shall be presented on a USGS topographic map at a scale of 1:24,000 or 1:25,000, or at a scale that gives greater detail.
- (e) The map required by subsection (d) of this section shall include a map legend that specifies the title, date, and scale of the map and includes a north arrow.

§ 24-506. Inventory of potential contamination sources.

- (a) An inventory of known and potential contaminant sources in the estimated area of contribution for bottled water or bulk water sources and in the area of influence for all other sources.
- (b) The potential contamination source inventory shall:

- (1) Be compiled from a search of the following information sources:
 - (A) Records at the Agency.
 - (B) Records at the municipalities.
 - (C) Other records, as available.
 - (D) A visual or windshield survey.
- (2) Identify and describe all known and potential contamination sources, by providing the following information for each known and potential source of contamination:
 - (A) The site name, parcel ID number, and physical address.
 - (B) The name and mailing address of each property owner and operator.
 - (C) For each known source of contamination, a description of the nature and extent of contamination, the agency site identification number, and the status of any site investigation or remedial action.

§ 24-507. Estimation of withdrawal effects.

- (a) The estimated effects of the proposed withdrawal on water resources and existing sources and uses in the potential area of influence shall be completed as follows:
 - (1) Be based on the hydrogeologic model and the potential area of influence identified pursuant to § 24-503.
 - (2) Be prepared by a qualified professional.
 - (3) Evaluate the likelihood of affecting the extent of known or potential groundwater contamination identified in the inventory prepared pursuant to § 24-506.
 - (4) The withdrawal of water shall not cause a contaminant to adversely effect an existing source's water quality.
 - (5) Quantify impacts on existing sources and uses identified in the inventory prepared pursuant to § 24-504.
 - (6) Quantify impacts on surface water and significant wetlands identified in the inventory prepared pursuant to § 24-505.
 - (7) Evaluate the likelihood that the proposed withdrawal will result in an undue adverse effect or not result in a safe yield.

- (b) The applicant shall describe any limitations to the estimate of the withdrawal effects, including but not limited to those arising from data gaps or the complexity of the geology.

§ 24-508. Source testing program design.

- (a) The source testing program shall be designed to:
 - (1) Estimate the effects of the withdrawal on existing sources and uses, surface waters and significant wetlands, and potential contaminant sources under conceptual hydrogeologic model pumping conditions, that is, 180 days of continuous operation of the withdrawal at the requested rate without direct recharge to groundwater from rainfall or snowmelt; and determine whether the proposed withdrawal represents a safe yield.
 - (2) Estimate the effects of the source under hydrogeologic model conditions and analyze whether the proposed source does or does not create an undue adverse effect at the proposed withdrawal rate.
 - (3) Address critical data gaps, limitations, or insufficiencies identified in § 24-503 and § 24-507 that are necessary to complete the impact assessment.
- (b) If the Secretary determines that the proposed testing program may result in an undue adverse effect to existing sources or uses, surface water, significant wetlands, or may impact a contaminant source, the Secretary may require that the applicant prepare a monitoring and mitigation plan for the source testing program for review and approval by the secretary.
- (c) The program shall be designed by a qualified professional and performed by or under the direction of a qualified professional;
- (d) As part of the source testing, the applicant shall provide a request for access and informational letter for owners of existing sources and water resources, and for property owners where a surface water or significant wetland is located within the area of influence. The request for access and informational letter shall contain the following:
 - (1) Include the items from an example form letter supplied by the Secretary.
 - (2) Request monitoring permission and a written response.
 - (3) Clearly state that it is the applicant's responsibility to prepare the source for monitoring, offer to sample for bacteria (e.coli) prior to and after monitoring at applicant's expense, and offer for the disinfection of the source after monitoring has taken place.
 - (4) State the monitoring requirements.

- (5) Inform the source user and owner that the applicant will supply potable water or cease the withdrawal test should their water supply needs not be met due to withdrawal testing activities.
- (6) Identify the name and telephone number of the individual who should be contacted in the event of a water outage during testing.
- (7) Be sent via certified mail with return receipt requested, or by another method that demonstrates receipt of the notice, at least 14 days prior to commencing the withdrawal testing program.
- (8) Inform the source user and owner that all complaints of an applicant's performance with this notice may be directed towards to the Agency of Natural Resources and provide the name and telephone number of the person handling the permit application at the Agency.
- (e) The proposed source testing program shall include the measurement and observation of a representative number and variety of existing sources and water resources so that the data can be used to estimate effects on all water resources and users that might be adversely impacted.
- (f) If the applicant is unable to monitor a existing source or water resource, the estimate of the effect of the withdrawal shall:
 - (1) Be based upon data collected from other nearby sources or water resources that represent the sources or water resources that could not be monitored;
or
 - (2) Be based on an estimate using data collected during the withdrawal testing and analytical techniques.
- (g) For all proposed sources, the source testing production rate shall equal or exceed the rate requested in the permit application.

Note: the source testing discharge rate may be less than the rate requested in the permit application, however the rate permitted shall not be greater than the actual withdrawal testing discharge rate.

- (h) The source testing program shall be designed to provide data to:
 - (1) Demonstrate production of the maximum withdrawal rate requested for each proposed source;
 - (2) Identify the responses of the aquifer and other water resources;
 - (3) Refine the hydrogeologic model and area of influence delineation in accordance with § 24-510;

- (4) Quantify the effects of the source and conclude if the impacts meet the criteria for an undue adverse effects as specified by § 24-511;
- (i) For proposed sources with a purpose of withdrawing for bottled or bulk water purposes, immediately following the conclusion of the source test the applicant shall test for the following:
 - (1) constituents identified in the Vermont Water Supply Rule Section 6.12, Table 6-1 (maximum contaminant levels) where it is indicated that initial source testing is required.
 - (2) constituents identified in the Vermont Water Supply Rule Section 6.13, Table 6-2 (secondary contaminants) where it is indicated that initial source testing is required.
- (j) For proposed sources with a purpose of withdrawing for bottled or bulk water purposes, determine whether the proposed source is groundwater under the direct influence of surface water as required by Vermont Water Supply Rule Appendix A Section 3.4.
- (k) The source testing program shall comply with withdrawal testing requirements in § 24-509.
- (l) Source testing and evaluation methods, procedures, data, laboratory reports, and other supporting documentation shall be presented in the final report required by § 24-512.

§ 24-509. Source testing requirements

- (a) Springs
 - (1) Yields for springs shall be determined using one of the following methods:
 - (A) With prior approval by the Secretary, spring yields may be determined from weekly measurements collected between June 1 to November 1. The spring yield determined by this method shall be the minimum flow measured during that period divided by four.
 - (B) The applicant shall conduct a detailed hydrologic low flow analysis, which must, at a minimum, include monitoring of spring yield on a weekly basis from July 1 to October 15 and from December 15 to March 15 during expected low flow conditions. Monitoring of spring yield for high flow analysis shall occur on a weekly basis from March 15 to July 1 and from October 15 to December 15. The high flow data shall be used to determine the upper withdrawal limit and aerial extent of the recharge area to the spring. The flow data collected during a detailed hydrologic low

flow analysis will be used to determine the spring yield in a 1Q20 low flow condition.

- (2) If proposed by the applicant in the source testing program developed in accordance with §24-508, and approved by the Secretary, the flow monitoring may also include a nearby stream or river to provide data to aid in the comparative flow analysis.
 - (4) A comparative flow analysis based on long term flow data from a gauged watershed (e.g., a watershed with a long term USGS gauging station) similar in hydrogeology to the area in which the proposed source spring is located shall be completed to calculate the 1Q20 flow of the spring.
 - (5) Spring sources shall have a minimum flow rate established that takes into account other uses or allocations for existing sources and water resources in the area of influence. An upper limit on withdrawal rate will also be established based on the high flow measurements.
- (b) Pumped groundwater sources
- (1) All pumping tests shall consist of and be conducted in the following order: pre-test water level monitoring of the proposed source, existing sources, and water resources, see subsection (b)(4) of this section,; a pumping test; a recovery test; recovery test water level monitoring of the proposed source, existing sources, and water resources, see subsection (b)(6)(B) of this section. The recovery test shall immediately follow the pumping test. Precipitation monitoring shall occur during the entire testing period. All testing data and evaluations (including graphical) appropriate to the testing program shall be provided to the Secretary.
 - (2) If proposed by the applicant in the source testing program developed in accordance with §24-508, and approved by the Secretary, a short term (i.e., 24-hours or less) test (e.g., step-drawdown test, short term constant discharge test) may be completed to aid in the design of the long term pumping test. Details of such testing shall be included in the source testing program.
 - (3) Under special circumstances (e.g., possibly associated with the testing of a flowing artesian well), the applicant may propose alternative withdrawal testing procedures (e.g., constant head test) in the source testing program. If proposed, specific details of such testing must be included in the source testing program, including methodologies to evaluate potential impacts to existing sources and water resources. If approved by the Secretary, the alternative testing shall be completed in strict accordance with the methods presented in the source testing program.
 - (4) Pre-Test Water Level Monitoring

- (A) Pre-test water level monitoring in the proposed source, existing sources, and water resources shall occur at all monitoring locations included in the source testing program.
- (B) Pre-test water level measurements shall be collected, at a minimum, every four hours for two days prior to the pumping test.
- (C) Pre-test monitoring of existing sources in use shall include measurements taken at a time following their longest recovery period, usually between 3 and 5 A.M.
- (D) The source testing program prepared by the applicant may include a longer duration or a greater frequency of pre-test monitoring. If approved by the Secretary, this modified pre-test water level monitoring shall occur in strict accordance with the source testing program.

(5) **Pumping Test**

- (A) The pumping test shall be conducted after full recovery from any short term testing (e.g., step-drawdown test, short-term constant discharge test) that may have occurred prior to the start of the pumping test.
- (B) The following table shall be used to determine the duration and discharge fluctuations for pumping tests:

Pumping Test Rate (GPM)	Test Duration	Discharge Within:
40 – 49	72 hours	± 5%
50 – 99	96 hours	± 3%
100 – 199	120 hours	± 3%
200+	168 hours	± 3%

- (i) Discharge shall be held constant within the limits presented in the table above. Meter accuracy shall be verified by another independent method (e.g., calibrated bucket and stopwatch).
- (ii) Measurements in the proposed source, existing sources, and water resources shall be collected to the nearest 10th of a foot.
- (C) During pumping tests, water level and discharge readings measured at the proposed source shall be collected at a frequency

sufficient to allow for accurate aquifer characterization and data analysis. The following table presents suggested reading frequencies.

ELAPSED TIME (MIN)	READING FREQUENCY
0-10	every 1 minute
10-30	every 2 minutes
30-90	every 5 minutes
90-180	every 10 minutes
180-420	every 30 minutes
420-1440	every 60 minutes
1440-end of test	every 2 to 4 hours

- (D) During pumping tests, water levels at all existing sources and water resources identified in the source testing program shall be monitored.
 - (i) Water level readings shall be collected every four hours or more frequently.
 - (ii) Monitoring of existing sources shall include measurements taken at a time following their longest recovery period, usually between 3 and 5 A.M.

- (E) The first 24 hours of the pumping test shall be free of interruptions. If an interruption occurs the test shall be terminated, the source allowed to fully recover, and the test restarted. After the first 24 hours, if the pumping test is interrupted a total of two hours or longer, the test shall be terminated, the source allowed to fully recover, and the test restarted.

- (F) The horizontal location shall be established using global positioning system (GPS) technology referenced to NAD83 and reported in units of degrees and minutes and seconds of latitude and longitude with at least three decimal places of precision, or an alternative map or method that provides a higher degree of accuracy; and

- (G) The vertical reference point elevation shall be established by (a) reference to a surveyed vertical reference point when one is available at the withdrawal site or monitoring well network, (b) using a global positioning system (GPS) technology referenced National Geodetic Vertical Datum 1988 and with the vertical reference point elevation being accurate to +/- 0.1 foot (c) a method that provides a higher degree of accuracy.

(6) Recovery Testing

(A) Recovery tests shall be conducted immediately following the pumping test and shall include the following:

- (i) Water level measurements to the nearest 10th of a foot in the proposed source.
- (ii) Monitoring for two days or complete recovery in the proposed source, whichever occurs first.
- (iii) Monitoring of water level at timed intervals that will result in evenly spaced plots on semi-logarithmic paper. Suggested times of recovery measurement beginning when the pumping test is terminated are as follows:

RECOVERY TIME (MIN)	FREQUENCY
0-10	every 1 minute
10-20	every 2 minutes
20-60	every 5 minutes
60-120	every 15 minutes
120-360	every 60 minutes
360-600	every 120 minutes
600-2880	every 240 minutes

(B) Post-pumping test water level monitoring at all existing sources and water resources shall continue during the recovery test period.

- (i) Water level readings shall be collected every four 4 hours or more frequently.
- (ii) Monitoring of existing sources shall include measurements taken at a time following their longest recovery period, usually between 3 and 5 A.M.

(7) Precipitation Monitoring

(A) Precipitation data sufficient to determine timing, amount, and type of precipitation shall be collected during the entire testing period (i.e., from the start of the pre-test monitoring to the end of the post-test monitoring). Precipitation data can be collected on-site or be from a nearby National Oceanographic and Atmospheric Administration (NOAA) weather station or NOAA-certified cooperative observation site.

(8) Pumping Test Data Analysis

- (A) All yield and interference analyses shall use methodologies appropriate to the hydrogeologic setting and aquifer type (e.g., unconfined, confined).
- (B) Pumping test and recovery test data shall be used to calculate aquifer parameters such as transmissivity and storativity.
- (C) All analyses shall be completed using standard and accepted methodologies, as presented in published texts or peer-reviewed scientific journals, unless alternative methodologies are previously approved by the Secretary.
- (D) A minimum of two methodologies shall be used to allow for comparison of results and to determine if additional methodologies should be used.
- (E) Graphs of drawdown vs. time on cartesian and semi-log and/or log-log paper and graphs of distance vs. drawdown, if appropriate, shall be included for the proposed source, existing sources, and water resources shall be included in the data analysis. A graph of discharge vs. time shall be included on graphs for the proposed source, and precipitation data shall be plotted on each graph of time vs. drawdown for all existing sources and water resources monitored.
- (F) The total available head used in yield and interference analyses shall be limited to the maximum drawdown achieved during the withdrawal testing unless limited further by subsection (b)(8)(G) of this section or by a hydraulic base of the source identified during the withdrawal testing that is above the tested depth of the source.
- (G) Proposed sources that may be subject to future interference shall be allowed to use only up to 90% of the total available head in the yield analysis. This requirement may be waived by the Secretary for sources at the same place of business or on the same tract of land.
- (H) The yield determination shall take into consideration the measured and predicted impacts to existing sources and water resources and any permitted groundwater or water resource uses in the estimated area of influence. Also, seasonal low static water level and hydrogeologic boundaries affecting the aquifer shall be considered in the yield analysis.

§ 24-510. Conceptual hydrogeologic model refinement.

- (a) The applicant shall refine the initial conceptual hydrogeologic model developed in accordance with § 24-503 based on results of the source testing completed in accordance with § 24-509.
- (b) If, after the source testing, the applicant elects to reduce the withdrawal volume proposed pursuant to §24-404(a)(3), the applicant shall refine the initial conceptual hydrogeologic model to reflect the revised proposed withdrawal rate.
- (c) Hydrogeologic model refinement shall include a refinement of the area of influence estimated in accordance with § 24-503.
- (d) The refined hydrogeologic model and area of influence delineation shall be presented with supporting documentation in the final report prepared in accordance with § 24-512.

§ 24-510. Revisions to contamination sources, existing sources, and water resources inventories.

Inventories generated pursuant to §§ 24-504, 505, and 506 used within the final report shall be not more 90 days old on the date of the final report submittal. The applicant shall present the updated and revised inventories in the final report prepared in accordance with § 24-512.

§ 24-511. Undue adverse effect criteria.

- (a) For all groundwater withdrawals, a proposed source will be presumed to not have an undue adverse effect when:

 - (1) For effects on surface water:

 - (A) If a proposed source does not have a hydrogeologic connection to a surface water within the area of influence, the proposed source is presumed to have no undue adverse effect.
 - (B) If a proposed source does have a hydrogeologic connection to a surface water, the proposed source shall be presumed to not result in an undue adverse effect to surface water, if the following can be demonstrated:

 - (i) For proposed sources that are hydrogeologically connected to surface waters that have a flow, the applicant shall demonstrate that the hydrology criteria of the water quality standards has been met.
 - (ii) For proposed sources that are hydrogeologically connected to ponds, lakes, and other surface waters without a discrete surface water outlet, the applicant shall demonstrate there is

no measurable change in the elevation of the water surface as a result of the withdrawal.

- (2) For effects on significant wetlands, if Secretary determines that a proposed source:
 - (A) Does not have a hydrogeologic connection to a significant wetland located within the area of influence, the proposed source is presumed to not have an undue adverse effect on that significant wetland.
 - (B) Has a hydrogeologic connection to a significant wetland, but the applicant demonstrates that the proposed source does not impact any function or value of the significant wetland and there is no loss of significant wetland then the proposed source is presumed to not have an undue adverse effect.
 - (C) Does have a hydrogeologic connection to a significant wetland, the connection will cause in an impact to functions and values the significant wetland, but the impact has been mitigated in accordance with the Vermont wetlands rules then the proposed source shall be presumed to not have an undue adverse effect.
- (3) For effects on existing sources, if the Secretary determines that the proposed source:
 - (A) Does not have a hydrogeologic connection to an existing source located within the area of influence, the proposed source is presumed to not have an undue adverse effect on that existing source.
 - (B) Has a hydrogeologic connection to an existing source, but the applicant demonstrates that the proposed source does not effect the ability of the existing source to meet its design demand. For purposes of this subdivision, design demand is the value established by the Vermont Water Supply Rule for a use or a value otherwise approved by the secretary.

§ 24-512. Final report.

- (a) After withdrawal testing pursuant to § 24-509 is completed, the applicant shall submit a final report to the secretary that includes the following:
 - (1) All information and materials required in §§ 24-502 through 511, including any updates to the name, mailing address, and daytime telephone number of the applicant and, if the applicant is other than an individual, the name, daytime telephone number and, if available, e-mail

address of the individual who will serve as the contact person for purposes of the application;

- (2) Certifications that the proposed source is consistent with the municipal plan adopted for the municipality in which the proposed source is located and the portion of the plan upon which the certification is based, and also in conformance with the regional plan adopted for the area in which the proposed source is located and the portion of the plan upon which the certification is based.
- (3) The estimated effects of the proposed withdrawal on water resources and existing sources in the area of influence shall be documented as follows:
 - (A) Be based on the refined conceptual hydrogeologic model and the area of influence identified pursuant to § 24-510.
 - (B) Be prepared by a qualified professional.
 - (C) Include a requested withdrawal rate(s), including seasonal limitations as appropriate and necessary to prevent undue adverse effects.
 - (D) Document that the proposed source will not cause undue adverse effects. If an undue adverse effect may take place, the applicant shall propose a plan to mitigate undue adverse effects.
- (4) A description of any data gaps or other limitations to the estimate of the withdrawal effects.
- (5) For a proposed source that is for bottled water or bulk water purposes, the final report shall develop a source protection area consistent with Vermont Water Supply Rule, Appendix A Section 3.3.1 (source protection areas) and develop a source protection plan consistent with Vermont Water Supply Rule, Appendix A, Subchapter 21-16 (source protection plan).
- (6) When mitigation measures to avoid an undue adverse effect are proposed, they shall be documented and made a of a plan that is included in the final report. A mitigation plan shall consider the following mitigation measures, when applicable, to avoid an adverse effect:
 - (A) Drill affected source deeper and test for water quantity and quality.
 - (B) Conduct a yield test on an affected source or re-evaluate existing data.
 - (C) Connect affected water system onto a permitted public water system.

- (D) Develop an alternative water source for the affected source.
 - (E) Present water usage data from the affected water system that documents a reduction in water demand.
 - (F) If the existing source is a bedrock well, hydrofracture the well or redevelop by other methods, and test for water quantity and quality.
 - (G) Mitigate impacts to significant wetlands as approved by the secretary.
 - (H) Other methods of mitigation approved by the secretary.
- (b) In selecting a mitigation measure, the applicant shall select a measure that has been agreed to by the applicant and the owner of the effected existing source. A copy of this agreement shall be provided to the secretary

§ 24-513. Undue adverse effect reporting and response during permit period.

- (a) Upon discovery of an apparent undue adverse effect, the permittee shall immediately report to the Secretary a description of the undue adverse effect and its potential cause. An undue adverse impact may be from the pumping test or from the operation of a source.
- (b) The Secretary shall notify the permittee within five calendar days of the time when the secretary observes, or another person reports to the Secretary , an unmitigated apparent undue adverse or unanticipated effects.
- (c) At the written request of any person, the Secretary shall investigate any allegation of an apparent undue adverse effects including hydrogeologic data supporting the occurrence or potential occurrence of an adverse impact, and determine whether an undue adverse impact has occurred.
- (d) The secretary shall notify the permittee after reviewing the allegation whether an undue adverse effect has occurred.
- (e) The Secretary may require the applicant, on an emergency basis, to provide emergency mitigation of a water source through the provision of bottled water or another alternate source approved by the Secretary.
- (f) Once an undue adverse effect is verified the permittee shall:
 - (1) Reduce or the withdrawal to the point where the undue adverse effect has ceased or cease the withdrawal.
 - (2) Present a proposal for resolving the undue adverse effect to the Secretary approval;

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- (3) Initiate steps to resolve the undue adverse effect in accordance with the approved plan; and
- (4) Report on the implementation of the approved plan and its effectiveness in resolving the undue adverse effect.