

STATE OF VERMONT
Agency of Natural Resources
Department of Environmental Conservation

Chapter 12
Of the Environmental Protection Rules:
GROUNDWATER PROTECTION RULE
AND STRATEGY

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SUBCHAPTER ONE - AUTHORITY, POLICY, PURPOSE, AND APPLICABILITY

12-101 Authority

This rule and strategy is adopted under the authority of 10 Vermont Statutes Annotated (V.S.A.) 1390-1394.

12-102 Policy

It is the policy of the State of Vermont that it shall protect its groundwater resources to maintain high quality drinking water. It shall manage its groundwater resources to minimize the risks of groundwater quality deterioration by limiting human activities that present unreasonable risks to the use classifications of groundwater in the vicinities of such activities. The state's groundwater policy shall be balanced with the need to maintain and promote a healthy and prosperous agricultural community.

12-103 Purpose and Applicability

10 V.S.A. 1390-1394 does not create any new permit programs for groundwater protection. The statute directs the Secretary to protect groundwater through existing regulatory programs and by the adoption of a strategy to assist in coordinating groundwater management statewide. This rule provides restrictions, prohibitions, standards, and criteria for groundwater protection that will be adopted, as appropriate, in Agency permit and regulatory programs that control activities which may affect groundwater. The Secretary shall amend all appropriate rules to conform to 10 V.S.A. 1390-1394 and this rule. These restrictions, prohibitions, standards, and criteria may be adopted by other state agencies or local governments with authority to manage activities that may affect groundwater.

12-104 Coordination

This Rule is not enforceable over activities outside the jurisdiction of the Agency of Natural Resources. State, federal and local agencies with the authority to manage activities that may affect groundwater are encouraged to adopt the restrictions, prohibitions, standards and criteria contained in this Rule as part of their own groundwater management programs. This Rule also provides a procedure for other agencies to request the Secretary's concurrence with their findings (see 12-505).

SUBCHAPTER TWO - DEFINITIONS

12-201 Definitions

Unless otherwise stated the following definitions apply throughout this rule.

- (1) "Acceptable Activity" means an activity that the Secretary determines is not likely to cause substantial harm, or a loss of beneficial uses, to a particular class of groundwater. In determining if an activity is acceptable, the Secretary will consider:
 - (a) the groundwater quality standards;
 - (b) the nature and quantity of groundwater at risk;
 - (c) the availability, cost and effectiveness of measures to mitigate risks;
 - (d) the nature and quantity of risks that the activity may generate;
 - (e) the expense and effectiveness of correcting the damage the risks may cause;
 - (f) the consequences to the public interest should damage occur and be irreparable;
 - (g) the economic, social and environmental value of existing activities;
 - (h) the Vermont Water Quality Standards including the classification of surface waters; and
 - (i) other factors relevant to designating appropriate groundwater classes or managing risks to groundwater quality.
- (2) "Activity" means any source or potential source of a waste that is detected in or has a reasonable probability of entering groundwater.
- (3) "Agency" means the Vermont Agency of Natural Resources.
- (4) "Acceptable laboratory" means a laboratory that:
 - (a) is certified, accredited or otherwise recognized by either the state in which it resides or by the Federal government for drinking water or environmental analysis in areas closely related to the kinds of monitoring required or permitted, or is acceptable to the Secretary;
 - (b) has a field procedures plan; and
 - (c) has a quality assurance/quality control program that may be reviewed by the Secretary.
- (5) "Background groundwater quality" means the groundwater quality at or near a property that has not been affected by any activity on that property.
- (6) "Beneficial uses" means those uses of groundwater included in each groundwater class.
- (7) "Class I groundwater" means groundwater that has been classified by the Secretary and approved by the General Assembly, if required by 10 V.S.A. 1394(f), and that:

- (a) is suitable for public water supply use;
 - (b) has uniformly excellent character;
 - (c) has no exposure to activities which pose a risk to its current or potential use as a public water supply source; and
 - (d) is in use as a public water supply source, or is determined by the Secretary to have a high probability for such use.
- (8) "Class II groundwater" means groundwater that has been classified by the Secretary and that:
- (a) is suitable for public water supply use;
 - (b) has uniformly excellent character;
 - (c) is exposed to activities which may pose a risk to its current or potential use as a public water supply source; and
 - (d) is in use as a public water supply source, or is determined by the Secretary to have a high probability for such use.
- (9) "Class III groundwater" means groundwater that has been classified by the statute or reclassified by the Secretary and that is suitable as a source of water for individual domestic water supply, irrigation, agricultural use and general industrial and commercial use.
- (10) "Class IV groundwater" means groundwater that has been classified by the Secretary and that is not suitable as a source of potable water but suitable for some agricultural, industrial and commercial use.
- (11) "Design Management Zone" means a three-dimensional subsurface zone that the Secretary may utilize to manage regulated activities which may affect groundwater quality (see Figure 1 and 12-802).
- (12) "Discharge" means the placing, depositing, emitting or release of any waste onto or beneath the land surface such that the waste, substance, or material reaches or is likely to reach groundwater.
- (13) "Enforcement standard" means a numerical value expressing the detectable concentration of a substance in groundwater, the reaching or exceeding of which requires a response under Section 12-804 of this Rule.
- (14) "Generally accepted methods" means methods for mapping groundwater areas and aquifers and for determining aquifer characteristics that are recognized by the U.S. Geological Survey, the U.S. Environmental Protection Agency or the National Groundwater Association.

- (15) "Generally accepted statistical methods" means published statistical procedures that have been used by the scientific community to evaluate statistical trends in groundwater quality data.
- (16) "Groundwater" means water below the land surface in a zone of saturation, but does not include surface waters within the meaning of 10 V.S.A. 1251 (13).
- (17) "Groundwater quality standards" means those water quality standards and criteria listed in Appendix One of this Rule.
- (18) "Groundwater Coordinating Committee" means the committee established by the Secretary which advises the Secretary on matters concerning groundwater.
- (19) "High probability for use as a public water supply source" means:
- (a) the Secretary has issued a Source Approval for a public water supply source in accordance with Chapter 21, Water Supply Rule, of the Environmental Protection Regulation and that the groundwater meets Class I or Class II criteria; or
 - (b) the Secretary finds on the basis of information available to him or her, that the need for a new municipal water supply source will be necessary and the Secretary has received a written petition from a Vermont municipal government requesting Class I or Class II designation to protect one or more groundwater areas and the petition contains:
 - (i) a copy of a duly adopted plan, bylaw, or ordinance providing local protection for the designated Class I or Class II area;
 - (ii) a map showing the general area or areas under the control of the municipal government in which that government proposes to develop a future public water supply source;
 - (iii) a projected maximum demand figure from a future public water supply source;
 - (iv) an estimated date for the construction of a new public water supply source and necessary appurtenances;
 - (v) a hydrogeologic study indicating that the area under consideration could reasonably meet the projected public water supply demand;
 - (vi) such other provisions as the Secretary deems necessary; or
 - (c) the Secretary finds on the basis of information available to him or her, that the need for a new municipal public water supply source will be necessary.
- (20) "Indicator Parameter" means a groundwater quality characteristic which the Secretary may use to determine groundwater quality deterioration or improvement.
- (21) "Non-potable groundwater" means groundwater which is not "potable groundwater" or which will not be "potable groundwater" for at least five years, or is scientifically predicted to become unsuitable as a source of "potable groundwater" within five years.

- (22) "Potable groundwater" means groundwater free from impurities in amounts sufficient to cause disease or harmful physiological effects, and having biological, chemical, physical and radiological quality conforming to applicable standards of the Agency.
- (23) "Preventive action level" means a numerical value expressing the detectable concentration of a substance in groundwater, the reaching or exceeding of which requires a response under Section 12-803 of this Rule.
- (24) "Public Water Source Protection Area" or "SPA" means a surface or subsurface area from or through which contaminants are reasonably likely to reach a public water system source. A "SPA" is also known as a Wellhead Protection Area.
- (25) "Public water supply" means a water supply system with fifteen or more connections or that serves an average of at least 25 individuals for at least sixty days per year.
- (26) "Risk Advisory" means notification to the public by the Secretary pursuant to Subchapter Six of this Rule.
- (27) "Secretary" means the Secretary of the Agency of Natural Resources or the Secretary's designee.
- (28) "Substantial harm" means a deterioration of groundwater quality to a level that requires treatment to restore or maintain groundwater quality enforcement standards.
- (29) "Unacceptable Activity" means an activity that the Secretary determines is likely to cause or causes substantial harm or a loss of beneficial uses to a particular class of groundwater. In determining if an activity is unacceptable, the Secretary will consider:
- (a) the groundwater quality standards;
 - (b) the nature and quantity of groundwater at risk;
 - (c) the availability, cost and effectiveness of measures to mitigate risks;
 - (d) the nature and quantity of risks that the activity may generate;
 - (e) the expense and effectiveness of correcting the damage the risks may cause;
 - (f) the consequences to the public interest should damage occur and be irreparable;
 - (g) the economic, social and environmental value of existing activities;
 - (h) the Vermont Water Quality Standards including the classification of surface waters; and
 - (i) other factors relevant to designating appropriate groundwater classes or managing risks to groundwater quality.
- (30) "Unacceptable risk" means an activity which is likely to cause or causes a groundwater quality condition that reaches or exceeds one or more of the groundwater quality enforcement standards.

- (31) "US EPA" means the United States Environmental Protection Agency.
- (32) "Waste" means effluent, sewage or any substance or material, liquid, gaseous, solid or radioactive, including heated liquids, whether or not harmful or deleterious to groundwater.

SUBCHAPTER THREE - A GROUNDWATER PROTECTION STRATEGY FOR VERMONT

12-301 Foreword

This Rule is the groundwater management and protection strategy for the State of Vermont and is adopted pursuant to the provisions of 10 V.S.A. 1390-1394. It replaces the Ground Water Protection Rule and Strategy which was effective on September 29, 1988.

The strategy rests on the principles and directives hereinafter stated, and sets forth the goals necessary to implement the policy established by the legislature in 10 V.S.A. 1390-1394. This strategy directs the activities of the Agency of Natural Resources in managing and protecting groundwater and serves as guidance to other state and local agencies in the development of groundwater protection programs. The Secretary may adopt joint policies with other agencies to expand groundwater protection efforts to cover activities by all state agencies which manage activities affecting groundwater.

12-302 Principles and Directives

The following principles and directives support and direct the Secretary's actions relating to groundwater.

(1) Principles

- (a) Groundwater is of critical importance to the State of Vermont and must be actively protected and managed in order to protect public health and welfare.
- (b) Each Class of groundwater has its appropriate, beneficial uses that must be protected. Protection should be accomplished by both limiting new activities based on potential risks to groundwater and by adherence to technical standards and criteria. Whenever and wherever possible, appropriate management practices rather than specific regulations will be utilized to protect the designated uses.
- (c) The Secretary will identify and classify the geographical boundaries of Classes I, II, and IV groundwater areas.

(2) Directives

- (a) The Secretary's groundwater classifications shall be presumed correct if, in establishing the geographical boundaries of each class of groundwater, he or she uses generally accepted methods of determining groundwater areas based on existing knowledge of surficial and bedrock geology and available hydrological

and hydrogeological data. The Secretary will also consider soils, topography, and past, present, and proposed uses of the land and groundwater resources in determining the appropriate boundaries of groundwater classification areas.

- (b) Groundwater protection will be integrated within regulatory programs administered by the Secretary by amending appropriate rules to comply with 10 V.S.A. 1390-1394 and this Rule. When the Secretary revises a rule with respect to standards and criteria relating to groundwater protection, the standards and criteria revision will take into consideration the following items:
 - (i) the groundwater quality standards;
 - (ii) the nature and quantity of groundwater at risk;
 - (iii) the availability, cost and effectiveness of measures to mitigate risks;
 - (iv) the nature and quantity of risks that the activity may generate;
 - (v) the expense and effectiveness of correcting the damage the risks may cause;
 - (vi) the consequences to the public interest should damage occur and be irreparable;
 - (vii) the economic, social and environmental value of existing activities;
 - (viii) the Vermont Water Quality Standards including the classification of surface waters; and
 - (ix) other factors relevant to designating appropriate groundwater classes or managing risks to groundwater quality.
- (c) This Rule will serve as guidance for federal, state, and local agencies that have authority over activities that may affect groundwater but are not regulated by the Secretary. Any of these agencies may propose a finding that an activity is an Acceptable or Unacceptable Activity to groundwater in accordance with 12-505.
- (d) The Secretary may take any actions within the context of regulatory programs established in statutes or rules outside of this Rule, if those actions are necessary to protect public health and welfare or prevent a significant damaging effect on groundwater or surface water quality for present or future potable or non-potable uses, whether or not an enforcement standard and preventive action level for the waste has been adopted under this Rule.
- (e) Nothing in this Rule authorizes a violation of the Vermont Water Quality Standards or the objectives of the Vermont Water Pollution Control Act.
- (f) The Secretary shall develop a comprehensive groundwater management program to protect the quality of groundwater resources by:
 - (i) developing a strategy for the management and protection of the state's groundwater resources;
 - (ii) continuing studies and investigations of groundwater in the state;
 - (iii) cooperating with other government agencies in collecting and compiling

- (iv) data on the quantity and quality of groundwater and location of aquifers; identifying and mapping groundwater currently used as public water supply sources and groundwater determined by the Secretary as potential public water supply sources;
- (v) providing technical assistance to municipal officials and other public bodies in the development of regional or municipal plans or bylaws, the purpose of which is the protection of groundwater resources;
- (vi) classifying groundwater resources according to the provisions of 10 V.S.A., Chapter 48, and adopting technical criteria and standards for the management of activities that may pose a risk to their beneficial uses;
- (vii) integrating the groundwater management strategy with other regulatory programs administered by the Secretary;
- (viii) developing public information and education materials; and
- (ix) cooperating with federal agencies in the development of programs for protecting the quality and quantity of the groundwater resources.

12-303 Goals

The goals of the Secretary's actions relating to groundwater are:

- (1) To implement the duties of the Secretary as defined in 10 V.S.A. 1390-1394;
- (2) to continually update this Rule consistent with changing conditions in the state and emerging technology;
- (3) to protect and manage groundwater resources to maintain high quality drinking water by minimizing the risks of groundwater quality deterioration consistent with the beneficial uses designated for each class and limiting or managing human activities which present unacceptable risks to these beneficial uses;
- (4) to revise existing Agency rules and criteria governing activity design, location, and management practices as necessary to prevent groundwater quality from reaching or exceeding enforcement standards at compliance points;
- (5) to develop and implement a program with adequate resources and flexibility to respond to rapidly expanding groundwater science and technology;
- (6) to monitor groundwater resources as appropriate to detect risk to beneficial uses;
- (7) to advise and warn the public of potentially non-potable groundwater and harmful conditions (a public risk advisory program);
- (8) to develop criteria and standards for groundwater mapping ;
- (9) to develop a statewide, comprehensive coordinated groundwater data management

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program for the use of local, regional, state, and federal agencies and any interested party;

- (10) to promote the use of global positioning systems (GPS) in conjunction with managing and utilizing groundwater information for inclusion in a statewide Geographical Information System (GIS); and
- (11) to manage activities that may pose a risk to groundwater.

12-304 Class I Goals:

- (1) To identify and classify Class I groundwater.
- (2) To implement a coordinated protection program including the inventorying and assessment of potentially contaminating activities.
- (3) To prohibit all human activities that presents a risk to groundwater quality.

12-305 Class II Goals:

- (1) To identify and classify Class II groundwater.
- (2) To maintain minimum risk for Class II groundwater.
- (3) To manage Class II groundwater by issuing permits for activities regulated under existing authorities, monitoring groundwater quality and human activities, and taking appropriate actions as authorized by law to reduce or stabilize the risk when required.

12-306 Class III Goals:

- (1) To maintain potable water quality for Class III groundwater by:
 - (a) issuing permits for activities regulated under existing authorities;
 - (b) monitoring groundwater quality as appropriate; and
 - (c) issuing Risk Advisories when appropriate.

12-307 Class IV Goals:

- (1) To identify and classify Class IV groundwater.

- (2) To manage activities for Class IV groundwater to insure Class III standards or better at the borders of Class IV area, and to improve of groundwater quality within Class IV areas.
- (3) To require that all new activities show that the activity shall not cause the groundwater quality to reach or exceed the groundwater quality standards listed in Appendix One of this Rule within the Class IV area and that the activity shall not cause an increase in existing contaminant levels at the Class IV boundary.

12-308 Groundwater Risk Advisory Goals:

To issue Groundwater Risk Advisories for those situations in which the Secretary finds or expects to find potentially non-potable conditions in the state's groundwater resources.

SUBCHAPTER FOUR - PROCEDURES FOR CLASSIFICATION

12-401 Groundwater Classification

- (1) As provided for in 10 VSA 1394(b), all groundwater of the state is classified as Class III, unless reclassified by the Secretary.
- (2) The Secretary may on his or her own motion, or upon the submittal of a written petition from a state agency, a municipality, or twenty-five or more potentially affected persons classify or reclassify any groundwater of the state. Reclassification to a Class I or II may be done in conjunction with the Secretary's Source Approval of a Public Water System.
- (3) The Secretary, upon the advice of the Groundwater Coordinating Committee, may adopt technical and other procedures necessary to implement these reclassifications. These may include procedures detailing the scientific processes required to delineate the physical boundaries of Class I, II, III, or IV groundwater areas.
- (4) The Director of the Water Supply Division in coordination with the Groundwater Coordinating Committee is responsible for recommending groundwater classifications or reclassifications to the Secretary.
- (5) Petitions for classification or reclassification of groundwater shall be submitted to the Director of the Water Supply Division for review.
- (6) Any classification or reclassification decision issued by the Secretary may include conditions for the management of the classified groundwater area that shall apply to activities regulated by the Secretary.

12-402 Criteria and Procedures for Distribution of Classification Maps

The Secretary will publish and distribute maps for each groundwater classification to:

- (a) the town clerk in the town or towns affected;
- (b) the Agency regional office for the area affected;
- (c) the owners and/or operators of any public water supplies affected;
- (d) Well Drillers Advisory Board;
- (e) the Vermont Center for Geographic Information;
- (f) the appropriate Regional Planning Commission; and
- (g) other interested parties as appropriate.

12-403 Class I, II, III, and IV Groundwater Reclassification Process

- (1) In determining whether or not to reclassify groundwater as a Class I, II, III, or IV the Secretary shall consider the following:
 - (a) the use or potential future use of the groundwater as a public water supply source;
 - (b) the extent of activity which poses a risk to groundwater;
 - (c) the current water quality of the groundwater;
 - (d) the availability of the groundwater in quantities needed for beneficial use;
 - (e) the consequences of its potential contamination and the availability of alternate sources of water;
 - (f) the classification of adjacent surface waters;
 - (g) the high probability for use as a public water supply source (Subchapter 12-201(18)).
 - (i) Groundwater not presently in use as public water supply source may be reclassified as Class I or II, if it has a high probability for use as a public water supply source.
 - (ii) Scientifically delineated SPAs for public water supplies may be adopted as a Class I or II, as appropriate;
 - (h) other factors relevant to determine the maximum beneficial use of the groundwater.
- (2) The Secretary will provide notice of any proposed reclassification by:
 - (a) advertisement in newspapers of general circulation in the area of the proposed classification or reclassification;
 - (b) written notice with the appropriate town clerk;
 - (c) written notice to all potentially affected property owners of record, and other persons as appropriate, of the proposed classification or reclassification action;
 - (d) written notice to the appropriate Regional Planning Commission; and
 - (e) written notice to the Groundwater Coordinating Committee.
- (3) The Secretary will provide a thirty day (30) comment period for each proposed reclassification action which shall start on the date that the notice is published in the newspaper.
- (4) Upon the request of an interested person or upon the Secretary's motion, the Secretary will hold a public information meeting on any proposed reclassification. The public information meeting will be held in a location convenient to the users or potential users of the groundwater which is the subject of the public information meeting. The Secretary will provide notice of the date, time, and location of the public information meeting.
- (5) Prior to the issuance of any final classification or reclassification decision, the Secretary shall consider all comments received during the public comment period and the public information meeting.

12-404 Statutory Requirements for Class I Reclassifications

(1) Submission to the Legislature for Approval

The Secretary shall follow the reclassification procedures in these rules for Class I reclassifications. However, pursuant to 10 V.S.A. 1394(f) any classification of Class I groundwater involving privately owned lands or a reclassification of Class I groundwater to another class shall be submitted by the Secretary to the Natural Resources Committees of both houses of the General Assembly within 15 days of the issuance of the decision order. Under 10 V.S.A. 1394 (f), any such classification or reclassification must be approved by an act of the General Assembly prior to becoming effective.

(2) Permanent Protection

Pursuant to statutory policy at 10 V.S.A. 1394(f), any Class I groundwater shall be permanently protected unless and until a reclassification is approved in accordance with Section 12-404(1).

12-405 Appeals

10 V.S.A. Chapter 48 is silent regarding appeals of reclassification decisions. However, in the opinion of the Secretary, any person aggrieved by a reclassification decision of the Secretary may appeal that decision under the Rules of Civil Procedure to the Superior Court of the county where the affected groundwaters are located.

SUBCHAPTER FIVE - MANAGEMENT OF GROUNDWATER AFTER CLASSIFICATION

Each of the classes of groundwater has designated beneficial uses and characteristics, the maintenance of which require specific management techniques. This Subchapter sets forth the management requirements for each class.

In general, groundwater will be managed by adhering to certain standards and criteria for groundwater quality, and by limiting risks by prohibiting or restricting new activities, as appropriate, within each class. Enforcement of these standards, criteria, prohibitions and restrictions will be accomplished through permitting and regulatory programs within the Agency of Natural Resources. This Rule is not enforceable over activities outside the jurisdiction of the Agency of Natural Resources.

As provided for in 10 VSA 1394, the Secretary may manage activities which constitute risks to the groundwater and which may be precluded. The criteria and standards for managing these activities are contained in Appendix One and Two.

12-501 Management of Class I Groundwater

- (1) All Class I groundwater will be managed to assure compliance with the groundwater quality standards established in Appendix One of this Rule.
- (2) Coordination

For activities that are not regulated by the Secretary, the Secretary will cooperate with federal, state, and local authorities to limit activities that may pose a risk to the groundwater.

- (3) Permit Oversight

The Secretary will monitor proposed new construction and development within Class I groundwater areas by reviewing Act 250 and other appropriate permit applications to determine the level of risk to the groundwater.

- (4) Management, Abatement, and Restoration
 - (a) The Secretary will cooperate in and encourage the management of land use activities within Class I areas to ensure no exposure to risk. When monitoring of water quality or other information demonstrates that deterioration has occurred, or that risk is imminent or increasing, the Secretary will cooperate in appropriate investigations to determine the probable cause or causes and act, as appropriate under his or her authority, to abate the deterioration and restore the groundwater

- to its previous uniformly excellent quality.
- (b) When the Secretary finds that a regulated activity causes or allows deterioration of the groundwater quality or poses unacceptable risk, the Secretary will take appropriate actions to reduce the risk up to and including cessation of discharges and remedial action. For activities not regulated by the Secretary, the Secretary will cooperate with the appropriate authority to reduce the risk.

(5) Report to the Legislature

Annually, the Secretary shall report to the General Assembly on the status of Class I groundwater. The report shall include data reflecting the quality of groundwater and land uses within existing Class I areas and shall propose, as necessary, new Class I areas for approval by the General Assembly.

12-502 Management of Class II Groundwater

- (1) Prior to issuing any permits or approving any regulated activity in a Class II groundwater area:
 - (a) the applicant shall provide evidence, and the Secretary will make a finding that the activity:
 - (i) will not cause the groundwater quality to reach or exceed the primary enforcement standards at a compliance point;
 - (ii) will not cause the groundwater quality to reach or exceed the secondary enforcement standards or 110% of the secondary background groundwater quality established under 12-704, whichever is greater, at a compliance point; and
 - (iii) is not an Unacceptable Activity in Class II Groundwater (see 12-201(29)); or
 - (b) the activity is an Acceptable Activity in a Class II area (see Section 2 of Appendix Two).
- (2) The Secretary will not issue permits for activities in a Class II area that are an Unacceptable Activity in a Class II area (see Section 2 of Appendix Two).
- (3) Coordination

For activities which are not regulated by the Secretary, the Secretary will cooperate with federal, state, and local authorities to limit activities that may cause the groundwater quality to reach or exceed the groundwater standards at any compliance points.

(4) Permit Oversight

- (a) The Secretary will monitor proposed new construction and development within

Class II groundwater areas by reviewing Act 250 and other appropriate permit applications to determine the level of risk to the groundwater.

- (b) The Secretary may require groundwater quality monitoring for any permitted or regulated activity in a Class II groundwater area.

(5) Corrective and Restorative Actions

When the Secretary finds that a regulated activity poses an unacceptable risk, the Secretary will take or require appropriate actions to reduce the risk up to and including cessation of discharges and remedial action. For activities not regulated by the Secretary, the Secretary will cooperate with the appropriate authority to reduce the risk.

12-503 Management of Class III Groundwater

- (1) Class III groundwater is the groundwater not otherwise classified as Class I, II or IV groundwater. It is generally protected by the Secretary's rules, guidelines and management practices which the Secretary presumes will reduce the potential for contamination.
- (2) Prior to issuing any permits or approving any regulated activity in a Class III groundwater area:
 - (a) the applicant shall provide evidence, and the Secretary will make a finding that the activity:
 - (i) will not cause the groundwater quality to reach or exceed the primary enforcement standards at a compliance point;
 - (ii) it will not cause the groundwater quality to reach or exceed the secondary enforcement standards or 110% of the secondary background groundwater quality established under 12-704, whichever is greater, at a compliance point; and
 - (iii) is not an Unacceptable Activity in Class III Groundwater (see 12-201(29)); or
 - (b) the activity is an Acceptable Activity in a Class III area (see Section 2 of Appendix Two).
- (3) All activities regulated by the Secretary are presumed to have made the finding for Class III groundwater in 12-503(2), if the activity meets the Secretary's rules and regulations, and those rules and regulations have given due consideration to 12-302(2)(b).
- (4) The Secretary will not issue permits for activities in a Class III area that are an Unacceptable Activity in a Class III area (see Section 3 of Appendix Two).

(5) Coordination

For activities that are not regulated by the Secretary, the Secretary will cooperate with federal, state, and local authorities to limit activities that may cause the groundwater quality to reach or exceed the groundwater standards at any compliance point.

(6) Permit Oversight

(a) The Secretary will monitor proposed new construction and development within Class III groundwater areas by reviewing Act 250 and other appropriate permit applications to determine the level of risk to the groundwater.

(b) The Secretary may require groundwater quality monitoring for any permitted or regulated activity in Class III groundwater.

(7) Corrective and Restorative Actions

When the Secretary finds that a regulated activity poses an unacceptable risk, the Secretary will take or require appropriate actions to reduce the risk up to and including cessation of discharges and remedial action. For activities not regulated by the Secretary, the Secretary will cooperate with the appropriate authority to reduce the risk.

12-504 Management of Class IV Groundwater

(1) Class IV groundwater is the groundwater associated with and found beneath Class IV groundwater areas that have been mapped and classified. It is not suitable as a source of potable water but may be suitable for some agricultural, industrial, and commercial uses.

(2) Class IV groundwaters will be managed to insure Class III standards or better at the border of the Class IV area and to improve the groundwater quality within the Class IV area.

(3) All new activities regulated or permitted by the Secretary in a Class IV groundwater area will be required to show that the activity would not cause the groundwater quality to reach or exceed the groundwater quality enforcement standards at the compliance points, and that the activity will not cause an increase in existing contaminant levels above enforcement standards at the Class IV boundary. Acceptable Activities for Class II and III areas in Appendix Two are also Acceptable Activities in Class IV areas provided they do not cause the contaminant plume associated with Class IV area to migrate.

(4) Coordination

For activities that are not regulated by the Secretary, the Secretary will cooperate with federal, state, and local authorities to limit activities that may cause the groundwater quality to reach or exceed the groundwater standards at the compliance points, and that the activity will not cause

an increase in existing contaminant levels above enforcement standards at the Class IV boundary.

(5) Monitoring

The Secretary will establish a program for groundwater quality monitoring within Class IV groundwater areas. The program will be updated as necessary to protect the public health, the Class IV areas, and adjacent groundwater.

(6) Permit Oversight

The Secretary will monitor proposed new construction and development within Class IV groundwater areas by reviewing Act 250 and other appropriate permit applications to determine the level of risk to the groundwater.

12-505 Findings of an Acceptable and Unacceptable Activity with Other Regulatory Agencies

(1) Requests from Other Agencies

The Secretary may adopt joint policies with other state agencies to expand groundwater protection efforts to all state agencies which manage activities affecting groundwater.

Federal, state, and local agencies with authority to regulate activities which may affect groundwater may propose a finding of Acceptable or Unacceptable Activity to groundwater for an activity or type of activity under their jurisdiction in a particular class of groundwater. When such findings are proposed to the Secretary for concurrence, the process listed in 12-505 (2) will be followed.

(2) Process

- (a) An agency that submits a proposed finding to the Secretary for concurrence that an activity or type of activity is an Acceptable or Unacceptable Activity for a particular class of groundwater will provide the following information to the Groundwater Coordinating Committee:
 - (i) a description of the activity;
 - (ii) an analysis of the impact the activity would or would not have on groundwater quality and on the beneficial uses of the particular class of groundwater including:
 - (A) the groundwater quality standards;
 - (B) the nature and quantity of groundwater at risk;
 - (C) the availability, cost and effectiveness of measures to mitigate risks;

- (D) the nature and quantity of risks that the activity may generate;
 - (E) the expense and effectiveness of correcting the damage the risks may cause;
 - (F) the consequences to the public interest should damage occur and be irremediable;
 - (G) the economic, social and environmental value of existing activities;
 - (H) the Vermont Water Quality Standards including the classification of surface waters; and
 - (I) other factors relevant to designating appropriate groundwater classes or managing risks to groundwater quality.
- (b) The Groundwater Coordinating Committee will review the submitted information based upon the above criteria. The Groundwater Coordinating Committee could choose to:
- (i) forward a recommendation to the Secretary to make the finding as proposed;
 - (ii) request further information from the proposing agency; or
 - (iii) recommend that the proposing agency revise the request and resubmit the request.
- (c) After receiving the recommendation of the Groundwater Coordinating Committee or upon his or her own motion, the Secretary may make a finding regarding activities that are not under the Secretary's jurisdiction.
- (d) Any finding made through this process will be incorporated in the next revision of the Groundwater Protection Rule and Strategy.

12-506 Potential Public Water Supply Sources

The Secretary, after consultation with the Groundwater Coordinating Committee, shall establish a procedure for identifying and mapping groundwater determined by the Secretary as potential public water supply sources

SUBCHAPTER SIX - RISK ADVISORIES

12-601 Criteria and Procedures for Risk Advisories

(1) Issuance of Advisory

When the Secretary finds that events have caused, or are likely to cause, primary groundwater quality enforcement standards (Table 1 of Appendix One) to be reached or exceeded at any groundwater drinking water source or sources, the Secretary, in cooperation with the Commissioner of Health, shall issue a Risk Advisory of such conditions. The Risk Advisory shall include the following information:

- (a) a brief description of the event or events that the Secretary has reason to believe are the cause, or are likely to be the cause, of the contamination;
- (b) a description of the contaminants, the groundwater quality enforcement standard, and the concentrations of the contaminants;
- (c) the location of the drinking water source or sources;
- (d) an advisory not to consume the drinking water; and
- (e) other information as appropriate.

(2) Distribution of the Advisory

- (a) The Secretary shall distribute the information in the Risk Advisory in any manner reasonably calculated to give notice of the potential risk to the persons affected.
- (b) Distribution may include notification to the following:
 - i) the town clerk and Health Officer in the town or towns affected;
 - ii) the Agency regional office for the area affected;
 - iii) the principal newspaper or newspapers for the area affected;
 - iv) the radio and television stations that broadcast to the affected area;
 - v) the regional planning or development commission or commissions serving the affected area;
 - vi) the Vermont Agency of Agriculture, the Vermont Department of Health, Department of Public Safety, and the Agencies of Commerce and Community Development, Human Services, and Transportation;
 - vii) any individuals the Secretary knows would be likely to consume the contaminated or potentially contaminated drinking water;
 - viii) the owners, operators, or both of any public water system using a groundwater source in the vicinity of the area affected;
 - ix) owners of properties likely to be affected;
 - x) Vermont Water Well Advisory Committee; and
 - xi) other interested parties, as appropriate.

(3) Risk Advisory Updates

The Secretary shall issue periodic updates, as appropriate. If the Secretary determines that a drinking water source or sources no longer reaches or exceeds the groundwater quality enforcement standards, the Secretary shall rescind the Risk Advisory and provide notice of the rescission in the same manner as was used for the Risk Advisory.

- (4) The Commissioner of Health has separate and distinct authority to issue Risk Advisories in situations that he or she determines to pose a risk to public health and welfare.

SUB-CHAPTER SEVEN - STANDARDS AND CRITERIA FOR GROUNDWATER PROTECTION

12-701 **Applicability**

- (1) This Rule establishes groundwater quality enforcement standards, Preventive Action Levels (PALs), and Indicator Parameters. They are contained in Appendix One of this Rule. The groundwater quality enforcement standards, PALs and Indicator Parameters apply to all permit and regulatory programs administered by the Secretary that may affect groundwater. The rules governing activities managed by these programs will be revised to incorporate them as appropriate. In addition to these standards, certain regulated activities have sighting and testing standards for the purpose of protecting groundwater quality and quantity. The relevant rules and regulations regarding a specific activity should be consulted.
- (2) These standards and Preventive Action Levels may serve as recommended guidelines for local governments and other state agencies which have programs or interest in groundwater protection.
- (3) The primary and secondary groundwater quality enforcement standards given in Table 1 and Table 2 of Appendix One are intended to identify a broad range of chemical constituents, the presence of which could pose a risk to the beneficial uses of that class of groundwater.
- (4) Preventive Action Levels are considered as an early warning mechanism of potential groundwater quality degradation. Section 12-803 details the responses when a Preventive Action Level is reached or exceeded.
- (5) The Secretary will consider the need for and may require groundwater quality monitoring as part of Agency permitting and regulatory programs. The monitoring data may be used to determine actions necessary to prevent or remediate conditions where the groundwater quality reaches or exceeds the enforcement standards in Appendix One.
- (6) Sampling and analysis of all constituents in Appendix One is costly and the Secretary will exercise his or her best judgment in the administration of permit and regulatory programs conducted under his or her authority to minimize the cost of sampling and analysis to reasonably assure compliance for those substances likely to be present in the waste to be discharged. In pursuit of this end:
 - (a) The Secretary may require an applicant, seeking approval for the disposal of sludge, septage, domestic sanitary sewage, industrial or other waste, or any combination thereof, to analyze a representative sample of the substance for any of the constituents listed in Tables 1 and 2 of Appendix One. The Secretary may, based on this sample result, limit sampling and monitoring requirements to only those constituents detected. The Secretary may require the applicant to

periodically resample the waste to be disposed of and to adjust subsequent sampling and monitoring requirements to those substances detected.

- (b) The Secretary may include in a permit or certificate of compliance, acknowledgment that the Secretary may require the permittee to expand sampling and analytical requirements of a permit or certificate when in the Secretary's judgment there is a possibility that groundwater contamination may have occurred or is about to occur; and
- (c) The Secretary may require, as part of any preventive action plan within a permit document, that the permittee automatically increase the frequency of sampling and analysis, the number of sampling points, and the number of constituents to be analyzed when preventive action levels are reached or exceeded.

12-702 Primary Groundwater Quality Standards

- (1) The Secretary, hereby adopts, the Primary Groundwater Quality Enforcement Standards contained in Table 1 in Appendix One of this Rule upon consideration of available drinking water quality standards information. The following drinking water quality standards information was and will be used in adopting primary groundwater quality standards:
 - (a) United States Environmental Protection Agency Maximum Contaminant Levels (MCL) for drinking water; and
 - (b) in cases where a US EPA MCL has not been adopted, the Vermont Health Advisory established by the Vermont Department of Health for the Primary Groundwater Enforcement Standard.
- (2) If a Groundwater Quality Enforcement Standard does not exist for a specific substance, and the Secretary in cooperation with the Department of Health determines a standard is needed, until the Secretary is able to adopt a Groundwater Quality Enforcement Standard by rule, the Secretary may use an Interim Groundwater Quality Enforcement Standard. This shall be determined in the same fashion as specified in 12-702 (1)(a) and (b).
- (3) If the Secretary uses an Interim Groundwater Quality Standard, the Secretary will adopt this standard by rule the next time the Rule is revised.
- (4) For all substances that have carcinogenic, mutagenic, or teratogenic properties or interactive effects, the preventive action level is 10% of the enforcement standard. The preventive action level for all other listed substances is 50% of the enforcement standard. In situations where the preventive action level established in Appendix One is below the detection limit, the preventive action level shall be re-established at the detection limit.

12-703 Secondary Groundwater Quality Standards

The Secretary, upon consideration of available secondary drinking water quality standards information as published by the US EPA, hereby adopts the Secondary Groundwater Quality Standards contained in Table 2 in Appendix One.

12-704 Establishing Background Groundwater Quality

The Secretary may determine that it is necessary to establish background groundwater quality for an activity regulated by the Secretary. Background groundwater quality may be established by sampling one or more monitoring points at locations and depths sufficient to yield samples that are representative of background groundwater quality at or near the activity. In determining background groundwater quality, the Secretary may require as many groundwater samples as are necessary.

12-705 Indicator Parameters

- (1) The Secretary may require monitoring of the groundwater quality characteristics in Table 3 of Appendix One. These groundwater characteristics are Indicator Parameters.
- (2) The Secretary may determine that changes in the values of the Indicator Parameters may be an indicator of possible groundwater quality degradation.
- (3) The Maximum Acceptable Change in the values of the Indicator Parameters are established in Table 3.
- (4) If a Maximum Acceptable Change identified in Table 3 is exceeded, the Secretary may require any of the responses under Section 12-803, Responses When a Preventive Action Level is Reached or Exceeded.

12-706 Determining if a Groundwater Quality Standard has been Reached or Exceeded

- (1) If a preventive action level or an enforcement standard for a substance listed in Table 1 or 2 in Appendix One of this Rule, or a Maximum Acceptable Change for an Indicator Parameter is reached or exceeded at a compliance point, the Secretary may require a response in accordance with the rules promulgated under the Secretary's authority.

- (2) In determining if an enforcement standard is reached or exceeded, the Secretary may utilize, or may require the use of generally accepted statistical methods which provide a statistical 95% level of confidence that the standard has or has not been reached or exceeded. If there are not enough data for a statistical analysis, the Secretary may choose to require more groundwater samples or to consider the existing laboratory analytical results as indicating that the groundwater quality reaches or exceeds the preventive action limit or enforcement standard. When sampling clearly indicates the Groundwater Enforcement Standards have been or will be met or exceeded, the Secretary may determine that the standard has been reached or exceeded without calculating a 95% confidence level.
- (3) In determining if a change in the concentration of a substance has occurred, the Secretary may require the use of generally accepted statistical methods that show whether or not a statistically significant change in the concentration of the substance has occurred.
- (4) The Secretary will determine acceptable analytical methods to be used to analyze groundwater quality. In determining the acceptable laboratory analytical method, the Secretary may consider the detection limits and practical quantification limits, the cost of available analytical methods, and the site benefits derived from using more expensive analytical methods. This determination may vary from site to site.

12-707 Monitoring and Laboratory Data Requirements

- (1) When groundwater quality monitoring is required by a regulatory program or permit, all water quality samples except field analyses for pH, specific conductance, and temperature shall be analyzed by an acceptable laboratory. The results of the analysis shall be submitted to the Secretary. The samples shall be collected in accordance with methods approved or specified by the Secretary.
- (2) The laboratory shall utilize the analytical methodology specified in the Secretary's rules or acceptable to the regulatory program. Where no analytical methodology is specified, the laboratory shall use an analytical methodology with a limit of detection and limit of quantification below the preventive action level. Where the limit of detection or limit of quantification is above the preventive action limit for that substance, the laboratory shall use the best available analytical methodology published by the EPA or acceptable to the Secretary to produce the lowest limit of detection and limit of quantification.

SUBCHAPTER EIGHT - MANAGING RISKS TO GROUNDWATER QUALITY

12- 801 Compliance Points

- (1) Activities which may affect groundwater, and which are regulated by the Secretary, shall be designed to minimize the level of substances in groundwater and to not reach or exceed the primary and secondary groundwater quality enforcement standards at the following compliance point locations:
 - (a) any point of present use of groundwater as a source of potable water; and
 - (b) any point at or within the boundary of any Class I groundwater area; and either
 - (c) any point at the boundary of the property on which the activity is located; or
 - (d) any point within the property boundaries beyond the 3-dimensional Design Management Zone if one is established by the Secretary for a regulated activity.
(See Section 12-802.)

- (2) In order to assess the groundwater quality at an activity regulated by the Secretary, the Secretary may require groundwater monitoring as part of any regulatory or permit process.

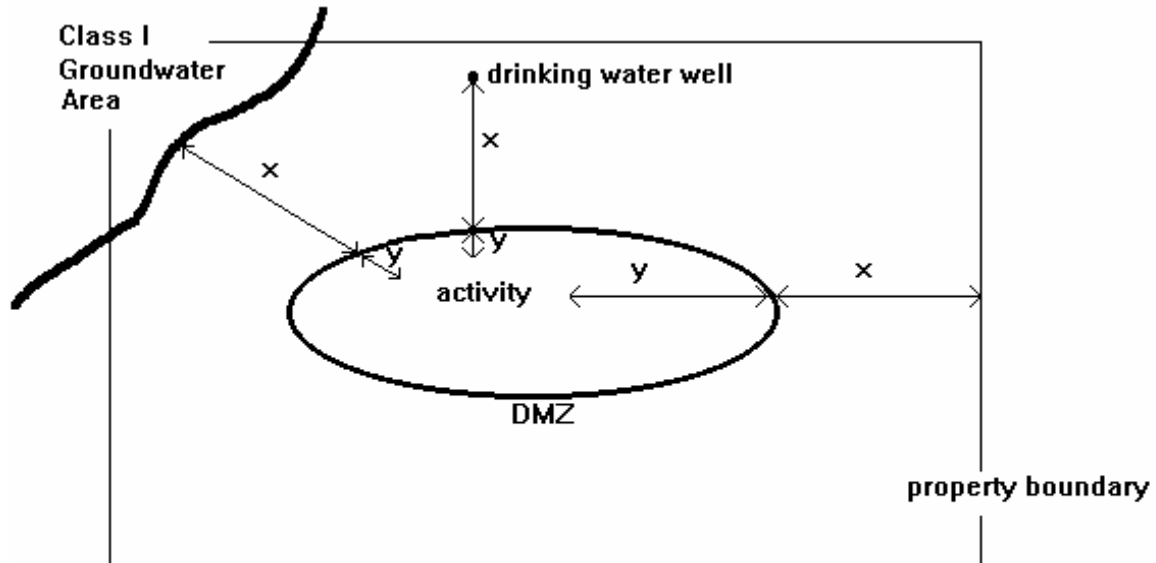
12-802 Design Management Zones

- (1) For activities regulated by the Secretary, the Secretary may determine it is necessary to require the owner or operator of an activity to develop a Design Management Zone. The purpose of the Design Management Zone is to create an area within a large parcel of land; the boundaries at which the groundwater quality standards included in Appendix One of this Rule must not be reached or exceeded.
 - (a) The Design Management Zone for activities which may affect groundwater, and are subject to regulation by the Secretary, shall be an area enclosed by vertical boundaries which extend from the land surface downward through all water saturated geological formations. The Design Management Zone may extend horizontally beyond the regulated activity or waste boundary, for example, as shown in Figure 1 but not beyond a distance greater than 1/3 of the total distance to a compliance point (as defined in 12-801 (1)) other than the boundary of the Design Management Zone itself.* The waste boundary shall be the outermost limit at which waste from an activity has been stored, applied or disposed of, or permitted or approved for storage, application or disposal. For solid or hazardous waste facilities regulated under 10 V.S.A., Chapter 159, the waste boundary shall include the horizontal space taken up by any liner, dike or other barrier to contain the waste.

*Note: The purpose of the 1/3 maximum allowable distance provision is to allow enough time for the Secretary to select the proper response and for the response to take effect before beneficial uses are affected.

- (b) In issuing or reissuing a permit, license or approval, the Secretary may approve, modify, expand, or reduce a Design Management Zone at each regulated or proposed activity.
- (c) The Secretary will consider the following factors in approving or modifying a Design Management Zone:
 - (i) Site topography;
 - (ii) Nature, thickness and permeability of unconsolidated materials;
 - (iii) Nature and permeability of bedrock;
 - (iv) Groundwater depth, flow direction and velocity;
 - (v) Waste volume, waste type and characteristics, including waste loading;
 - (vi) Contaminant mobility;
 - (vii) Distances to property boundary and surface waters;
 - (viii) Engineering design of the activity;
 - (ix) Life span of the activity;
 - (x) Present and anticipated use of land and groundwater;
 - (xi) Potential abatement options if an enforcement standard is reached or exceeded; and
 - (xii) Groundwater classification.
- (2) The Secretary may require groundwater monitoring within a Design Management Zone to evaluate the fate and migration of substances and to help the Secretary determine if an enforcement standard has been or will be reached or exceeded at a compliance point.
- (3) Design Management Zones are not intended for use in areas where the groundwater is already contaminated; but are intended for managing areas where new activities could affect groundwater quality.

Figure 1
EXAMPLE OF A DESIGN MANAGEMENT ZONE WITH
COMPLIANCE POINTS



$x + y =$ the total distance from the activity to the compliance point
 x must be greater than or equal to $2/3$ of the total distance
 y must be less than or equal to $1/3$ of the total distance

NOT TO SCALE

Compliance Points for Enforcement Standards (see 12-801)

- Any point of present use of groundwater as a source of potable water; and
- any point at or within any Class I groundwater area; and either
- any point at the boundary of the property on which an activity is located; or
- any point within the property boundaries beyond the 3-dimensional Design Management Zone if one is established by the Secretary for a regulated activity.

12-803 Responses When a Preventive Action Level is Reached or Exceeded

- (1) If groundwater monitoring indicates that the concentration of a waste in groundwater, including Indicator Parameters, for which monitoring was required by the Secretary, reaches or exceeds a preventive action level at a compliance point:
 - (a) The owner or operator of the activity shall notify the Secretary in writing in accordance with any deadlines in applicable statutes, rules, permits or plan approvals. Where no deadlines are imposed, the owner or operator shall notify the Secretary within five working days after receiving the results. The notification shall provide a preliminary analysis of the cause and significance of the concentration.
 - (b) Upon receipt of the notice under 12-803(1)(a), the Secretary will evaluate the information and if further information is required to make the assessment under 12-803(1) (c), may direct the owner or operator to prepare and submit a report by a specified deadline. The report shall assess the cause and significance of the increased concentration. The Secretary may require the regulated party to analyze and predict whether or not an enforcement standard will be reached or exceeded at a compliance point.
 - (c) The Secretary may assess the cause and significance of the concentration of the waste in determining the appropriate response measures. If a preventive action level is reached or exceeded at a monitoring point, the Secretary will determine whether the reaching or exceeding of the preventive action limit indicates the potential for an enforcement standard to be reached or exceeded at a compliance point. In addition to all other relevant information, the Secretary will consider the information submitted under 12-803(1)(a) and (b) and the following factors where applicable:
 - (i) Reliability of Sampling Data

As part of the review of the quality of the sampling data, the Secretary will evaluate the sampling procedures, precision and accuracy of the analytical test, size of the data set, and the quality control and quality assurance procedures used. If there is insufficient information to evaluate the reliability of the sampling data, the Secretary may require additional samples or other changes in the monitoring program at the activity.
 - (ii) Public Health, Welfare and Environmental Effects of the Substance

The Secretary shall consider the public health, welfare and environmental effects of the waste, including but not limited to its mobility in the subsurface, environmental fate, the risks considered when the standard

was adopted and whether it is carcinogenic, mutagenic, teratogenic or has interactive effects with other substances.

(iii) Performance of the Activity

The Secretary will consider whether the activity is performing as designed. The Secretary will consider the type, age and size of the activity; the type of design, if applicable; the operational history; and other factors related to performance of the activity as appropriate.

(vi) Other Known or Suspected Sources of the Substance in the Area

If other known or suspected sources are present in the vicinity of an activity of concern, the Secretary will evaluate the probability of contributions from other sources of the substance. The Secretary will consider, at a minimum, the number, size, type and age of nearby sources; the groundwater flow patterns; and the substances involved.

(v) Hydrogeologic Conditions

The Secretary will consider the geologic and groundwater conditions. This may include, but is not limited to, the following data: the nature, thickness and permeability of the unconsolidated materials; the nature and permeability of bedrock; the depth to the water table; groundwater flow gradients, both vertical and horizontal; the position of the activity within the groundwater flow system; and the present and potential groundwater use in the vicinity of the activity at which the groundwater quality standards are reached or exceeded. If there is insufficient hydrogeologic information, the Secretary may require additional information.

- (2) Based on the evaluation of the report required under 12-803(1)(b) and the factors in 12-803(1)(c), the Secretary will specify the responses to be implemented by the owner or operator of the activity in order to prevent the groundwater quality from reaching or exceeding enforcement standards at a compliance point.
- (3) The range of responses which the Secretary may take or may require the owner or operator to take if a preventive action level for a substance has been reached or exceeded, and the data indicate a probability that an enforcement standard will be reached or exceeded at a compliance point, may include, but are not limited to the following:
- (a) No action;
 - (b) Sample wells or require sampling of wells;
 - (c) Require a change in the monitoring program, including increased monitoring;
 - (d) Require an investigation of the extent of groundwater contamination;
 - (e) Require a revision of the operational procedures at the activity;

- (f) Require a change in the design or construction of the activity;
 - (g) Require an alternate method of waste treatment or disposal;
 - (h) Require prohibition or closure and abandonment of an activity;
 - (i) Require remedial action to renovate or restore groundwater quality;
 - (j) Revise rules or criteria on activity design, location or management practices; or
 - (k) Require other action as necessary to prevent the reaching or exceeding the groundwater quality enforcement standards at a compliance point.
- (4) The Secretary may determine that no remedial action to restore groundwater quality is necessary if the enforcement standards will not be reached or exceeded at a compliance point as defined in 12-801.
- (5) If the Secretary determines that the probable cause of reaching or exceeding a preventive action level for the substances listed in Appendix One is an activity over which the Secretary does not have statutory authority, the Secretary may:
- (a) Notify the appropriate local, State, or Federal authorities of the factual evidence; and
 - (b) cooperate with the appropriate local, State, or Federal Authorities in determining appropriate action under 12-803(2).

12- 804 Responses When an Enforcement Standard is Reached or Exceeded

(1) Notification

When monitoring groundwater quality pursuant to this Rule or under other authorities of the Secretary, if the concentration of a substance in groundwater reaches or exceeds an enforcement standard the steps listed below will be followed:

- (a) The owner or operator of the facility shall notify the Secretary in writing in accordance with applicable statutes, rules, permits or plan approvals. Where no deadlines are imposed, the owner or operator shall notify the Secretary within five working days of receiving the results. The notification shall provide a preliminary analysis of the cause and significance of the concentration of the substance(s) reaching or exceeding the groundwater quality enforcement standard.
- (b) Upon receipt of the notice under 12- 804(1)(a), the Secretary will evaluate the information to determine if it is sufficient to make the assessment required under 12-804(1)(c). If further information is required to make this assessment, the Secretary may direct the owner or operator to conduct an investigation of the groundwater contamination and prepare and submit a report by a specified deadline. The report shall contain the information required to allow the Secretary

to make the assessment required by 12-804(1)(c). If the Secretary determines that the report is incomplete or incorrect, the Secretary may require the owner/operator to revise the report and resubmit it to the Secretary.

- (c) The Secretary will assess the cause and significance of the increased concentration of the substance, will determine if the enforcement standards have or will be reached or exceeded at a compliance point, and may determine the source, fate and transport of the waste in the groundwater, in order to determine the appropriate action under applicable rules and regulations.

(2) Response

If the evaluation under 12-804(1) indicates that an enforcement standard has been reached or exceeded or will be reached or exceeded at a compliance point, the Secretary shall take action under applicable regulatory or statutory authority to achieve the goals listed in 12-804(3). These actions may include, but are not limited to:

- (a) revision of the operational procedures at an activity;
- (b) changing the design or construction of the activity;
- (c) using an alternate method of waste treatment or disposal;
- (d) closure and abandonment of an activity;
- (e) remedial action to renovate or restore ground water quality;
- (f) development of a system to contain the contamination within the compliance point locations; or
- (g) allow natural attenuation of the contaminants in coordination with long term groundwater monitoring to track the contaminant or contaminants in the groundwater.

(3) Goals of Responding

The goals of responding under 12-804(2), are to manage groundwater consistent with its classification to prevent groundwater from reaching or exceeding an enforcement standard at a compliance point. If an enforcement standard has been reached or exceeded at a compliance point, the goal is to take appropriate action to return the groundwater quality to below enforcement standards, if possible.

(4) Determining a Response

In determining a response under 12-803(2) and in attempting to achieve the goals listed in 12-804(3), the Secretary should consider the following:

(i) Reliability of Sampling Data

As part of reviewing the quality of the sampling data, the Secretary will evaluate the sampling procedures, precision and accuracy of the analytical test, size of the data set, and the quality control and quality assurance procedures used. If there is insufficient information to evaluate the reliability of the sampling data, the Secretary may require additional samples or other changes in the monitoring program at the activity.

(ii) Public Health, Welfare and Environmental Effects of the Substance

The Secretary shall consider the public health, welfare and environmental effects of the waste, including but not limited to its mobility in the subsurface, environmental fate, the risks considered when the standard was adopted and whether it is carcinogenic, mutagenic, teratogenic or has interactive effects with other substances.

(iii) Performance of the Activity

The Secretary will consider whether the activity is performing as designed. The Secretary will consider the type, age and size of the activity; the type of design, if applicable; the operational history; and other factors related to performance of the activity as appropriate.

(vi) Other Known or Suspected Sources of the Substance in the Area

If other known or suspected sources are present in the vicinity of an activity of concern, the Secretary will evaluate the probability of contributions from other sources of the substance. The Secretary will consider, at a minimum, the number, size, type and age of nearby sources; the groundwater flow patterns; and the substances involved.

(v) Hydrogeologic Conditions

The Secretary will consider the geologic and groundwater conditions. This may include, but is not limited to the following data: the nature, thickness and permeability of the unconsolidated materials; the nature and permeability of bedrock; the depth to the water table; groundwater flow gradients, both vertical and horizontal; the position of the activity within the groundwater flow system; and the present and potential groundwater use in the vicinity of the activity at which the groundwater quality standards are reached or exceeded. If there is insufficient hydrogeologic information, the Secretary may require additional information.

(5) Non-regulated Activities

If an activity is not subject to regulation by the Secretary, and if the concentration of a substance in groundwater exceeds an enforcement standard, the Secretary may:

- (a) notify the appropriate local, state, or Federal authorities of the factual evidence; and
- (b) cooperate with the appropriate local, state, or Federal authorities in determining the appropriate action.

(6) Background Exceedences

In some cases, the background groundwater quality at an activity will naturally reach or exceed the enforcement standards in Appendix One. In these cases, the Secretary will not require the owner or operator of the activity to remediate the groundwater below the naturally occurring background groundwater quality.

APPENDIX ONE

Groundwater Quality Standards

TABLE 1 Primary Groundwater Quality Standards		
Substance	Enforcement Standard (micrograms per liter (=ppb), except as noted)	Preventive Action Level** (micrograms per liter (=ppb), except as noted)
Acetone	700.0	350.0
Acifluorfen	1.0	0.1
Alachlor	2.0	0.7
Aldicarb	7.0	3.5
Aldicarb Sulfone	7.0	3.5
Aldicarb Sulfoxide	7.0	3.5
Aldrin	0.05	0.05
Alpha Particle Activity (Gross)	15 pCi/liter	5 pCi/liter
Ametryn	60.0	30.0

1/27/2005

TABLE 1
Primary Groundwater Quality Standards

Substance	Enforcement Standard (micrograms per liter (=ppb), except as noted)	Preventive Action Level** (micrograms per liter (=ppb), except as noted)
Ammonium Sulfamate	2000.0	1000.0
Anthracene	2100.0	1050.0
Antimony	6.0	3.0
Arsenic	10.0	1.0
Asbestos	7x10 ⁶ fibers/liter (>10 micron length)	0.7X10 ⁶ fibers/liter (>10 micron length)
Atrazine	3.0	1.5
Azoxystrobin Technical	1476.0	147.6
Bacteria Total Coliform	Absent	Absent
Barium	2000.0	1000.0
Baygon	3.0	1.5

TABLE 1
Primary Groundwater Quality Standards

Substance	Enforcement Standard (micrograms per liter (=ppb), except as noted)	Preventive Action Level** (micrograms per liter (=ppb), except as noted)
Bendiocarb	3.0	1.5
Benefin	2100.0	1050.0
Benomyl	350.0	175.0
Bensulide	50.0	25.0
Bentazon	200.0	100.0
Benzene*	5.0	0.5
Benzo(a)pyrene	0.2	0.1
Beryllium	4.0	1.0
Beta Particle and Photon Radioactivity	4 millirems/yr	50 pCi/liter ¹

¹The PAL has been established based upon the Safe Drinking Water Act monitoring requirements, not a percentage of the Enforcement Standard. Please see CFR 40 Section 141.16 and 141.26.

TABLE 1
Primary Groundwater Quality Standards

Substance	Enforcement Standard (micrograms per liter (=ppb), except as noted)	Preventive Action Level** (micrograms per liter (=ppb), except as noted)
Boron	600.0	300.0
Bromacil	90.0	45.0
Bromate	10.0	5.0
Bromochloromethane	90.0	9.0
Bromomethane	10.0	1.0
Bromoxynil	14.0	1.4
Butylate	350.0	175.0
Cadmium	5.0	2.5
Carbaryl	70.0	7.0
Carbofuran	40.0	20.0

TABLE 1
Primary Groundwater Quality Standards

Substance	Enforcement Standard (micrograms per liter (=ppb), except as noted)	Preventive Action Level** (micrograms per liter (=ppb), except as noted)
Carbon Tetrachloride*	5.0	0.5
Carboxin	700.0	70.0
Chloramben	100.0	50.0
Chloramines	70.0	35.0
Chlordane	2.0	0.44
Chlorite	1000.0	500.0
Chlorobenzene	100.0	50.0
Chloroisopropyl Ether(Bis-2)	300.0	150.0
Chloromethane	30.0	15.0
Chlorothalonil	1.5	0.15

TABLE 1
Primary Groundwater Quality Standards

Substance	Enforcement Standard (micrograms per liter (=ppb), except as noted)	Preventive Action Level** (micrograms per liter (=ppb), except as noted)
Chlorotoluene (ortho)	100.0	50.0
Chlorotoluene (para)	100.0	50.0
Chlorpyrifos	20.0	10.0
Chromium	100.0	50.0
Cimectacarb	1050.0	105.0
Clopyralid	330.0	165.0
Copper	1300.0	650.0
Cyanazine	1.0	0.5
Cyanide	200.0	100.0
Dacthal	7.0	0.7

TABLE 1
Primary Groundwater Quality Standards

Substance	Enforcement Standard (micrograms per liter (=ppb), except as noted)	Preventive Action Level** (micrograms per liter (=ppb), except as noted)
Dalapon	200.0	100.0
Dazomet	88.0	44.0
Di(2-ethylhexyl)adipate	400.0	200.0
Di(2-ethylhexyl)phthalate	6.0	3.0
Diazinon	0.6	0.3
Dibromochloropropane*	0.2	0.02
Dicamba	189.0	18.9
Dichlorobenzene (meta)	600.0	300.0
Dichlorobenzene (ortho)	600.0	300.0
Dichlorobenzene (para)	75.0	37.5

TABLE 1
Primary Groundwater Quality Standards

Substance	Enforcement Standard (micrograms per liter (=ppb), except as noted)	Preventive Action Level** (micrograms per liter (=ppb), except as noted)
Dichlorodifluoromethane	1000.0	500.0
Dichloroethane (1,1)	70.0	35
Dichloroethane (1,2)*	5.0	0.5
Dichloroethene (1,1)	7.0	0.7
Dichloroethene (cis-1,2)	70.0	35.0
Dichloroethene (trans-1,2)	100.0	50.0
Dichlorophenoxyacetic Acid (2,4)	70.0	7.0
Dichloroprop	140.0	14.0
Dichloropropane (1,2)*	5.0	0.5
Dichloropropene (1,3)	0.5	0.5

TABLE 1
Primary Groundwater Quality Standards

Substance	Enforcement Standard (micrograms per liter (=ppb), except as noted)	Preventive Action Level** (micrograms per liter (=ppb), except as noted)
Dieldrin	0.02	0.02
Dimethrin	2000.0	1000.0
Dinoseb	7.0	0.7
Dioxane (para)	20.0	20.0
Diphenamid	200.0	100.0
Diquat	20.0	10.0
Disulfoton	0.30	0.03
Diuron	10.0	5.0
Endothall	100.0	50.0
Endrin	2.0	1.0

TABLE 1
Primary Groundwater Quality Standards

Substance	Enforcement Standard (micrograms per liter (=ppb), except as noted)	Preventive Action Level** (micrograms per liter (=ppb), except as noted)
Ethofumesate	280.0	28.0
Ethoprop	1.0	0.1
Ethylbenzene	700.0	350.0
Ethylene Dibromide	0.05	0.01
Ethylene Glycol	7000.0	700.0
Ethylene Thiourea	5.0	5.0
Etridiazole	1.0	0.1
Fenamiphos	2.0	1.0
Fenarimol	630.5	315.25
Fluometuron	90.0	45.0

TABLE 1
Primary Groundwater Quality Standards

Substance	Enforcement Standard (micrograms per liter (=ppb), except as noted)	Preventive Action Level** (micrograms per liter (=ppb), except as noted)
Fluoranthene	280.0	140.0
Fluorenes	280.0	140.0
Fluoride	4000.0	2000.0
Flurprimidol	700.0	350.0
Flutolanil	1400.0	140.0
Fluvalinate	70.0	35.0
Fonofos	10.0	5.0
Formaldehyde	1000.0	100.0
Fosetyl-Al	2343.0	234.3
Glufosinate-ammonium	20.0	10.0

TABLE 1
Primary Groundwater Quality Standards

Substance	Enforcement Standard (micrograms per liter (=ppb), except as noted)	Preventive Action Level** (micrograms per liter (=ppb), except as noted)
Glyphosate	700.0	350.0
Haloacetic Acids (Total)	60.0	6.0
Halofenozide	46.0	23.0
Halosulfuron-methyl	990.0	495.0
Heptachlor	0.4	0.088
Heptachlor Epoxide	0.2	0.06
Hexachlorobenzene*	1.0	0.22
Hexochlorobutadiene	1.0	0.5
Hexachlorocyclopentadiene	50.0	25.0
Hexane (n)	420.0	210.0

TABLE 1
Primary Groundwater Quality Standards

Substance	Enforcement Standard (micrograms per liter (=ppb), except as noted)	Preventive Action Level** (micrograms per liter (=ppb), except as noted)
Hexazinone	200.0	100.0
Imidacloprid	93.0	9.3
Iprodione	280.0	140.0
Isophorone	100.0	50.0
Isoxaben	175.0	17.5
Lead	15.0	1.5
Lindane	0.2	0.1
Maleic Hydrazide	4000.0	400.0
Maneb	35.0	17.5
Manganese	840.0	420.0

TABLE 1
Primary Groundwater Quality Standards

Substance	Enforcement Standard (micrograms per liter (=ppb), except as noted)	Preventive Action Level** (micrograms per liter (=ppb), except as noted)
MCPA	10.0	1.0
Mecoprop	35.0	3.5
Mercury	2.0	0.5
Metalaxyl	350.0	35.0
Methomyl	200.0	100.0
Methoxychlor	40.0	4.0
Methyl Ethyl Ketone	4200.0	2100.0
Methyl Isobutyl Ketone	560.0	280.0
Methyl Parathion	2.0	1.0
Methyl-tert-butyl Ether	40.0	20.0

TABLE 1
Primary Groundwater Quality Standards

Substance	Enforcement Standard (micrograms per liter (=ppb), except as noted)	Preventive Action Level** (micrograms per liter (=ppb), except as noted)
Methylene Chloride	5.0	0.5
Metolachlor	70.0	35.0
Metribuzin	32.5	16.25
Molybdenum	40.0	20.0
Myclobutanil	120.0	12.0
Naphthalene	20.0	10.0
Napropamide	70.0	35.0
Nickel	100.0	50.0
Nitrate	10000.0	5000.0
Nitrates + Nitrites (total)	10000.0	5000.0

TABLE 1
Primary Groundwater Quality Standards

Substance	Enforcement Standard (micrograms per liter (=ppb), except as noted)	Preventive Action Level** (micrograms per liter (=ppb), except as noted)
Nitrites	1000.0	500.0
Ortho-phenylphenol	18.0	9.0
Oxamyl	200.0	100.0
Paclobtrazol	455.0	45.5
Paraquat	30.0	3.0
Pendimethalin	280.0	140.0
Pentachloronitrobenzene	6.0	3.0
Pentachlorophenol	1.0	0.3
Phenol	2100.0	210.0
Picloram	500.0	250.0

TABLE 1
Primary Groundwater Quality Standards

Substance	Enforcement Standard (micrograms per liter (=ppb), except as noted)	Preventive Action Level** (micrograms per liter (=ppb), except as noted)
Polychlorinated Biphenyls	0.5	0.25
Prometon	100.0	50.0
Pronamide	50.0	25.0
Propamocarb hydrochloride	924.0	92.4
Propachlor	90.0	45.0
Propazine	10.0	5.0
Propham	100.0	50.0
Propiconazole	104.0	10.4
Propham	100.0	50.0
Quinclorac	369.0	184.5

TABLE 1
Primary Groundwater Quality Standards

Substance	Enforcement Standard (micrograms per liter (=ppb), except as noted)	Preventive Action Level** (micrograms per liter (=ppb), except as noted)
Radium (Combined 226 + 228)	5 pCi/liter	0.5pCi/liter
Selenium	50.0	25.0
Simazine	4.0	2.0
Styrene	100.0	50.0
Tebuthiuron	500.0	250.0
Terbacil	90.0	45.0
Terbufos	0.9	0.45
Tetrachlorodibenzo-p-Dioxin (2,3,7,8)	0.00003	0.000011
Tetrachloroethane (1,1,1,2)	70.0	35.0
Tetrachloroethylene*	5.0	0.5

TABLE 1
Primary Groundwater Quality Standards

Substance	Enforcement Standard (micrograms per liter (=ppb), except as noted)	Preventive Action Level** (micrograms per liter (=ppb), except as noted)
Thallium	2.0	1.0
Thiophanate Methyl	560.0	280.0
Thiram	35.0	3.5
Toluene	1000.0	500.0
Toxaphene	3.0	2.2
Triadimefon	10.0	1.0
Trichlorfon	1.5	0.15
Trichlorobenzene (1,2,4)	70.0	35.0
Trichlorobenzene (1,3,5)	40.0	20.0
Trichloroethane (1,1,1)	200.0	100.0

TABLE 1
Primary Groundwater Quality Standards

Substance	Enforcement Standard (micrograms per liter (=ppb), except as noted)	Preventive Action Level** (micrograms per liter (=ppb), except as noted)
Trichloroethane (1,1,2)	5.0	2.5
Trichloroethylene	5.0	0.5
Trichlorofluoromethane	2100.0	1050.0
Trichlorophenoxyacetic Acid (2,4,5)	70.0	7.0
Trichlorophenoxypropionic (2,4,5)	50.0	25.0
Trichloropropane (1,2,3)	5.0	0.5
Triclopyr	487.0	243.5
Trifloxystrobin	410.0	205.0
Trifluralin	5.0	2.5
Trihalomethanes (Total) Comprised of Bromodichloromethane, Bromoform, Chloroform, and	80.0	8.0

TABLE 1 Primary Groundwater Quality Standards		
Substance	Enforcement Standard (micrograms per liter (=ppb), except as noted)	Preventive Action Level** (micrograms per liter (=ppb), except as noted)
Dibromochloromethane.		
Trimethylbenzene (1,2,4)	5.0	2.5
Trimethylbenzene (1,3,5)	4.0	2.0
Uranium	20.0	2.0
Vinyl chloride*	2.0	0.5
Xylenes	10000.0	5000.0
Zineb	350.0	175.0

*Contaminants of special concern to the Department of Environmental Conservation and the Department of Health. Contact the Department of Environmental Conservation if these contaminants are found in a drinking water source for additional information concerning resampling and risk notification.

** Where the PAL is below the substance's detection limit, the PAL has been redefined at the detection limit.

TABLE 2
Secondary Groundwater Quality Standards

Substance	Enforcement Standard (milligrams per liter - except as noted)	Preventive Action Level (milligrams per liter - except as noted)
Aluminum	0.2	0.1
Chloride	250	125
Color	15 color units	7.5 color units
Copper	1.0	0.5
Fluoride	2.0	1.0
Foaming Agents MBAS (Methylene-Blue Active Substances)	0.5	0.25
Iron	0.3	0.15
Manganese	0.05	0.025
Odor	3 (Threshold Odor No.)	1.5 (Threshold Odor No.)
Silver	0.1	0.05
Sodium	250	125
Sulfate	250	125
Total Dissolved Solids (TDS)	500	250
Zinc	5	2.5

Note: An activity shall not cause the groundwater quality to reach or exceed the secondary enforcement standards or 110% of the secondary background groundwater quality standards established under 12-704, whichever is greater.

TABLE 3
Maximum Acceptable Change for Indicator Parameters

Parameter	Maximum Acceptable Change (mg/l - excepted as noted)
Alkalinity	100
Biochemical Oxygen Demand (BOD ₅)	25
Chemical Oxygen Demand (COD)	25
Potassium	5
Sodium	10
Field Specific Conductance	100 micromhos/cm
pH	1 pH unit
Temperature	10EF (5.6EC) or 3 standard deviations
Total Hardness (as CaCO ₃)	100
Total Organic Carbon (TOC)	1
Total Organic Halogen (TOX)	0.25

APPENDIX TWO

Acceptable and Unacceptable Activities

The following activities are those which the Secretary has determined are acceptable or unacceptable activities in specific groundwater classes. The Secretary may identify specific activities which are acceptable activities in a reclassification decision.

(1) Class I Groundwater Areas

All human activities in Class I groundwater areas are unacceptable activities except:

- (a) Any activities approved or permitted by the Secretary which are necessary to operate and maintain a public water supply system;
- (b) Outdoor recreational activities such as fishing, hiking, hunting, skiing, snowshoeing, trapping, and during periods of snow cover, snowmobiling; which do not cause or allow disposal of wastes or otherwise threaten groundwater quality. This subsection shall not be construed to permit the operation of all terrain vehicles or motorcycles.
- (c) When consistent with Accepted Agricultural Practices (AAP), the low density pasturing of livestock, at a density not to exceed that approved by the Vermont Agency of Agriculture, the liming, mowing or clipping of pastures and maple sap collection;
- (d) When consistent with Acceptable Management Practices (AMP), the harvesting of trees by the selection method for lumber, fiber, or fuel, and Christmas tree production from wild uncultivated stands; and
- (e) Other activities identified by the Secretary in the classification decision.

(2) Class II Groundwater Areas

- (a) Unacceptable Activities
 - (i) the construction of new or expanded use of unpermitted injection wells; unsewered floor drains; construction and demolition debris disposal facilities; municipal solid waste disposal facilities; hazardous waste disposal facilities;

- (ii) new improperly constructed or protected wells;
 - (iii) the installation of new underground storage tanks not meeting the Agency's underground storage tank criteria pursuant to Chapter 8 of the Environmental Protection Rules;
 - (iv) any activity which results in discharges to the groundwater of any hazardous or radioactive waste.
 - (v) new subsurface ground water discharges of sewage from individual residences which do not meet the Secretary's sewage disposal rule criteria;
 - (vi) new stockpiles of highway deicing salt or salted sand piles;
 - (vii) new pit privies;
 - (viii) new junkyards; and
 - (ix) new commercial storage or mixing facilities for fertilizers, pesticides or other hazardous materials.
- (b) Acceptable Activities:

The following activities are Acceptable Activities for Class II groundwater.

- (i) Accepted Agricultural Practices insofar as they give due consideration to protecting groundwater quality, unless the Secretary, with the consent of the Commissioner of Agriculture, Food and Markets, finds that a specific practice has exceeded or threatens to exceed the groundwater quality enforcement standards in Appendix One;
- (ii) Acceptable Management Practices (AMP) for forestry insofar as they give due consideration to protecting groundwater quality, unless the Secretary, in consultation with the Commissioner of Forests, Parks and Recreation, finds that a specific practice has exceeded or threatens to exceed the groundwater quality enforcement standards in Appendix One;
- (iii) Activities which are permissible in Class I ground water areas as provided in Section 1 of Appendix Two; and
- (iv) Treatment/disposal systems for sanitary wastewater that are 1000 gallons per day or less, when design, location, and construction standards meet the Secretary's sewage disposal rules.
- (v) Replacement treatment/disposal systems for sanitary wastewater when

permitted by the Secretary when design, location and construction standards meet the Secretary's sewage disposal rules.

(3) Class III Groundwater

(a) Unacceptable Activities

Any activity which results in discharges to the groundwater of any hazardous or radioactive waste is prohibited in a Class III groundwater area.

(b) Acceptable Activities

The following activities are Acceptable Activities for Class III groundwater:

- (i) Accepted Agricultural Practices insofar as they give due consideration to protecting groundwater quality unless the Secretary, with the consent of the Commissioner of Agriculture, Food, and Markets finds that a specific practice has exceeded or threatens to exceed the groundwater quality enforcement standards in Appendix One.
- (ii) Acceptable Management Practices (AMP) for forestry insofar as they give due consideration to protecting groundwater quality, unless the Secretary, in consultation with the Commissioner of Forests, Parks and Recreation, finds that a specific practice has exceeded or threatens to exceed the groundwater quality enforcement standards in Appendix One;
- (iii) Treatment/disposal systems for sanitary waste water only when design, location and construction standards meet the Secretary's sewage disposal rules.
- (iv) The application of sewage treatment plant sludge, septage and dairy wastes for crop production and soil enhancement when:
 - (A) the activity is permitted by the Secretary;
 - (B) the adjacent groundwater quality is monitored for nitrate concentrations and other constituents as the Secretary may require in both upgradient and downgradient directions; and
 - (C) there is no evidence of exceeding the groundwater quality enforcement standards at any compliance point in Appendix One.
- (v) Activities which are Acceptable Activities in Class I and II groundwater areas as provided Section 1 and 2 of Appendix Two.

- (vi) Land surface or subsurface discharges of treated industrial type, non-sanitary waste waters when treatment achieves an effluent quality prior to discharge which does not reach or exceed any groundwater quality enforcement standard listed in Appendix One.

(4) Class IV Groundwater Areas

Acceptable and Unacceptable Activities for Class IV Groundwater will be based upon Section 12-504.

- End of Chapter 12 -