

**STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
Division of Groundwater and Individual Sewage Disposal Systems**

**Rules and Regulations for
GROUNDWATER QUALITY**



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STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
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RULES AND REGULATIONS FOR GROUNDWATER QUALITY

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RULES AND REGULATIONS FOR GROUNDWATER QUALITY

RULE 1. PURPOSE

It is the purpose of these regulations to protect and restore the quality of the state's groundwater resources for use as drinking water and other beneficial uses, and to assure protection of the public health and welfare and the environment.

RULE 2. LEGAL AUTHORITY

These Rules and Regulations are promulgated pursuant to the requirements and provisions of Chapter 46-12, Water Pollution; Chapter 46-13.1, Groundwater Protection; Chapter 23-18.9, Refuse Disposal; Chapter 23-19.1, Hazardous Waste Management Act; Chapter 42-17.1, Environmental Management; Chapter 42-17.6, Administrative Penalties for Environmental Violations; in accordance with Chapter 42-35, Administrative Procedures, of the Rhode Island General Laws of 1956, as amended.

RULE 3. LIBERAL APPLICATION

The terms and provisions of these Rules and Regulations shall be liberally construed to allow the Department to effectuate the purposes of state and federal laws, goals, and policies.

RULE 4. SEVERABILITY

If any provision of these Rules and Regulations, or the application thereof to any person or circumstances, is held invalid by a court of competent jurisdiction, the validity of the remainder of the Rules and Regulations shall not be affected thereby.

RULE 5. APPLICABILITY

- 5.01 These Rules and Regulations apply to all of the groundwater of the state.
- 5.02 Persons subject to these Rules and Regulations may also be subject to other regulations of the Department and may also be subject to federal regulations. Obligations of facility owners and facility operators hereunder shall be joint and several.
- 5.03 These Rules and Regulations shall be construed in harmony with other Department regulations and the regulations of federal agencies. Nothing in these regulations shall affect the Director's power and duty to issue or require any form of groundwater monitoring, groundwater remediation, enforcement action or other action pursuant to any other regulatory program administered or enforced by the Director.
- 5.04 Individual Sewage Disposal Systems
 - (a) These Rules and Regulations apply to all individual sewage disposal systems designed to treat ten thousand (10,000) or more gallons per day. Such systems are subject to the Groundwater Quality Certification requirements of Rule 17.
 - (b) Individual sewage disposal systems that are designed to treat less than ten thousand (10,000) gallons per

day, that are used solely for the disposal of sanitary sewage (as defined herein), and which are designed, installed and operating in compliance with the Department's Rules and Regulations Establishing Minimum Standards Relating to Location, Design, Construction, and Maintenance of Individual Sewage Disposal Systems, December 1989, and amendments thereto, are exempt from these Rules and Regulations for Groundwater Quality.

- 5.05 Monitoring Wells: Permanent monitoring wells installed pursuant to these Rules and Regulations shall be in compliance with the construction standards in Appendix 1. A monitoring well is designated permanent if it exists for more than 180 days. The monitoring well abandonment procedures in Appendix 1 shall apply to all permanent and non-permanent monitoring wells and those piezometers where improper abandonment would result in a reasonable likelihood of groundwater pollution.
- 5.06 The Director may require any facility owner or operator subject to these Rules and Regulations to provide any information deemed necessary in order to determine compliance with these Rules and Regulations. Failure to disclose such information shall be cause for initiating appropriate enforcement action and shall constitute valid cause for denial of any Departmental approvals under these Rules and Regulations or the suspension of any approval issued hereunder.
- 5.07 Nothing in these Rules and Regulations shall affect the Director's power and duty to issue an immediate compliance order or take any other action pursuant to the General Laws of Rhode Island, 1956, as amended.

RULE 6. FINDINGS

The legislative findings set forth in the Rhode Island Groundwater Protection Act of 1985, section 46-13.1-2 of the General Laws of Rhode Island, 1956, as amended and which are repeated below in Rule 6.01 and the additional findings of the Department set forth in Rule 6.02 are made a basis for these Rules and Regulations.

6.01 Legislative Findings

- (a) Water is vital to life and comprises an invaluable natural resource which is not to be abused by any segment of the state's population or its economy. It is the policy of the state to restore, enhance, and maintain the chemical, physical, and biological integrity of its waters, to protect public health, to safeguard fish and aquatic life and scenic and ecological values, and to enhance the domestic, municipal, recreational, industrial, and other uses of water;
- (b) The groundwaters of the state are a critical renewable resource which must be protected to insure the availability of safe and potable drinking water for present and future needs;
- (c) It is a paramount policy of the state to protect the purity of present and future drinking water supplies by protecting aquifers, recharge areas, and watersheds;
- (d) It is the policy of the state to restore and maintain the quality of groundwater to a quality consistent with its use for drinking water supplies and other designated beneficial uses without treatment as feasible. All groundwaters of the state shall be restored to the extent practicable to a quality consistent with this policy;
- (e) It is the policy of the state not to permit the introduction of pollutants into the groundwaters of the state in concentrations which are known to be toxic, carcinogenic, mutagenic, or teratogenic. To the maximum extent practical, efforts shall be made to require the removal of those pollutants from discharges where such discharges are shown to have already occurred;
- (f) Existing and potential sources of groundwater shall be maintained and protected. Where existing quality is inadequate to support certain uses, the quality shall be upgraded if feasible to protect the present and

potential uses of the resource;

- (g) The groundwaters of the state are to be protected for use as agricultural, industrial, and potable water supplies, and other reasonable uses, and as a supplement to surface waters for recreation, wildlife, fish and other aquatic life, agriculture, industry, and potable water supply;
- (h) Discharges to groundwater which subsequently discharge into surface waters and which would cause a contravention of surface water quality or standards shall not be permitted;
- (i) No degradation of the state's groundwaters shall be permitted unless the state chooses to allow lower water quality as a result of the essential, desirable and justifiable economic, commercial, industrial, or social development.

6.02 Administrative Findings

- (a) Approximately 25% of the population of Rhode Island depends on groundwater for its drinking water supply, and approximately 27 million gallons of groundwater are used every day in Rhode Island.
- (b) Approximately two-thirds of the cities and towns in Rhode Island depend on groundwater for all or a significant portion of their public and private drinking water supply needs.
- (c) Three sole source aquifers have been designated in Rhode Island by the United States Environmental Protection Agency.
- (d) The groundwater resources of the state with the highest potential yield are located in glacial deposits of stratified drift which underlie about one-third of the state. These groundwater resources are vulnerable to pollution due to the relatively high water table, high permeability, and the absence of a confining subsurface layer that would inhibit movement of pollutants to groundwater.
- (e) Most private drinking water supplies and many small public water supply systems obtain water from fractured bedrock aquifers. Groundwater pollution in bedrock is extremely difficult to monitor and remediate.
- (f) Groundwater pollution continues to threaten public and private drinking water supplies. A significant number of public and private wells in Rhode Island have had pollutants in concentrations that have adversely impacted their use.
- (g) Groundwater pollution must be prevented wherever possible because of the actual and potential adverse effects on public health and the environment and due to the technical difficulties and economic costs involved in groundwater remediation.
- (h) Certain activities that represent a potential threat to groundwater quality are not appropriate in particular areas because of the sensitivity and value to the state of the underlying groundwater resource.

RULE 7. DEFINITIONS

"Annular space seal" means the material placed above the top of the filter pack or the filter pack seal up to the ground surface seal and between the well casing and the adjacent formation.

"Aquifer" means a geologic formation, group of formations, or part of a formation that contains sufficient saturated, permeable material to yield significant quantities of water to wells and springs.

"Bedrock" means solid rock, commonly called ledge, that forms the earth's crust, including fracture zones within said rock.

"Best management practices" means schedules of activities, prohibitions of practices, maintenance procedures, and other management practices designed to prevent or reduce the degradation of the state's groundwater to the maximum extent possible.

"Contaminant" means any physical, chemical, biological, or radiological substance or matter in water which impairs its intended or feasible use. For purposes of these Rules and Regulations, contaminants shall include pollutants.

"Community water system" means a public water system which serves at least 15 service connections used by year-round residents or regularly serves at least 25 year-round residents.

"Community water supply well" means a well that serves a community water system.

"Degradation" means a deterioration or decline in groundwater quality.

"Department" means the Rhode Island Department of Environmental Management or its successor.

"Director" means the director of the Rhode Island Department of Environmental Management or the Director's designee.

"Discharge to groundwater" means the intentional, negligent, accidental, or other release of any pollutant onto or beneath the land surface, in a location where it is likely to enter the groundwater of the state.

"Discharge zone" means a departmentally designated, three-dimensional zone within which the pollutant concentrations resulting from an active discharge to groundwater are allowed to be greater than the groundwater quality standards.

"Effluent" means liquid that is discharged from a facility.

"Emergency response" means any action undertaken immediately following the discovery of a release in order to completely or partially contain, clean up or treat the released material to prevent an immediate and/or substantial threat or risk of acute or chronic adverse effect on human health or to prevent an immediate and/or substantial significant adverse impact to the environment.

"Facility" means any parcel of real estate or a contiguous series or parcels of real estate together with any and all structures, facility components, improvements, fixtures and other appurtenances located therein or thereon which constitutes a distinct geographic unit.

"Filter Pack" means the sand, gravel, or both placed in direct contact with the well screen.

"Filter pack seal" means the sealing material placed in the annular space above the filter pack and below the annular space seal to prevent the migration of annular space sealant into the filter pack.

"Groundwater" means water found underground which completely fills the open spaces between particles of sediment and within rock formations.

"Groundwater quality classification" means the categorization of groundwater as usable for particular purposes on the basis of its physical, chemical, and hydrogeologic characteristics; also, the particular class (GAA, GA, GB, or GC) assigned to a particular volume of groundwater within specific geographic boundaries.

"Groundwater quality standards" means concentrations of specific chemical, biological, and radiological constituents and/or narrative statements which describe the quality of groundwater which shall be met in a particular groundwater quality

classification.

"Groundwater recharge" means the process of adding water to the zone of saturation; or the quantity of water added to the zone of saturation.

"Groundwater reservoirs" means those stratified drift deposits having a saturated thickness greater than or equal to 40 feet and a transmissivity greater than or equal to 4000 feet squared per day which have been designated by the Director to be potentially significant sources of water.

"Hazardous material" means any material or combination or mixture of materials containing any hazardous substance in an amount and concentration such that when discharged to groundwater will or may reasonably be expected to cause acute or chronic adverse effects on human health or the environment. Hazardous material shall also include any material that contains a hazardous waste.

"Hazardous substance" means any substance designated as such pursuant to 40 CFR 300.5.

"Hazardous waste" means hazardous waste as defined in the Rhode Island Department of Environmental Management Rules and Regulations for Hazardous Waste Generation, Transportation, Treatment, Storage and Disposal, 1988, and amendments thereto.

"Hydraulic conductivity" means a measure of the ability of an aquifer to transmit a fluid; it is expressed as the volume of water at the existing kinematic viscosity that will move in a unit time under a unit hydraulic gradient through a unit area measured at right angles to the direction of flow.

"Individual sewage disposal system" means any system of piping, tanks, disposal areas, alternative toilets or other facilities designed to function as a unit to convey, store, treat and/or dispose of sanitary sewage by means other than discharge into a public sewer system.

"Licensed solid waste landfill" means any solid waste disposal facility consisting in whole or in part of a landfill, which facility is operating pursuant to a valid department license issued pursuant to a final action of the Director as to which all applicable appeals periods have expired.

"Monitoring well" means a well that is specifically located, designed, constructed, and emplaced to sample groundwater quality; the monitoring well may also be used to measure water table elevations.

"Monitoring well abandonment" means to remove a monitoring well from service in such a manner that vertical movement of water within the well bore and within the annular space surrounding the well casing is effectively and permanently prevented.

"Non-attainment" means groundwater, designated by the Director, that has pollutant concentrations greater than the groundwater quality standards for the classification.

"Non-community water system" means a public water system that is not a community water system; as is defined in the Rhode Island Department of Health Rules and Regulations Pertaining to Public Drinking Water, September 1977, and amendments thereto.

"Non-community water supply well" means a well that serves a non-community water system.

"Non-transient non-community water system" means a non-community water system that regularly services at least 25 of the same persons over six months per year.

"Non-transient non-community water supply well" means a well that serves a non-transient non-community water system.

"Operator" means any person or persons having control or having legal responsibility for operating or maintaining any facility which is subject to these Rules and Regulations.

"Owner" means any person who holds exclusive or joint title to, or lawful possession of real or personal property which is subject to these Rules and Regulations.

"Person" means an individual, trust, firm, joint stock company, corporation (including a quasi-governmental corporation), partnership, association, syndicate, municipality, municipal or state agency, fire district, club, non-profit agency, or any subdivision, commission, department, bureau, agency or department of state or federal government (including quasi-governmental corporation), or any interstate or international body, or any agent or employee thereof.

"Piezometer" means a well with a short screen that allows measurement of the water level at a particular depth in the aquifer.

"Point of compliance" means any location, described by depth and/or distance from a facility, at which the groundwater quality is sampled to determine whether a preventive action limit or groundwater quality standard is met as a result of activities occurring at such facility.

"Pollutant" means any material or effluent which may alter the chemical, physical, biological, or radiological characteristics and/or integrity of water, including but not limited to, dredged spoil, solid waste, incinerator residue, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, cellar dirt or industrial, municipal, agricultural, or other waste or material, petroleum or petroleum products, including but not limited to oil.

"Pollution" means the man-made or man-induced alteration of the chemical, physical, biological, and radiological integrity of water.

"Preventive action limit" means a specified percentage of a numerical groundwater quality standard.

"Private well" means a well established for the purpose of meeting all or part of a person's potable water needs provided said well does not supply a public water system.

"Public water system" means a system for the provision to the public of piped water for human consumption, provided such a system has at least 15 service connections or regularly serves an average of at least 25 individuals daily at least 60 days out of the year; and shall include all sources and facilities involved in collecting, treating, storing, and distributing the water.

"Public well" means a well that serves a public water system.

"Recharge area" means the land surface from which water is added to the zone of saturation. The recharge area for a particular well or aquifer, for instance, is that land surface from which water moves to the well or aquifer or may move to the well or aquifer under certain hydraulic conditions.

"Refined wellhead protection area" means a wellhead protection area which is approved and designated by the Director based upon a delineation submitted to the Director which was prepared using more sophisticated methods and/or additional data than that used in the Director's initial delineation. The refined wellhead protection area must be prepared in a manner consistent with the criteria and criteria thresholds in the Rhode Island Wellhead Protection Program approved by the US Environmental Protection Agency.

"Release" means any spilling, leaking, pumping, pouring, emitting, emptying, injecting, escaping, leaching, dumping, or disposing of any pollutant onto or below the land surface. For purposes of these Rules and Regulations, release also includes

any storage, disposal, or abandonment of any substance or material in a manner which presents a substantial threat of release as herein defined.

"Remediation" means prevention and control of pollutant migration to, within, or from the groundwater and/or the removal of a pollutant from the groundwater.

"Residual zone" means a departmentally designated, three-dimensional zone within which the pollutant concentrations remaining in the groundwater after remediation activities are allowed to be greater than the groundwater quality standards.

"Sanitary sewage" means wastewater associated with human hygiene, routine cleaning and janitorial activities that is discharged from sanitary conveniences (e.g., toilets, sinks, tubs, showers; dishwashers, kitchen sinks; and laundry machines).

"Saturated thickness" means the thickness of an aquifer measured from the water table to an essentially impermeable boundary; such boundary is typically taken to be the top of the bedrock surface.

"Saturated zone" means the subsurface zone in which all open spaces are filled with water.

"Sludge" means residue, whether partially solid or solid, treated or untreated, resulting from the treatment of sewage, including, without limitation, such residues from the cleaning of sewers, by processes, such as settling, flotation, filtration and centrifugation, and shall not meet the criteria for a hazardous waste as found in the Rhode Island Department of Environmental Management Rules and Regulations for Hazardous Waste Generation, Transportation, Treatment, Storage and Disposal, 1988, and amendments thereto.

"Sole source aquifer" means an aquifer designated by the United States Environmental Protection Agency as the sole or principal source of drinking water for the area above the aquifer and including those lands where the population served by the aquifer live; that is, an aquifer which is needed to supply 50% or more of the drinking water for that area and for which there are no reasonably available alternative sources should the aquifer become polluted.

"Solid waste" means solid waste as defined in the Rhode Island Department of Environmental Management Rules and Regulations for Solid Waste Management Facilities, February 1991, and amendments thereto; and which shall include garbage, refuse and other discarded solid materials generated by residential, institutional, commercial, industrial and agricultural sources but does not include solids or dissolved materials in domestic sewage or sewage sludge, nor does it include hazardous waste. Solid waste shall also include non-hazardous liquid, semi-solid, and containerized gaseous waste.

"Static water table" means the water table under natural, non-pumping conditions.

"Stratified drift" means predominantly sorted sediments deposited in layers by meltwater from a glacier.

"Till" means predominantly unsorted, unstratified sediments deposited directly by a glacier.

"Transmissivity" means a measure of the ability of an aquifer to transmit a fluid. It can be quantified as the hydraulic conductivity multiplied by the saturated thickness.

"Unconfined aquifer" means an aquifer that is not under pressure beneath a relatively impermeable layer. The groundwater in an unconfined aquifer is under atmospheric pressure, and its upper surface is the water table.

"Unconsolidated deposits" means naturally occurring materials in which the particles are loose or loosely cemented, e.g., sand, gravel.

"Underground storage tank" means any one or combination of tanks (including underground pipes connected thereto) which is used to contain an accumulation of petroleum product or hazardous material, and the volume of which (including the volume

of the underground pipes connected thereto) is 10 percent or more beneath the surface of the ground.

"Water table" means the upper surface of the saturated zone in an unconfined aquifer.

"Well" means a bored, drilled, or driven shaft or a dug hole, with a depth that is greater than its largest surface dimension, through which groundwater flows, has flowed, or may flow under natural or induced pressure.

"Wellhead protection area" means the critical portion of a three-dimensional zone surrounding a public well or wellfield through which water will move toward and reach such well or wellfield as designated by the Director.

RULE 8. PROHIBITIONS

- 8.01 Groundwater shall be maintained at a quality consistent with its classification. No person shall take actions that violate or cause to violate the standards established in these Rules and Regulations.
- 8.02 No person shall cause or allow a discharge of any pollutant to groundwater without the approval of the Director pursuant to these and other Department rules and regulations.
- 8.03 No person shall take action that shall cause or allow groundwater designated non-attainment pursuant to Rule 9.02 to be further degraded.
- 8.04 No person shall operate or maintain a facility in a manner that is likely to result in a discharge of any pollutant to groundwater without the approval of the Director.
- 8.05 No person shall discharge hazardous materials to the groundwaters of the state.
- 8.06 The establishment of new solid waste landfills and facilities for the disposal of hazardous waste are prohibited in areas where the groundwater is classified GAA.
- 8.07 The establishment of new solid waste landfills and facilities for the disposal of hazardous waste shall be prohibited within areas designated by the Director to be wellhead protection areas for community water supply wells.
- 8.08 Owners and operators of existing solid waste landfills and facilities for the disposal of hazardous waste licensed at the date of promulgation of this Rule and located within the wellhead protection area of a community water supply well, shall be prohibited from expanding the areal extent of the waste disposal area and shall obtain approval of the Director prior to undertaking any action which constitutes a modification to an approved license, permit, operating or closure plan, issued pursuant to the Rhode Island Rules and Regulations for Solid Waste Management Facilities, February 1991, as amended and to licenses or approvals issued pursuant to Rhode Island Rules and Regulations for Hazardous Waste Generation, Transportation, Treatment, Storage and Disposal, October 1988, as amended. Facility modifications which pose an increased risk of introducing pollutants to the groundwater shall be prohibited.
- 8.09 Disposal of solid waste is prohibited at facilities which lack a valid DEM solid waste facility license or at such facilities whose licenses have expired or lapsed pursuant to Rhode Island Rules and Regulations for Solid Waste Management Facilities, February 1991, and amendments thereto.
- 8.10 No person shall install underground storage tanks in new locations within the wellhead protection area of community water supply wells. This prohibition shall not apply to the replacement or upgrading of existing underground storage tanks installed prior to July 1, 1991 provided that such activity take place in accordance with all applicable state and federal regulations.
- 8.11 Any action taken in violation of the above prohibitions shall be deemed a violation of these Rules and Regulations

for Groundwater Quality. For violations that are of a continuing nature, each and every day that the violation exists shall constitute a separate and distinct violation.

RULE 9. GROUNDWATER CLASSIFICATION

9.01 Definitions: The Director shall classify the groundwater resources of Rhode Island using the four classes established in Chapter 46-13.1 of the General Laws of Rhode Island, 1956, as amended and which are further defined below:

- (a) Groundwater classified GAA shall be those groundwater resources which the Director has designated to be suitable for public drinking water use without treatment and which are located within the following areas:
 - (1) Groundwater reservoirs and portions of their recharge areas as delineated by the Department, pursuant to the method described in Policies and Procedures for Mapping Recharge Areas to Groundwater Reservoirs for GAA Classification, Rhode Island Department of Environmental Management, March, 1990;
 - (2) Wellhead protection areas for community water supply wells, as described below:
 - (i) Within the delineation of a wellhead protection area to each community water supply well as designated by the Director or another delineation which is accepted by the Director in accordance with the Rhode Island Wellhead Protection Program, Rhode Island Department of Environmental Management, February 1990, and any amendments thereto and in accordance with Rule 18;
 - (ii) Where a delineation of a wellhead protection area for a community water supply well in accordance with 9.01(a)(2)(i) above is not available, the wellhead protection area shall be a 2000 foot radius circle surrounding the well, until such time that a delineation in accordance with 9.01(a)(2)(i) above is available.
 - (3) Groundwater dependent areas, such as Block Island, that are physically isolated from reasonable alternative water supplies and where the existing groundwater supply warrants the highest level of protection.
- (b) Groundwater classified GA shall be those groundwater resources which the Director has designated to be suitable for public or private drinking water use without treatment and which are not described in Rule 9.01(a)(1)-(3).
- (c) Groundwater classified GB shall be those groundwater resources which the Director has designated not suitable for public or private drinking water use. Groundwater located beneath the following areas may be classified GB:
 - (1) Highly urbanized areas of the state with dense concentrations of industrial and commercial activity;
 - (2) The permanent waste disposal area at sites of the following facilities:
 - (i) Inactive landfills and inactive land disposal sites for solid waste, hazardous waste, and/or sewage sludge;
 - (ii) Active sites for the land disposal of sewage sludge, unless such disposal site is associated with a licensed solid waste landfill;
 - (3) The area immediately surrounding the permanent waste disposal area, which the Director has

determined is not suitable for public or private drinking water use, at the following inactive and active facilities: landfills, land disposal sites for solid waste, hazardous waste, and sewage sludge.

- (d) Groundwater may be classified GC in those areas which, because of present or past land use or hydrogeological conditions, the Director has determined to be more suitable for certain waste disposal practices than for development as a drinking water supply.

- (1) Groundwater located beneath the following areas may be classified GC:

- (i) At licensed solid waste landfills:

- (A) The currently permitted area for waste disposal as established in a valid operating license issued by the Department, including a license issued pursuant to a court order; and
 - (B) Areas surrounding the permitted area for waste disposal that the Director determines are potentially suitable for waste disposal based on the hydrogeologic environment, groundwater quality, groundwater use off-site, and surrounding surface water quality and use;

- (ii) Areas that have been reclassified pursuant to Rule 11.08 for solid waste landfills and facilities for the disposal of hazardous waste.

- (2) The classification of a site as GC shall be limited to the waste disposal activities and other site specific conditions prescribed for the facility in the valid DEM solid waste or hazardous waste disposal facility license which was in effect on the effective date of these Rules and Regulations. Changes in the design, construction, or operation of such facilities which constitute formal modifications to approved licenses, permits, operating or closure plans, issued pursuant to the Rhode Island Rules and Regulations for Solid Waste Management Facilities, February 1991, as amended and to licenses or approvals issued pursuant to Rhode Island Rules and Regulations for Hazardous Waste Generation, Transportation, Treatment, Storage and Disposal, October 1988, as amended and which the Director has reason to believe may affect the potential for groundwater contamination at the site, shall be subject to the groundwater quality certification requirements of Rule 17;

- (3) At the point in time when a license for a solid waste landfill or facility for the disposal of hazardous waste has lapsed or the facility is no longer being operated, then by definition the site shall be considered reclassified to GB, unless the Director determines that the GC classification is appropriate for the site.

9.02 Non-attainment Areas: Non-attainment areas are those areas that have pollutant concentrations greater than the groundwater quality standards for the applicable classification. The Director shall designate such groundwater as "non-attainment" in the following manner: GAA Non-attainment (GAA-NA), GA Non-attainment (GA-NA), or GB Non-attainment (GB-NA).

- (a) The goal for non-attainment areas is restoration to the groundwater quality consistent with the standards in Rule 10 for the applicable class.
- (b) The Director shall maintain maps of areas in which groundwater has been designated GAA-NA and GA-NA on file in the Department's Groundwater Section. Groundwater designated GAA-NA and GA-NA shall include, but shall not be limited to, groundwater not classified GB or GC that is located in areas associated with the following activities:

- (1) Subsurface disposal of commercial and industrial effluent where the Director has reason to believe such areas are in non-attainment;
- (2) Surface impoundments and uncontrolled surface disposal of commercial and industrial wastes where the Director has reason to believe such areas are in non-attainment;
- (3) At inactive landfills and inactive land disposal sites for solid waste, hazardous waste, and sewage sludge:
 - (i) The entire site at those sites where data is not available for an adequate delineation of the waste disposal area;
 - (ii) At sites where the waste disposal area has been adequately delineated pursuant to Rule 9.01(c)(2): the area determined by the Director to be in non-attainment beyond the waste disposal area and beyond the area described in Rule 9.01(c)(3);
- (4) At licensed solid waste landfills and active sites for the land disposal of sewage sludge: the area determined by the Director to be in non-attainment beyond that area described in Rule 9.01(d)(1) and 9.01(c)(3);
- (5) Road salt storage sites where road salt has not been stored in accordance with best management practices; and
- (6) Releases of chemicals or petroleum products where significant volumes are known or presumed to have reached the groundwater.

9.03 Classification Boundary Disputes: In the event that the boundaries of the groundwater classification areas shown on groundwater classification maps produced by the Department are in dispute, the burden of proof shall be on the person disputing the boundary locations as shown on such map to show, pursuant to Rule 11 that the boundary locations are incorrect. In determining the accuracy of the Director's delineations, the regional hydrogeologic conditions beyond the boundaries of the specific site in question and the seasonal fluctuations in the water table shall be considered.

9.04 Classification Maps: The Director shall prepare and adopt, simultaneously with the adoption of these Rules and Regulations, groundwater classification maps, which designate groundwater classification pursuant to these Rules and Regulations. Said groundwater classification maps shall be at a scale of 1:24000, and such maps shall be on file for review at the Rhode Island Department of Environmental Management Groundwater Section, 291 Promenade Street, Providence, RI 02908. Smaller scale, statewide maps may be made available from the Department at the above address. The Director shall establish an appropriate fee for copies of the groundwater classification maps, which shall be based on the costs of map reproduction.

RULE 10. GROUNDWATER QUALITY STANDARDS AND PREVENTIVE ACTION LIMITS

- 10.01 General: The Director shall establish groundwater quality standards and preventive action limits to be used in determining compliance with the groundwater classifications, including, but not limited to, compliance of proposed discharges to groundwater, existing discharges to groundwater, groundwater remediation activities, and other facilities and activities that have an actual or potential adverse impact on groundwater quality. Numerical groundwater quality standards and preventive action limits shall be established only for class GAA and class GA.
- 10.02 Class GAA and Class GA Groundwater Quality Standards and Preventive Action Limits

Class GAA and class GA groundwater are suitable for drinking water use without treatment, and therefore, both

classes are subject to the same groundwater quality standards and preventive action limits, which are defined below. The preventive action limits shall be set at 50% of the numerical groundwater quality standards.

- (a) Pollutants shall not be in groundwater classified GAA or GA, except within an approved discharge zone or residual zone (as provided for in Rules 13.03 and 13.04 respectively), in any concentration which will adversely affect the groundwater as a source of potable water or which will adversely affect other beneficial uses of the groundwater, to include but not be limited to recreational, agricultural and industrial uses and the preservation of fish and wildlife habitat through the maintenance of surface water quality.
- (b) The numerical groundwater quality standards and the preventive action limits for specific substances in class GAA and class GA are listed in Table 1.
- (c) Groundwater classified GAA and GA shall be of a quality which the Director determines does not violate or have any reasonable potential to cause a violation of surface water quality standards established by the Rhode Island Water Quality Regulations for Water Pollution Control, October 1988, and amendments thereto.

TABLE 1.
Numerical Groundwater Quality Standards and Preventive Action Limits for Class GAA and Class GA.

	Substance	Groundwater Quality Standard (milligrams per liter, except as noted)	Preventative Action Limit
A.Inorganic Chemicals			
	Antimony	0.006	0.003
	Arsenic	0.05	0.025
	Asbestos	7 million fibers/l	3.5 million fibers/l
	Barium	2	1
	Beryllium	0.004	0.002
	Cadmium	0.005	0.0025
	Chromium (total)	0.1	0.05
	Cyanide	0.2	0.1
	Fluoride	4	2
	Lead	0.015	0.0075
	Mercury	0.002	0.001
	Nickel	0.1	0.05
	Nitrate (as N)	10	5
	Nitrite (as N)	1	0.5
	Nitrate/Nitrite (total)	10	5
	Selenium	0.05	0.025
	Thallium	0.002	0.001
B. Organic Chemicals			
	Adipate(diethylhexyl)	0.4	0.2
	Alachlor	0.002	0.001
	Aldicarb (Temik)	0.010	0.005
	Atrazine	0.003	0.0015
	Benzene	0.005	0.0025
	Benzo(a)pyrene	0.0002	0.0001
	Carbofuran	0.04	0.02
	Carbon Tetrachloride	0.005	0.0025
	Chlordane	0.002	0.001

	Substance	Groundwater Quality Standard (milligrams per liter, except as noted)	Preventative Action Limit
	2,4-D	0.07	0.035
	Dalapon	0.2	0.1
	Di(2-ethylhexyl)adipate	0.4	0.2
	Di(2-ethylhexyl)phthalate	0.006	0.003
	Dibromochloropropane (DBCP)	0.0002	0.0001
	Dichlorobenzene o-	0.6	0.3
	Dichlorobenzene m-	0.6	0.3
	Dichlorobenzene p-	0.075	0.0375
	Dichloroethane (1, 2-)	0.005	0.0025
	Dichloroethylene (1, 1-)	0.007	0.0035
	Dichloroethylene (cis-1, 2-)	0.07	0.035
	Dichloroethylene (trans-1, 2-)	0.1	0.05
	Dichloromethane	0.005	0.0025
	Dichloropropane (1, 2-)	0.005	0.0025
	Dinoseb	0.007	0.0035
	Diquat	0.02	0.01
	Endothall	0.1	0.05
	Endrin	0.002	0.001
	Ethylbenzene	0.7	0.35
	Ethylene dibromide (EDB)	0.00005	0.000025
	Glyphosate	0.7	0.35
	Heptachlor	0.0004	0.0002
	Heptachlor epoxide	0.0002	0.0001
	Hexachlorobenzene	0.001	0.0005
	Hexachlorocyclopentadiene	0.05	0.025
	Lindane	0.0002	0.0001
	Methoxychlor	0.04	0.02
	Methyl tertiary butyl ether (MTBE)	0.04	0.02
	Monochlorobenzene	0.1	0.05
	Naphthalene	0.02	0.01
	Oxamyl (Vydate)	0.2	0.1
	Pentachlorophenol	0.001	0.0005
	Picloram	0.5	0.25
	Polychlorinated biphenyls (PCBs)	0.0005	0.00025
	Simazine	0.004	0.002
	Styrene	0.1	0.05
	2,3,7,8-TCDD (Dioxin)	3E-08	1.5E-08
	Tetrachloroethylene	0.005	0.0025
	Toluene	1	0.5
	Toxaphene	0.003	0.0015
	2,3,4-TP (Silvex)	0.05	0.025
	Trichlorobenzene (1,2,4)	0.07	0.035
	Trichloroethane (1,1,1-)	0.2	0.1
	Trichloroethane (1,1,2)	0.005	0.0025
	Trichloroethylene (TCE)	0.005	0.0025
	Trihalomethanes (total)	0.1	0.05

	Substance	Groundwater Quality Standard (milligrams per liter, except as noted)	Preventative Action Limit
	Vinyl Chloride	0.002	0.001
	Xylenes	10	5
C. Microbiological			
	Total Coliform Bacteria	Zero	zero
D. Radionuclides			
	Gross Alpha Particle Activity	15 pCi/liter	7.5 pCi/liter
	Gross Beta Particle Activity	4 mrem/yr	2 mrem/yr
	Radium 226 and Radium 228 combined	5 pCi/liter	2.5 pCi/liter

Note: The numerical groundwater quality standards in these Rules and Regulations are based primarily on the maximum contaminant levels promulgated by the Rhode Island Department of Health in the Rules and Regulations Pertaining to Public Drinking Water, January 1995, and amendments thereto. As additional or revised maximum contaminant levels are adopted by the Rhode Island Department of Health, the new or revised maximum contaminant levels are incorporated herein by reference as groundwater quality standards for class GAA and class GA.

10.03 Class GB and GC Groundwater Quality Standards

- (a) Groundwater classified GB and GC shall be of a quality which the Director determines does not:
 - (1) Threaten public health and/or the environment;
 - (2) Violate or have a substantial likelihood to cause a violation of surrounding groundwater quality standards;
 - (3) Adversely impact or have a substantial likelihood to adversely impact:
 - (i) Current or proposed uses of the facility;
 - (ii) Current or proposed uses of groundwater and surface water at or within the facility boundaries;
 - (iii) Current and future uses of surrounding property, groundwater and surface water;
 - (4) Violate or have any reasonable potential to cause a violation of surface water quality standards established by the Rhode Island Water Quality Regulations for Water Pollution Control, October 1988, and amendments thereto.
- (b) In determining compliance with the groundwater quality standards for class GB and class GC at a facility, the Director may consider the factors below, in addition to other relevant information, provided by the facility owner or operator:
 - (1) Surrounding groundwater quality;
 - (2) Groundwater classification surrounding the facility;
 - (3) Surface water classification within the facility boundaries and surrounding the facility;
 - (4) Current and proposed future uses of groundwater and surface water at or within the facility boundaries;
 - (5) Current and proposed future uses of the facility;
 - (6) Uses of surrounding property, groundwater and surface water;
 - (7) Hydrogeologic characteristics of the facility and surrounding the facility, including, but not limited to, groundwater flow direction, hydraulic gradient, type of subsurface materials, and depth to bedrock;
 - (8) Actual and potential routes for human exposure and points of human exposure to the pollutant(s);
 - (9) Man-made pathways for pollutant movement off-site, e.g., underground utility lines; and
 - (10) Persistence and mobility of the pollutant(s) in the subsurface and the toxicity of the pollutant(s).

RULE 11. REVIEW AND MODIFICATION OF GROUNDWATER CLASSIFICATION

- 11.01 Groundwater Classification Changes by the Director: The Director may from time to time propose changes in the groundwater classifications as more information becomes available. The changes shall be delineated in a manner consistent with Rule 9. At such time that the Director proposes a change in the groundwater classification, the Director shall initiate rule-making procedures.
- 11.02 Public Hearings: The Director may from time to time conduct public hearings to receive public comment on the groundwater classifications, groundwater quality standards, and preventive action limits.
- 11.03 Request for Modification of Groundwater Classification
- (a) Any person who may be substantially and specifically affected may petition the Director to modify the classification assigned to particular groundwaters of the state.
 - (b) The petitioner for a reclassification shall specify the precise boundary in question and prove by clear, convincing and scientifically valid evidence that a reclassification is consistent with Rules 11.05, 11.06, 11.07, or 11.08.
- 11.04 Reclassification Considerations: In evaluating a reclassification petition in accordance with Rules 11.05, 11.06, 11.07, or 11.08, the Director shall consider the factors below, in addition to other relevant information, provided by the facility owner or operator for the location in question:
- (a) Actual or potential threats to public health and/or the environment;
 - (b) Surrounding groundwater and surface water quality;
 - (c) Surrounding groundwater and surface water quality standards;
 - (d) Current and potential future uses of surrounding property, groundwater, and surface water;
 - (e) Local and regional groundwater flow direction; and
 - (f) Feasibility of groundwater remediation to a quality consistent with the standards in Rule 10.02.
- 11.05 Upgrading Groundwater Classification: Where it has been proven by clear, convincing and scientifically valid evidence that the groundwater quality of an area meets the standards of a higher quality groundwater classification than the current classification or that the classification delineation pursuant to Rule 9.01(b) or 9.01(c)(2) is incorrect, the Director shall initiate rule-making procedures to upgrade the groundwater classification.
- 11.06 Changing Groundwater Classified GAA to GA: Where it has been proven by clear, convincing and scientifically valid evidence that groundwater classified GAA is not in an area described in Rule 9.01(a)(1)-(3), then and in that event, the Director shall initiate rule-making procedures for reclassification of such groundwater to GA.
- 11.07 Downgrading Groundwater Classified GAA or GA to GB: The Director may initiate rule-making procedures for reclassification of groundwater to GB, provided that it has been demonstrated by clear, convincing and scientifically valid evidence that the area in question is located within one of the areas described below and that site conditions are such that the groundwater is known or presumed likely not to meet the standards for groundwater classified GAA or GA:
- (a) Contiguous with an existing area classified GB pursuant to Rule 9.01(c)(1), provided that the land use

activities in the area in question represent a similar degree of threat to groundwater quality as the contiguous area classified GB;

- (b) Within the permanent waste disposal area at inactive landfills or inactive disposal sites for solid waste, hazardous waste, or sewage sludge, where the Director has determined that groundwater remediation to drinking water quality is not feasible or practical; or
- (c) The area immediately surrounding the waste disposal area, which the Director has designated not suitable for public or private drinking water use, at the following inactive and active facilities: landfills, land disposal sites for solid waste, hazardous waste, and sewage sludge.

11.08 Downgrading of Groundwater Classification to GC

- (a) Groundwater reclassification to GC is required for proposed sites for solid waste landfills and proposed sites for hazardous waste disposal facilities. Such facilities are the only uses for which groundwater will be reclassified to GC.
- (b) Groundwater reclassification to GC will not be considered until an application for a solid waste disposal license has been filed with the Department pursuant to the Rules and Regulations for Solid Waste Management Facilities, January 1992, and amendments thereto or pursuant to the Rules and Regulations for Hazardous Waste Generation, Transportation, Treatment, Storage and Disposal, October 1988, and amendments thereto.
- (c) Groundwater currently classified GA and GB that does not lie within the wellhead protection area of a community water supply well as designated by DEM may be reclassified to GC for proposed sites for solid waste landfills and proposed sites for hazardous waste disposal facilities. Groundwater classified GAA or designated GAA Non-attainment shall not be reclassified to GC.
- (d) In order to reclassify groundwater to GC, the applicant must submit to the Department a site-specific study which demonstrates by clear, convincing, and scientifically valid evidence that the groundwater quality standards for GC in Rule 10.03(a) will be met. The study shall include, but not be limited to, the following:
 - (1) A locus map using the U.S. Geological Survey 7.5 minute quadrangle map;
 - (2) Site plan at an appropriate scale (minimum scale of one inch equals fifty feet (1"=50')) to adequately show the location on and immediately surrounding the site of the following: property boundaries, buildings and other structures, roads, surface topography, surface water courses and wetlands, wells, water lines, sewer lines, individual sewage disposal systems and other waste disposal areas, and any other significant site features;
 - (3) Depth to groundwater, water table elevations, hydraulic gradient, groundwater flow direction, groundwater flow velocity, and water table map;
 - (4) Description of the unconsolidated materials (in both the unsaturated and saturated zones), including permeability, porosity, degree of stratification, and the capacity for pollutant attenuation;
 - (5) Depth to bedrock and bedrock characteristics, to include, but not be limited to, weathering, jointing, faulting, fracture orientation and density;
 - (6) Aquifer characteristics including saturated thickness, hydraulic conductivity, and transmissivity;
 - (7) Groundwater quality on-site and surrounding the site;

- (8) The hydraulic connection between nearby surface waters and groundwater;
- (9) Location and distance off-site of the nearest surface water body that will receive runoff from the site and that surface water body that will receive groundwater flow from the site and the water quality classification of these surface water bodies.
- (10) Public and private wells:
 - (i) Determine the number and location of public wells within three (3) miles of the site and the number and location of private wells within one (1) mile of the site, or the number and location of such wells within alternative distances agreed upon by the Director;
 - (ii) Determine or estimate the well depths;
- (11) Current and most probable future uses of surrounding groundwater and surface water;
- (12) History of site ownership and operation;
- (13) Volume and characteristics of the waste to be disposed of on the site;
- (14) Specific methods and procedures to be utilized in the construction, operation, and maintenance of the facility necessary to contain or prevent migration of pollutants;
- (15) Evaluation of the potential for migration of pollutants from the site and identification of potential impacts to groundwater and associated surface waters from the proposal.

RULE 12. DETERMINATION OF COMPLIANCE WITH GROUNDWATER QUALITY STANDARDS AND PREVENTATIVE ACTION LIMITS

12.01 General: Compliance with the groundwater quality standards and preventive action limits shall be determined through analytical tests of groundwater quality by the facility owner or operator. Where applicable, the Director may also require analytical tests of the effluent prior to the discharge to the groundwater. The Director may request verification of any test data or collect separate samples if it is deemed necessary.

- (a) Groundwater samples and effluent samples shall be collected, stored, transported, and analyzed in accordance with the most recent United States Environmental Protection Agency approved procedures; the most recent "Standard Methods for the Examination of Water and Wastewater" (American Public Health Association, et al.); or alternative methods approved by the Director.
- (b) Groundwater and effluent sampling frequency and the list of parameters to test for shall be proposed to the Director by the facility owner or operator. The Director's determination of sampling frequency and the parameters to test for shall be made, in part, utilizing information provided by the facility owner or operator regarding the type of facility, waste generated, waste disposed of on site, materials stored or utilized on site and any site specific hydrogeologic characteristics that may be required by the Director.

12.02 Groundwater Monitoring Program

- (a) All facilities that are required by the Director to monitor groundwater quality pursuant to these Rules and Regulations and the Underground Injection Control Program Rules and Regulations, May 1984, and amendments thereto, shall implement a groundwater monitoring program approved by the Director. Groundwater monitoring done in compliance with the following Department regulations and federal

programs are exempt from the provisions of Rule 12.02 but shall comply with Rule 12.03 regarding termination of groundwater monitoring:

- (1) Rhode Island Oil Pollution Control Regulations, December 1990, and amendments thereto;
 - (2) Rhode Island Regulations for Underground Storage Facilities Used for Petroleum Products and Hazardous Materials, April 1985, and amendments thereto;
 - (3) Rhode Island Rules and Regulations Pertaining to the Treatment, Disposal, Utilization and Transportation of Wastewater Treatment Facility Sludge, March 1991, and amendments thereto;
 - (4) Rhode Island Rules and Regulations for Solid Waste Management Facilities, February 1991, and amendments thereto;
 - (5) Rhode Island Rules and Regulations for Hazardous Waste Generation, Transportation, Treatment, Storage and Disposal, October 1988, and amendments thereto;
 - (6) Rhode Island Rules and Regulations for the Investigation and Remediation of Hazardous Material Releases, as promulgated;
 - (7) Federal Comprehensive Environmental Response, Compensation and Liability Act (42 USC 9601 et seq.); and
 - (8) Federal Resource Conservation and Recovery Act (42 USC 6901 et seq.)
- (b) The groundwater monitoring program to be approved by the Director shall include, at minimum, the following:
- (1) A locus map using the U.S. Geological Survey 7.5 minute quadrangle map;
 - (2) Site plan at an appropriate scale (minimum scale of one inch equals fifty feet (1"=50')) to adequately show the monitoring well locations, well casing elevations, and the location on and immediately surrounding the site of the following: property boundaries, buildings and other structures, roads, surface topography, surface water courses and wetlands, wells, water lines, sewer lines, individual sewage disposal systems and other waste disposal areas, and any other significant site features;
 - (3) A sufficient number of wells (minimum of three) at the appropriate locations and depths to permit detection of any pollutants in the groundwater;
 - (4) Well logs with detailed lithologic and well construction information; and
 - (5) Sampling schedule pursuant to Rule 12.01(b).
- (c) Monitoring well construction shall be in compliance with the standards set forth in Appendix 1.
- (d) Minimum site monitoring requirements:
- (1) The static water table elevation shall be recorded at the time of monitoring; and
 - (2) A log containing static water table elevations and the sample analyses shall be maintained on-site by the facility owner or operator.

- (e) Copies of sample results and water table measurements shall be submitted to the Director within thirty (30) days of the receipt of such information by the facility owner or operator.
- (f) An approved groundwater monitoring program shall be valid for a duration specified by the Director.
- (g) There shall be no change in a groundwater monitoring program without the approval of the Director. The Director may require a change in an approved monitoring program where such change is necessary to determine compliance with the groundwater quality standards.
- (h) Any person transferring ownership or control of a facility having an approved groundwater monitoring program shall notify the Director of such transfer not less than thirty (30) days prior to the effective date of such transfer.
- (i) Groundwater monitoring subject to these Rules and Regulations and the Underground Injection Control Program Rules and Regulations, May 1984, and amendments thereto, that was approved by the Director prior to June 18, 1992 shall comply with all provisions of Rule 12 except for 12.02(b)(3) and (4) and 12.02(c) within one year.

12.03 Termination of Groundwater Monitoring: Groundwater monitoring required by the Director shall not be terminated without the approval of the Director.

- (a) A facility owner or operator may petition the Director for termination of groundwater monitoring when one of the following conditions is met:
 - (1) For discharges to groundwater: The discharge to groundwater has ceased, the discharge system has been closed in accordance with the appropriate state and federal regulations, and there has been no violation of a preventive action limit or groundwater quality standard at the points of compliance for the number of samples and the time period established by the Director;
 - (2) At sites of groundwater remediation: There has been no violation of the groundwater quality standards at the points of compliance for the number of samples and the time period established by the Director; or
 - (3) At sites of suspected or potential discharges to groundwater and any other sites required by the Director to monitor groundwater quality: There has been no violation of the groundwater quality standards at the points of compliance for the number of samples and the time period established by the Director.
- (b) Monitoring wells at sites where groundwater monitoring has been terminated shall be abandoned in accordance with the procedures established in Appendix 1.

RULE 13. POINTS OF COMPLIANCE

13.01 General: Any point where the groundwater quality is monitored or where groundwater is withdrawn for use, excepting points within a discharge zone or residual zone approved pursuant to this Rule, may be used to determine compliance with the groundwater quality standards for the area.

13.02 Facility Points of Compliance for Groundwater Quality Standards and Preventive Action Limits: The point or points of compliance to determine if pollutant concentrations are greater than a groundwater quality standard or preventive action limit shall be established by the Director at any point within or beyond the property boundary, provided that it is beyond a discharge zone, if such zone is approved by the Director pursuant to Rule 13.03, and provided it is beyond a residual zone, if such zone is approved by the Director pursuant to Rule 13.04.

13.03 Discharge Zone: In determining compliance with the groundwater quality standards and preventive action limits in these Rules and Regulations for an active discharge to groundwater, the Director may approve, deny, or modify a discharge zone proposed by a facility owner or operator. A groundwater monitoring program or revised groundwater monitoring program prepared pursuant to Rule 12.02 shall be submitted to the Director at the same time that a discharge zone is proposed.

- (a) Within this discharge zone, the pollutant concentrations in groundwater are allowed to be greater than the groundwater quality standards. Acceptable pollutant concentrations in the groundwater within a discharge zone shall be determined by the Director on a case-by-case basis. The Director may require that the groundwater quality within the discharge zone be monitored.
- (b) The facility owner or operator proposing a discharge zone shall provide the Director with information on the site's hydrogeology and the characteristics of the discharge to groundwater.
- (c) Prior to approval of a discharge zone, the facility owner or operator shall demonstrate by clear, convincing, and scientifically valid evidence that:
 - (1) All practical alternatives to a discharge to groundwater have been evaluated and no technically or economically feasible alternative exists;
 - (2) Every practical effort has been made to limit the pollutant concentrations in the discharge to groundwater by such means as, but not limited to, reducing the quantity of potentially contaminating substances in use, use of alternative substances, changes in the operational procedures at the facility, and pretreatment of the effluent;
 - (3) The area encompassed by the discharge zone is owned and controlled by the owner or operator of the facility, and the discharge zone is limited to the smallest area that is technically and economically feasible;
 - (4) The discharge to groundwater and the resulting groundwater quality in the discharge zone do not represent a threat to public health or the environment;
 - (5) There will be no violation of the groundwater quality standards established in Rule 10 beyond the discharge zone as a result of the proposed discharge;
 - (6) There will be no adverse impact on existing public or private drinking water wells as a result of the proposed discharge; and
 - (7) The groundwater within the discharge zone will not cause a violation of the surface water quality standards established by the Rhode Island Water Quality Regulations for Water Pollution Control, October 1988, and amendments thereto as a result of the proposed discharge.

13.04 Residual Zone: In determining compliance with the groundwater quality standards and preventive action limits in these Rules and Regulations for groundwater remediation activities, the Director may approve, deny, or modify the designation of a residual zone proposed by the facility owner or operator.

- (a) Within this residual zone, the pollutant concentrations in groundwater are allowed to be greater than the groundwater quality standards. Acceptable pollutant concentrations in the groundwater within a residual zone shall be determined by the Director on a case-by-case basis. The Director may require that the groundwater quality within the residual zone be monitored.

- (b) Prior to approval of a residual zone, the facility owner or operator shall demonstrate by clear, convincing and scientifically valid evidence that:
 - (1) Every practical effort has or will have been made to decrease the pollutant concentrations in the residual zone;
 - (2) The area encompassed by the residual zone is owned and/or effectively controlled by the owner or operator of the facility, and the residual zone is limited to the smallest area that is technically and economically feasible;
 - (3) The pollutant concentrations in the groundwater within the residual zone do not or will not represent a threat to the public health or the environment;
 - (4) There will be no adverse impact on existing public or private drinking water wells as a result of the residual zone;
 - (5) At the conclusion of the remediation activities, there will be no violation of the groundwater quality standards established in Rule 10 beyond the residual zone; and
 - (6) The groundwater within the residual zone will not cause a violation of the surface water quality standards established by the Rhode Island Water Quality Regulations for Water Pollution Control, October 1988, and amendments thereto.
- (c) Residual zones approved pursuant to this Rule shall be designated non-attainment areas pursuant to Rule 9.02.

RULE 14. NOTIFICATION TO DEM OF VIOLATIONS OF PREVENTIVE ACTION LIMITS AND GROUNDWATER QUALITY STANDARDS

14.01 Exemptions from Provisions of This Rule:

- (a) Owners or operators of facilities which, prior to the effective date of these Rules and Regulations, discovered groundwater quality at their facility does not comply with the groundwater quality standards in these Rules and Regulations, provided that such information was previously reported to the Department; and
- (b) Persons with knowledge of analytical test results from private wells that serve properties used exclusively for residential purposes.

14.02 Owners or operators of facilities that did not previously report to the Department the discovery, prior to the effective date of these Rules and Regulations, of groundwater quality at their facility that does not comply with the groundwater quality standards in these Rules and Regulations, must comply with the notification provisions of these Rules and Regulations, provided that the conditions requiring notification still exist after the effective date of these Rules and Regulations.

14.03 Notification: Facility owners and/or operators that discharge to groundwater or have had a discharge or release to groundwater shall notify the Department when:

- (a) A preventive action limit has not been met at any point of compliance at a facility that has a discharge to groundwater approved by DEM where the groundwater is classified GAA or GA;
- (b) A groundwater quality standard has not been met at any point of compliance at a facility in any groundwater

classification;

- (c) An alternative notification level established under a groundwater monitoring program approved by the Director pursuant to Rule 12 or other groundwater monitoring program approved by the Director pursuant to other rules and regulations of the Department or the federal government has not been met; or
- (d) The facility owner or operator has reasonable cause to believe that a discharge or release has occurred which may result in the violation of a preventive action limit and/or groundwater quality standard. Persons reporting spills of chemical and/or petroleum products to the Department pursuant to the immediate notification requirements of other state or federal laws and regulations are exempt from provisions of this Rule.

14.04 Immediate Notification: Nothing in these Rules and Regulations shall exempt facility owners or operators from immediate notification requirements as set forth in other Department rules and regulations.

14.05 Notification Deadlines:

- (a) Notification required in Rule 14.02 shall be made to the Department in writing within six (6) months of the effective date of these Rules and Regulations.
- (b) Notification required in Rule 14.03 shall be made to the Department in writing within fifteen (15) days after discovery of the occurrence requiring notification.

14.06 Notification Contents: Notification shall include, but not be limited to, the following:

- (a) Name, address, telephone number of person notifying the Department and of the facility owner or operator;
- (b) Date and time of the discovery and the circumstances surrounding the discovery of the occurrence requiring notification;
- (c) Groundwater classification of the site;
- (d) Location of the occurrence and a legal description of the site (plat and lot);
- (e) Concentration of the pollutant(s) identified in the groundwater when notification is pursuant to Rule 14.03(a)-(c);
- (f) Identification of the pollutant(s) in the discharge or release when notification is pursuant to Rule 14.03(d);
- (g) Initial determination of the source of the pollutant(s) and an estimate of the extent of pollution; and
- (h) Measures taken or proposed to be taken at the time of notification.

14.07 Certification Requirements: The notification shall include a statement signed by the facility owner or operator, or an authorized representative, that is responsible for the preparation and submittal of the notification certifying, to the best of their knowledge, that the notification is complete and accurate.

RULE 15. FACILITY OWNER OR OPERATOR RESPONSES TO VIOLATIONS OF PREVENTIVE ACTION LIMITS AND GROUNDWATER QUALITY STANDARDS

15.01 Violation of a Preventive Action Limit: When a preventive action limit has not been met, the facility owner and operator are responsible for taking actions, which shall be subject to the approval of the Director, to meet the following objectives at the point of compliance:

- (a) Minimize the concentration of the pollutant in the groundwater where technically and economically feasible;
- (b) Regain and maintain compliance with the preventive action limit, unless the Director determines that it is not technically or economically feasible to attain the preventive action limit concentration, in which case the owner or operator shall achieve compliance with the lowest possible concentration that is technically and economically feasible; and
- (c) Ensure that the groundwater quality standard is met at any point of compliance.

15.02 Violation of a Groundwater Quality Standard: When a groundwater quality standard has not been met, the facility owner and operator are responsible for taking actions, which shall be subject to the approval of the Director, to regain and maintain compliance with the groundwater quality standard at the point of compliance.

15.03 Potential for Violation of Preventive Action Limit and/or Groundwater Quality Standard: Where the Director has reason to believe that a discharge or release has occurred which is likely to enter the groundwaters of the state and result in the violation of a preventive action limit and/or groundwater quality standard, the Director is authorized to require the facility owner or operator to take action pursuant to Rule 15.04.

15.04 Responses to Violation of a Preventive Action Limit or a Groundwater Quality Standard: The responses the Director may require of the facility owner or operator when a preventive action limit or groundwater quality standard is not met at a point of compliance or a discharge or release is suspected that may result in the violation of a preventive action limit or groundwater quality standard at a point of compliance include, but are not limited to, the responses listed below. The Director may require more than one response.

- (a) Resample groundwater quality at the point of compliance.
- (b) Collect and submit additional data on groundwater quality on site or surrounding the site, hydrogeologic characteristics, and/or facility practices.
- (c) Arrange for the sampling of drinking water wells which may be adversely affected.
- (d) Install and sample monitoring wells. Such wells shall be in compliance with the construction standards in Appendix 1, unless otherwise approved by the Director.
- (e) Require the establishment of a groundwater monitoring program pursuant to Rule 12 or other groundwater monitoring program approved by the Director pursuant to other regulations of the Department or the federal government, or require a change in an existing groundwater monitoring program.
- (f) Require a revision of the operational procedures at the facility.
- (g) Require a change in the design or construction of the facility.
- (h) Require an alternate method of waste treatment or disposal.
- (i) Require the facility owner or operator to conduct a groundwater assessment and prepare a report pursuant to Rule 15.06, or another report pursuant to other applicable Department rules and regulations, that is subject to the Director's review and approval. Based on the results of this report, the Director may require further investigation.
- (j) Require cessation of any prohibited discharges to groundwater.

- (k) Require prohibition of an activity.
- (l) Require the facility owner or operator to provide drinking water to those persons that do not have a potable water supply (for violation of groundwater quality standard only).
- (m) Require the facility owner or operator to conduct a groundwater investigation and prepare a report pursuant to Rule 15.07, or another report pursuant to other applicable Department rules and regulations, to adequately assess the nature and extent of pollution. Such report shall be subject to the Director's review and approval.
- (n) Require remedial action to restore groundwater quality to levels established by the Director pursuant to Rule 16.

15.05 Determination of the Response: In evaluating a violation of a preventive action limit or groundwater quality standard, and in determining the appropriate response required of the facility owner or operator pursuant to Rule 15.04, the Director may consider the following information provided by the facility owner or operator, in addition to all other relevant information:

- (a) Surrounding groundwater quality;
- (b) Geographic extent of pollutant migration;
- (c) Hydrogeologic conditions;
- (d) Present and future uses of the groundwater on-site and in the surrounding area;
- (e) Reliability of sampling data;
- (f) Performance of the activities at the facility;
- (g) Water quality standards established by the Rhode Island Water Quality Regulations for Water Pollution Control, October 1988, and amendments thereto, for those surface waters receiving groundwater from the site; and
- (h) Other known or suspected sources in the area of the substance that is identified as in violation of the preventive action limit or groundwater quality standard.

15.06 Groundwater Assessment Report

- (a) The groundwater assessment report shall be prepared by a person with appropriate qualifications, and it shall include, but not be limited to, the following information, unless otherwise specified by the Director:
 - (1) All information previously reported to the Director pursuant to Rule 14 and/or information reported to the Director in accordance with emergency response procedures of other applicable state and federal laws and regulations. The facility owner or operator may elaborate and expand on any and all information found in previous reports. The facility owner or operator shall correct any incorrect information or interpretations contained in previous reports as part of the site characterization;
 - (2) A locus map using the U.S. Geological Survey 7.5 minute quadrangle map;
 - (3) Description of past and present activities on the site, including a list of past owners and operators of the site and approximate time periods of occupancy;

- (4) A compliance history of the site including any and all past environmental enforcement actions and documentation of any past discharges or releases;
 - (5) Site plan at an appropriate scale (minimum scale of one inch equals fifty feet (1"=50')) to adequately show the location on and immediately surrounding the site of the following: property boundaries, buildings and other structures, roads, surface topography, surface water courses and wetlands, wells, water lines, groundwater monitoring wells, materials storage areas (including underground storage tanks), sewer lines, individual sewage disposal systems and other waste disposal areas;
 - (6) Names and addresses of the owners and tenants of all properties that abut the site;
 - (7) Description of the site's hydrogeology, including, but not limited to, depth to groundwater, groundwater flow direction, and a description of the unconsolidated materials, including soil characteristics;
 - (8) Location and distance off-site of the nearest surface water body that will receive runoff from the site and the water quality classification of this surface water;
 - (9) Location of public wells within three (3) miles of the site or within an alternative distance of the site agreed upon by the Director;
 - (10) Information regarding private water supply as follows:
 - (i) Location of private wells on those properties that are wholly or partially within 500 feet of the site or a greater distance specified by the Director;
 - (ii) A description of the water supply sources and services available beyond 500 feet from the site and up to one mile from the site. The Director may require more specific detail.
 - (11) Identification of the pollutant(s) and an estimate of the geographic extent and volume of the affected area;
 - (12) A description of evidence of possible groundwater pollution, including, but not limited to, free liquids, stained soil, stressed vegetation, and the presence and volume of excavated materials.
 - (13) Results of any analytical testing of groundwater or soil on the site, including identification of methods used and sampling protocols;
 - (14) Recommendations for further groundwater investigation, groundwater remediation, or other actions; and
 - (15) Any other factors that the Director has reason to believe are necessary for an adequate groundwater assessment.
- (b) Monitoring wells installed to collect groundwater quality data shall be in compliance with the construction standards in Appendix 1, unless otherwise approved by the Director.
- (c) The groundwater assessment report and any associated progress reports shall include the following statements signed by an authorized representative of the party specified:
- (1) A statement signed by an authorized representative of the person who prepared the groundwater assessment report certifying, to the best of their knowledge, the accuracy of the information

contained in the report; and

- (2) A statement signed by the facility owner or operator responsible for the submittal of the groundwater assessment report certifying, to the best of their knowledge, that the report is a complete and accurate representation, and that it includes all known facts about the discharge to groundwater or the release that has, or may result in, the violation of a preventive action limit or groundwater quality standard.

15.07 Groundwater Investigation Report

- (a) The groundwater investigation report shall be prepared by a person with appropriate qualifications, and it shall include all the elements of a groundwater assessment report described in Rule 15.06, and it shall also include, but not be limited to, the following information:
 - (1) Complete description of the site's hydrogeology, including, but not limited to, the following:
 - (i) Depth to groundwater, water table elevations, hydraulic gradient, groundwater flow direction, groundwater flow velocity, and water table map;
 - (ii) Description of the unconsolidated materials (in both the unsaturated and saturated zones), including permeability, porosity, degree of stratification, and the capacity for pollutant attenuation;
 - (iii) Depth to bedrock and bedrock characteristics;
 - (iv) Aquifer characteristics including saturated thickness, hydraulic conductivity, and transmissivity;
 - (v) The presence and effects of both natural and man-made barriers to and conduits for pollutant migration;
 - (vi) Surrounding groundwater quality;
 - (2) Description of the pollutant source and the events that caused the pollution;
 - (3) Extent of soil pollution;
 - (4) Extent of groundwater pollution;
 - (5) Map showing lines of equal pollutant concentrations in the groundwater; and
 - (6) Conclusions based on the site data and recommendations for groundwater remediation.
- (b) Monitoring wells installed to collect groundwater quality data shall be in compliance with the construction standards in Appendix 1, unless otherwise approved by the Director.
- (c) The groundwater investigation report and any associated progress reports shall include the following statements signed by an authorized representative of the party specified:
 - (1) A statement signed by an authorized representative of the person who prepared the groundwater investigation report certifying, to the best of their knowledge, the accuracy of the information

contained in the report; and

- (2) A statement signed by the facility owner or operator responsible for the submittal of the groundwater investigation report certifying, to the best of their knowledge, that the report is a complete and accurate representation, and that it includes all known facts about the discharge to groundwater or the release that has, or may result in, the violation of a preventive action limit or groundwater quality standard.

RULE 16. GROUNDWATER REMEDIATION

16.01 General: When groundwater remediation is required by the Director pursuant to Rule 15.04, the facility owner and operator are jointly and severally responsible for designing and implementing efforts to remediate the groundwater to achieve pollutant concentrations established by the Director.

16.02 Exemptions:

- (a) Groundwater remediation activities and groundwater remediation plans approved in writing by the Director prior to the effective date of these Rules and Regulations are exempt from the provisions of Rule 16.06.
- (b) Groundwater remediation plans prepared in accordance with the Department regulations and federal programs listed below are exempt from the provisions of Rule 16.06.
 - (1) Rhode Island Regulations for Underground Storage Facilities Used for Petroleum Products and Hazardous Materials, April 1985, and amendments thereto;
 - (2) Rhode Island Rules and Regulations for the Investigation and Remediation of Hazardous Material Releases, as promulgated;
 - (3) Federal Comprehensive Environmental Response, Compensation and Liability Act (42 USC 9601 et seq.); and
 - (4) Federal Resource Conservation and Recovery Act (42 USC 6901 et seq.).

16.03 Groundwater Quality Certification: Groundwater remediation plans, including those prepared pursuant to these Rules and Regulations and the Rules and Regulations and programs specified in Rule 16.02(b)(1)-(4), are subject to the requirements of groundwater quality certification in Rule 17, except where limited by constraints of federal laws.

16.04 Groundwater Remediation Objectives: Groundwater remediation activities shall be designed to meet the following objectives:

- (a) Protect public health and the environment;
- (b) Ensure compliance with the groundwater quality standards for the classification assigned to the groundwater of concern;
- (c) Eliminate or contain the source of groundwater pollution and minimize the impacted area;
- (d) Achieve pollutant concentrations that are consistent with proposed and anticipated future uses of the site;

- (e) Prevent an adverse impact on surrounding uses of property, groundwater and surface water;
- (f) Prevent the violation of surrounding groundwater quality standards; and
- (g) Prevent the groundwater at the remediation site from causing a violation of the surface water quality standards established by the Rhode Island Water Quality Regulations for Water Pollution Control, October 1988, and amendments thereto.

16.05 Considerations for Remediation Decisions: The determination by the Director of remediation actions required of an owner or operator, the suitability of proposed remediation techniques, and the acceptable pollutant concentrations that may remain in groundwater after remediation may be based on, but not limited to, a consideration of:

- (a) Relative threat to public health and the environment from the facility;
- (b) The physical and chemical characteristics of the pollutant(s), including toxicity, persistence and potential for migration;
- (c) Hydrogeologic characteristics of the site and surrounding the site;
- (d) Current and potential future uses of groundwater and surface water at the site and surrounding the site;
- (e) Groundwater classification at the site and surrounding the site;
- (f) Other state and federal program priorities;
- (g) Relative potential for adverse impacts on surrounding uses of property, groundwater and surface water;
- (h) Relative potential for violation of surrounding groundwater quality standards;
- (i) Relative potential for the groundwater at the remediation site to cause a violation of the surface water quality standards established by the Rhode Island Water Quality Regulations for Water Pollution Control, October 1988, and amendments thereto; and
- (j) Reliability and technical feasibility of the proposed technologies for groundwater remediation.

16.06 Groundwater Remediation Plan: Where required by the Director, a groundwater remediation plan shall be prepared by the facility owner or operator.

- (a) The groundwater remediation plan shall consist of, at minimum, the following:
 - (1) Groundwater assessment report pursuant to Rule 15.06, groundwater investigation report pursuant to Rule 15.07 (if such report was required), and any additional information the Director shall require;
 - (2) Proposed method for remediation, to include, but not be limited to, the following:
 - (i) Justification of the ability of the method to meet the remediation objectives;
 - (ii) Design standards and technical specifications for the design and construction of any equipment necessary for the proposed remediation;

- (iii) Diagrams of any piping routes, instrumentation, and process flows;
 - (iv) Proposed plans for the disposal of any products or by-products from the remediation activities;
- (3) Proposed schedule for implementation of the remediation plan; and
- (4) Proposed groundwater monitoring program pursuant to Rule 12.
- (b) The groundwater remediation plan and any associated progress reports shall include the following statements signed by an authorized representative of the party specified:
 - (1) A statement signed by an authorized representative of the person who prepared the groundwater remediation plan certifying, to the best of their knowledge, the accuracy of the information contained in the plan; and
 - (2) A statement signed by the facility owner or operator responsible for the preparation and submittal of the groundwater remediation plan certifying, to the best of their knowledge, that the plan is complete and accurate.

16.07 Approval of Groundwater Remediation: Groundwater remediation activities shall be proposed and implemented by the facility owner or operator, and they shall be done in a manner approved by the Director through the issuance of an order of approval unless otherwise specified by the Director. Emergency response procedures at sites of groundwater pollution or the threat of pollution are exempt from the provisions of this Rule, and such procedures shall be conducted in accordance with other applicable state and federal laws and regulations.

- (a) Upon review of the groundwater remediation plan, the Director shall approve the plan, approve the plan with conditions, require revisions to the plan, or deny approval of the plan based on a determination of the plan's ability to meet the groundwater remediation objectives in Rule 16.04.
- (b) Orders of approval for groundwater remediation shall be valid for a time period specified by the Director.
- (c) Any person transferring ownership or control of a facility having an approved groundwater remediation plan shall notify the Director of such transfer not less than thirty (30) days prior to the effective date of such transfer.
- (d) Implementation of remedial activities approved by the Director does not discharge or otherwise release the facility owner or operator from responsibility for any adverse impacts to public health and the environment caused by pollutants in the groundwater at the site.

RULE 17. GROUNDWATER QUALITY CERTIFICATION

17.01 Applicability: In order to determine compliance with groundwater classification, groundwater quality certification is required for proposed facilities and activities that have an actual or potential adverse impact on groundwater quality, including certain facilities and activities with no designed discharge to groundwater. Groundwater quality certification by the Department's Groundwater Section shall be a requirement for final Department approval of the applications or requests to grant, renew or formally modify the approvals, licenses, certifications, etc. below:

- (a) Department approvals for groundwater remediation plans (including, but not limited to, remediation pursuant to: Rhode Island Regulations for Underground Storage Facilities Used for Petroleum Products and Hazardous Materials, April 1985, and amendments thereto; Rhode Island Rules and Regulations for the Investigation and Remediation of Hazardous Material Releases, as promulgated; federal Comprehensive

Environmental Response, Compensation and Liability Act (42 USC 9601 et seq.); and federal Resource Conservation and Recovery Act (42 USC 6901 et seq.); except where limited by constraints of federal laws;

- (b) Solid waste disposal licenses (Rhode Island Rules and Regulations for Solid Waste Management Facilities, February 1991, and amendments thereto) and operating or closure plans associated with such facilities;
- (c) Hazardous waste treatment, storage, and disposal licenses (Rhode Island Rules and Regulations for Hazardous Waste Generation, Transportation, Treatment, Storage and Disposal, October 1988, and amendments thereto);
- (d) Department approvals for land disposal, land application, and composting of sewage sludge (Rhode Island Rules and Regulations Pertaining to the Treatment, Disposal, Utilization and Transportation of Wastewater Treatment Facility Sludge, March 1991, and amendments thereto);
- (e) Department approvals for individual sewage disposal systems designed to treat ten thousand (10,000) gallons or more per day (Rhode Island Rules and Regulations Establishing Minimum Standards Relating to Location, Design, Construction, and Maintenance of Individual Sewage Disposal Systems, December 1989, and amendments thereto);
- (f) Water quality certification for upland dredge disposal (Rhode Island Water Quality Regulations for Water Pollution Control, October 1988, and amendments thereto); and
- (g) Any other department approval, license, certification, etc. for an industrial, commercial or institutional facility which has a reasonable potential for adversely impacting groundwater quality as determined by the Director.

17.02 Groundwater Quality Certification Review

- (a) The applicant or, at the Department's discretion, a division of the Department shall notify the Department's Groundwater Section in writing of applications or requests for the Department approvals, licenses, certifications, etc. in Rule 17.01(a)-(g).
- (b) The applicant shall provide information necessary for groundwater quality certification review. The review of proposals for groundwater quality certification will initially depend on the information provided to the Department division or section that received the application or request for the approvals, licenses, certifications, etc. listed in Rule 17.01(a)-(g). Additional information may be required in order to adequately review a proposal for groundwater quality certification.
- (c) After reviewing a proposal, the groundwater quality certification shall be approved, denied, or approved with conditions and forwarded to the applicant and the Department division or section that received the application or request for the approval, license, certification, etc. listed in Rule 17.01(a)-(g).
- (d) Failure to obtain groundwater quality certification shall be independent and sufficient grounds for Department denial of the application or request for the approvals, licenses, certifications, etc. listed in Rule 17.01(a)-(g).

17.03 Criteria for Groundwater Quality Certification Approvals: Facility owners or operators that are requesting groundwater quality certification must show by clear, convincing and scientifically valid evidence that:

- (a) There is no substantial likelihood for violation of the groundwater quality standards in Rule 10, except within an approved discharge zone or residual zone pursuant to Rule 13 as a result of the proposed project requiring groundwater quality certification; and

- (b) There is no substantial likelihood for groundwater impacted by the proposed project requiring groundwater quality certification to cause a violation of surface water quality standards established by the Rhode Island Water Quality Regulations for Water Pollution Control, October 1988, and amendments thereto.

17.04 Groundwater Quality Certification for Groundwater Remediation: Groundwater quality certification shall be required for all proposed groundwater remediation plans prepared pursuant to these and other state and federal regulations. Groundwater remediation activities and groundwater remediation plans approved by the Director in writing prior to the effective date of these Rules and Regulations are exempt from the requirement to obtain groundwater quality certification.

- (a) The Director's review of proposed groundwater remediation plans for groundwater quality certification shall be based on the ability of the remediation activities to meet the groundwater remediation objectives in Rule 16.04.
- (b) Proposed termination of groundwater remediation activities and proposed changes in an active groundwater remediation plan that are deemed significant will require groundwater quality certification. Significant changes are defined as:
 - (1) Establishment of a residual zone pursuant to Rule 13;
 - (2) Any change in the operation of remediation activities that will result in pollutant concentrations in groundwater greater than that concentration proposed in the original or most recent groundwater remediation plan; and
 - (3) Any change in the operation of remediation activities that will result in groundwater quality achieving the desired pollutant concentrations over a longer period than what was proposed in the original or most recent groundwater remediation plan.

RULE 18. WELLHEAD PROTECTION

18.01 Delineation of Wellhead Protection Areas: Wellhead protection areas for each public well or wellfield in Rhode Island shall be established by the Department in accordance with one of the following:

- (a) Wellhead protection areas shall be delineated by the Department in accordance with the requirements of the "Rhode Island Wellhead Protection Program," Rhode Island Department of Environmental Management, February 1990, and any amendments thereto;
- (b) A refined wellhead protection area delineated by the Director, or accepted by the Director in accordance with Rule 18.02;
- (c) Where a delineation of a wellhead protection area for a community water supply well in accordance with 18.01(a) or (b) above is not available, the interim wellhead protection area shall be a 2000 foot radius circle surrounding the well, until such time that a delineation in accordance with 18.01(a) or (b) is available; or
- (d) Where a delineation of a wellhead protection area for a non-community water supply well in accordance with 18.01(a) or (b) above is not available, the wellhead protection area shall be a 1750 foot radius circle surrounding the well, until such time that a delineation in accordance with 18.01(a) or (b) is available.

18.02 Refined Wellhead Protection Areas: Refined wellhead protection areas shall be delineated in accordance with the "Rhode Island Wellhead Protection Program," Rhode Island Department of Environmental Management, February 1990, and any amendments thereto. The delineation criteria and criteria thresholds, as described in the "Rhode Island Wellhead Protection Program," shall be adhered to unless otherwise approved by the Director.

- (a) Requests for approval of refined wellhead protection areas shall be submitted in writing to the Director and shall include, at minimum:
 - (1) A map of the well location and proposed refined wellhead protection area using the United States Geological Survey 7.5 minute quadrangle map (scale of 1:24000);
 - (2) Detailed description of the mapping methodology;
 - (3) List of data sources;
 - (4) Detailed description of field methods and results for such activities as pump tests and water table measurements;
 - (5) Detailed description of modelling method, assumptions, results, and principal model input and output values; and
 - (6) Water table map at a scale of 1:24000 used in the refined wellhead protection area mapping;
- (b) Written requests to the Director to designate a refined wellhead protection area shall be accepted from the following entities:
 - (1) Mayor, council president, manager or administrator of the municipality that is the owner of the well;
 - (2) Owner or the chief executive officer, chairman of the board or president of the entity that is the owner of a non-municipal well.
- (c) Additional information may be required by the Director in order to adequately review a proposed refined wellhead protection area.
- (d) After reviewing the proposed refined wellhead protection area, the Director shall accept it, deny it, or accept it with conditions. An accepted refined wellhead protection area delineation will be incorporated into the official wellhead protection map in accordance with Rule 18.03(b) and shall supersede the Director's initial wellhead protection area delineation.

18.03 Wellhead Protection Area Maps:

- (a) The wellhead protection areas shall be delineated on 1:24000 scale maps. The 1:24000 scale maps shall be on file for review at the Rhode Island Department of Environmental Management, Groundwater Section, 291 Promenade Street, Providence, RI 02908. Smaller scale maps may be made available from the Department at the above address. The Director shall establish an appropriate fee, which shall be based on the costs of map reproduction, for copies of the wellhead protection area maps.
- (b) The Director shall periodically initiate rule-making procedures to update the wellhead protection maps to incorporate additional wellhead protection areas and/or delete certain wellhead protection areas.

18.04 Deletion of Wells from the Wellhead Protection Program: Wells and their respective wellhead protection area delineations will be deleted from the Department's Wellhead Protection Program when the Director has determined that the well is no longer serving the purpose of a public well and it is not likely to serve such purpose in the foreseeable future. Such a determination shall be made in a manner consistent with the appropriate elements of the State Guide Plan.

18.05 Wellhead Protection Program Roles and Responsibilities: Consistent with the "Rhode Island Wellhead Protection Program," Rhode Island Department of Environmental Management, February 1990, and any amendments thereto, the Wellhead Protection Program roles and responsibilities shall be assigned as follows:

- (a) The Department of Environmental Management shall:
 - (1) Provide water suppliers and municipalities with wellhead protection area delineations;
 - (2) Provide water suppliers and municipalities with technical assistance on conducting inventories of known and potential sources of groundwater contamination and assistance in the development of local wellhead protection plans;
 - (3) Review and approve, deny, or approve with conditions the inventories of known and potential sources of groundwater pollution and the local wellhead protection plans;
 - (4) Ensure that the local wellhead protection plans are implemented and updated as required;
 - (5) Conduct inventories of known and potential sources of groundwater contamination in accordance with Rule 18.06 within the wellhead protection areas of public wells owned by the state of Rhode Island, with the exception of the wellhead protection areas of the public wells owned or operated by the University of Rhode Island and the RI Port Authority.
- (b) Water suppliers that have a groundwater source(s) of supply and which are subject to the Department's "Rules and Regulations for Water Supply Management Planning," August 1992, and amendments thereto, and the University of Rhode Island shall:
 - (1) Conduct an inventory of known and potential sources of groundwater contamination within their wellhead protection areas in accordance with Rule 18.06; and
 - (2) Prepare a wellhead protection plan in accordance with Rule 18.07.
- (c) Municipalities that have wellhead protection areas within their boundaries shall:
 - (1) Conduct an inventory of known and potential sources of groundwater contamination within the wellhead protection areas in accordance with Rule 18.06, except for those wellhead protection areas addressed by the water suppliers and the University of Rhode Island in Rule 18.05(b) and those wellhead protection areas addressed by the Department in 18.05(a); and
 - (2) Prepare a wellhead protection plan in accordance with Rule 18.07.
- (d) In carrying out the tasks described above, the Director encourages suppliers and municipalities to coordinate their efforts and where practical to conduct regional inventories and prepare regional wellhead protection plans.
- (e) Each supplier and municipality required to conduct a wellhead protection area inventory and prepare a wellhead protection plan shall designate a committee or individual responsible for such inventory and plan and shall notify the Director of this designation.

18.06 Wellhead Protection Area Inventory of Known and Potential Sources of Pollution: An inventory is required to identify known and potential sources of groundwater pollution within the wellhead protection area(s). The results of the inventory will then be used in the determination of the most appropriate management strategies to include in the wellhead protection plan described in Rule 18.07.

- (a) The inventory should be done in accordance with the Rhode Island Department of Environmental Management Guidance Document: "Inventory of Potential Sources of Groundwater Contamination in Wellhead Protection Areas," December 1992, and amendments thereto.
- (b) The results of the wellhead protection area inventory shall be submitted to the Groundwater Section on maps and in a summary report in accordance with the following schedule:

- (1) Water suppliers that have a groundwater source(s) of supply and which are subject to the Department's "Rules and Regulations for Water Supply Management Planning," August 1992, and amendments thereto, shall submit a wellhead protection area inventory in accordance with the schedule for the water supply management plans promulgated in the "Rules and Regulations for Water Supply Management Planning." This schedule is reiterated below:

Pawtucket Water Supply Board	October 1, 1993
Wakefield Water Company	October 1, 1993
Kingston Water District	November 1, 1993
South Kingstown(*)	November 1, 1993
North Kingstown(*)	November 1, 1993
Rhode Island Port Authority	November 1, 1993
Kent County Water Authority	February 1, 1994
Lincoln Water Commission	March 1, 1994
Cumberland(*)	March 1, 1994
Bristol County Water Authority	April 1, 1994
Pascoag Fire District	April 1, 1994
Harrisville Fire District	April 1, 1994
Westerly(*)	June 1, 1994
(*) These entities represent public water systems owned and operated by municipal governments.	

- (2) The University of Rhode Island shall submit a wellhead protection area inventory to the Department by September 30, 1996.
- (3) Municipalities with wellhead protection areas shall submit a wellhead protection area inventory to the Department by October 31, 1994.
- (4) Individual requests for a six month extension of this deadline for completion of all or part of the inventory will be considered by the Director.
- (c) Once an inventory is submitted to the Director, the Director shall approve it, deny it or approve it with conditions. In order for an inventory to be approved by the Director, the Director must determine that the methods used to conduct the inventory and the resulting maps and summary reports have sufficiently identified and characterized the threats to groundwater quality within the wellhead protection area.
- (d) The wellhead protection area inventory shall be updated and submitted to the Director for approval at least once every five years. The inventory shall at minimum address all community and non-transient non-community water supply system wellhead protection areas. The purpose of this inventory update is to:
- (1) Conduct an inventory within wellhead protection areas that were not delineated at the time of the previous inventory; and
- (2) Identify new facilities and activities and changes in existing facilities that have the potential to cause groundwater pollution in wellhead protection areas that were previously inventoried.
- (e) If a water supplier subject to the Department's "Rules and Regulations for Water Supply Management Planning," August 1992, and any amendments thereto, or the University of Rhode Island activates a new well as part of its system, a wellhead protection area inventory for this new well shall be submitted to the Director within one year after the Director provides the supplier or the University with the Department's wellhead protection area delineation for this well.

18.07 Wellhead Protection Plan:

- (a) A wellhead protection plan, prepared in accordance with the "Rhode Island Wellhead Protection Program," February 1990, and any amendments or guidance documents thereto, shall be developed to identify workable management strategies to protect groundwater quality within the wellhead protection areas. The plan shall be submitted to the Department's Groundwater Section by:
 - (1) Water suppliers that have a groundwater source(s) of supply and which are subject to the Department's "Rules and Regulations for Water Supply Management Planning," August 1992, and amendments thereto, and the University of Rhode Island shall prepare a wellhead protection plan outlining strategies under their authority to protect groundwater quality within their wellhead protection areas.
 - (2) Except as otherwise noted in Rule 18.07(a)(3), municipalities that have wellhead protection areas within their municipal boundaries, as designated on the map referenced in Rule 18.03, shall each submit one wellhead protection plan that outlines municipal government strategies for protecting groundwater quality within the wellhead protection areas in the municipality, including the following:
 - (i) Wellhead protection areas for wells of water suppliers subject to the Department's "Rules and Regulations for Water Supply Management Planning," August 1992, and amendments thereto; and
 - (ii) Wellhead protection areas for all other community and non-community public water systems that are wholly or partially within the boundaries of the municipality.
 - (3) The Director may waive the requirement for a municipality to submit a local wellhead protection plan provided that the municipality, as determined by the Director, meets the following criteria:
 - (i) The community comprehensive plan, prepared pursuant to the Rhode Island Comprehensive Planning and Land Use Act (Chapter 22.2, Rhode Island General Laws of 1956, as amended) adequately characterizes the use of groundwater in the community and specifies policies to protect groundwater resources; and
 - (ii) There are no community water system wellhead protection areas in the municipality.
- (b) The wellhead protection plan shall be submitted to the Department in accordance with the following schedule:
 - (1) Water suppliers as described above in Rule 18.07(a)(1) and the University of Rhode Island shall submit a wellhead protection plan by June 30, 1997.
 - (2) Municipalities shall submit a wellhead protection plan by October 31, 1997.
 - (3) Individual requests for a six month extension of this deadline will be considered by the Director.
- (c) The wellhead protection plan shall, at minimum, consist of:
 - (1) An evaluation of the groundwater quality within the wellhead protection area(s) based on available groundwater quality data from the well(s) and based on the presence of known and potential sources of pollution as identified in the inventory required in Rule 18.06;

- (2) A description of present and past efforts to protect groundwater quality, both regulatory and non-regulatory (e.g., public education, land acquisition);
 - (3) Identification of the protection strategies determined to be most appropriate for protecting groundwater quality within the wellhead protection area(s), given the unique circumstances of the municipality or the supplier that is preparing the wellhead protection plan, which shall include, at minimum, a strategy for public education that fosters groundwater protection;
 - (4) Implementation approach for each protection strategy identified above in 18.07(c)(3), including, but not limited to, problems that may be encountered and how they will be resolved, and a five year schedule of activities for implementation; and
 - (5) Efforts to coordinate implementation of the plan between municipal governments and water suppliers and between neighboring municipalities, where applicable;
- (d) Prior to submission of the wellhead protection plan to the Director, the plan shall be approved and endorsed in accordance with the following:
- (1) A wellhead protection plan prepared by or at the request of an office or department of a municipal government shall be approved and endorsed by the town or city council;
 - (2) A wellhead protection plan prepared by or at the request of a non-municipal water supplier shall be approved and endorsed by the governing body of such water supplier.
- (e) Once a wellhead protection plan is submitted to the Director, the Director shall approve it, deny it or approve it with conditions. In order for a plan to be approved by the Director, the Director must determine that:
- (1) There is a substantial likelihood that implementation of the plan will result in an increased level of groundwater protection in the wellhead protection area; and
 - (2) The pollution sources identified in the inventory required in Rule 18.06 will be addressed in a manner that will minimize the threat they pose to groundwater quality in the wellhead protection area(s).
- (f) The wellhead protection plan shall be updated and submitted to the Director for approval at least once every five years.
- (g) If a water supplier subject to the Department's "Rules and Regulations for Water Supply Management Planning," (August 1992), and any amendments thereto, or the University of Rhode Island activates a new well as part of its system, the wellhead protection plan shall be amended to include the new well in its protection strategies. This amended plan shall be submitted to the Director within two years after the Director provides the supplier or the University with the Department's wellhead protection area delineation for this well.
- (h) Municipalities and those suppliers described in Rule 18.07(a)(1) and (2) shall respond to a wellhead protection plan implementation survey distributed periodically by the Director to collect information that will be used by the Director to meet federal reporting requirements.

RULE 19. VARIANCES

19.01 Variance Requests: A facility owner or operator may submit a written request to the Director for a variance from any of the provisions of these Rules and Regulations. Such request for a variance shall include at a minimum:

- (a) Name and address of the facility owner or operator, and the name and location of the facility for which the owner or operator seeks a variance;
- (b) A list of the names and addresses of the owners and tenants of all properties that abut the facility;
- (c) Identification of the specific Rule or Rules from which a variance is requested;
- (d) A statement of the reasons for which the facility owner or operator seeks a variance. This statement shall specify the reasons that the facility owner or operator is unable to comply with these Rules and Regulations, why a variance is necessary, and the reasons why a hardship is alleged. The person seeking the variance should separately and by number list each reason and any other mitigating factors he believes the Director should consider; and
- (e) An explanation that the alternative procedures requested are substantially equivalent to the Rules and Regulations herein in achieving protection of the public health and the environment.

19.02 Variance Decisions

- (a) The Director may issue a variance under this Rule when the facility owner or operator proves by clear, convincing and scientifically valid evidence that:
 - (1) Compliance with these Rules and Regulations would cause unreasonable or undue hardship;
 - (2) The issuance of the variance will have no adverse effect on public health and the environment; and
 - (3) The alternative procedures requested are substantially equivalent to the Rules and Regulations herein in achieving protection of the public health and the environment.
- (b) If the Director determines that there is widespread public interest or that the variance request raises major issues that could affect other facilities, then the Director may schedule a public hearing to solicit public comment prior to rendering a decision on the variance request.
- (c) The Director's decision to grant or deny a variance shall be in writing and may, as a condition of granting the variance, impose appropriate requirements necessary to protect the public health and the environment.

RULE 20. ENFORCEMENT

20.01 Where the Director has reason to believe that a violation of any part of the Rules and Regulations herein has occurred, the Director may issue a notice of violation and/or immediate compliance order pursuant to Chapter 42-17.1 of the Rhode Island General Laws of 1956, as amended.

20.02 For violations that are of a continuing nature, each and every day that the violation exists shall constitute a separate and distinct violation.

RULE 21. APPEALS

Any person affected by a decision of the Director pursuant to these Rules and Regulations may, in accordance with the

Administrative Rules of Practice and Procedure for the Department of Environmental Management, file a claim for an adjudicatory hearing to review the decision. The party appealing a Department decision bears the burden of proving that their application complies with all requirements of the Rules and Regulations herein.

RULE 22. SUPERSEDED REGULATIONS

- 22.01 Effective June 18, 1992, Rule 9.03 (Monitoring Well Abandonment) of the Rules and Regulations Governing the Enforcement of Chapter 46-13.2 Relating to the Drilling of Drinking Water Wells, filed with the Secretary of State December 15, 1989, is hereby revoked and superseded by section 9.0 of Appendix 1 of the Rules and Regulations herein.
- 22.02 On the effective date of these Rules and Regulations, all previous Rules and Regulations, and any policies regarding the administration and enforcement of the Groundwater Protection Act (Rhode Island General Laws, Chapter 46-13.1) shall be superseded. However, any enforcement action taken by, or application submitted to, the Department prior to the effective date of these Rules and Regulations shall be governed by the Rules and Regulations in effect at the time the enforcement action was taken, or application filed.

RULE 23. PENALTIES

Penalties will be assessed in accordance with the Department's Rules and Regulations for the Assessment of Administrative Penalties for any violation of these Rules and Regulations.

APPENDIX 1

Required Monitoring Well Construction Standards and Abandonment Procedures

- 1.0 Purpose: to provide minimum standards for; (a) the procurement of samples representative of groundwater; and (b) abandonment procedures for removing the vertical conduit to groundwater.
- 2.0 Applicability: The monitoring well construction standards herein apply to all permanent monitoring wells installed pursuant to these regulations. Pursuant to Rule 12.02 of these regulations, wells installed at the direction of other programs are exempt from Rules 4.0 through 12.0 of this Appendix. A monitoring well is designated permanent if it exists for more than 180 days. Rule 13 of this Appendix on monitoring well abandonment applies to all permanent and non-permanent monitoring wells subject to these regulations. Rule 13 also applies to those piezometers where improper abandonment would result in a reasonable likelihood of groundwater pollution. Additional requirements may be specified by the Director.
- 3.0 Prevention of Groundwater Pollution: During well construction and abandonment, every appropriate precaution shall be taken to prevent introducing pollutants into the groundwater. This shall include, but not be limited to, steam cleaning and washing of drilling equipment and proper cleaning and storage of well casing. Only potable water shall be used in well construction and abandonment unless otherwise approved by the Director.
- 4.0 Construction and Abandonment Standards: The procedures described in this Appendix incorporate minimum standards. The Director may waive the requirements and allow deviation from these procedures where such deviations are necessary to procure representative groundwater samples. All deviations from the procedures shall be documented and provided to the Director. If the Director determines that the deviation from these procedures will not or does not result in the procurement of samples representative of groundwater, the Director may require the installation of a new monitoring well.
- 5.0 Well Casing: All permanent groundwater monitoring wells shall be constructed of PVC well casing material. All casing shall have a minimum inside diameter of 2.0 inches. Monitoring wells constructed in unconsolidated material less than 100 feet in depth shall be constructed using a minimum of schedule 40 PVC. Wells greater than 100 feet shall be constructed using a minimum of schedule 80 PVC.
- 5.1 Assembly and Installation: All casing shall be constructed of flush threaded joints or threaded coupling joints. All joints shall be fitted with an "O" ring or wrapped with teflon tape. Solvent welded joints are not permissible without prior written permission of the Director.
- 5.2 Exceptions: The Director may allow alternate well casing material if the pollutant concentrations or geologic setting require an alternative construction. Alternative materials include but are not limited to: (a) Teflon; (b) stainless steel; or (c) uncoated or galvanized steel.
- 6.0 Well Screen: The well screen slot size shall retain at least 90% of the grain size of a filter pack or at least 60% of the grain size of the collapsed formation. Well screens on wells and piezometers shall not exceed the length necessary to collect a representative groundwater sample or to determine water table elevation. Well screens shall be factory slotted. A bottom cap and sump sediment trap shall be installed.
- 7.0 Filter Pack: The filter pack shall be chemically inert, well rounded and well sorted glass beads or silica-based sand or gravel of uniform grain size. The filter pack must minimize the amount of fine material entering the well and shall not inhibit the flow of water into the well. The filter pack shall extend a minimum of one foot, but no more than 5 feet above the well screen. The filter pack shall not pollute groundwater.

8.0 Sealing Requirements

- 8.1 Filter Pack Seal: All monitoring wells installed with a filter pack shall be constructed with a filter pack seal, such as bentonite flakes or pellets. The seal shall extend to approximately one foot above the filter pack and shall be properly hydrated.
- 8.2 Annular Space Seal: All monitoring wells shall be installed with an annular space seal that has a permeability of 1×10^{-7} centimeters per second or less. Materials that meet this criterion include but are not limited to neat cement grout and cement-bentonite grout. The annular space seal shall extend to the ground surface seal, except where a road box meeting the requirements of Rule 10.0 of this Appendix is used.
- 8.3 Ground Surface Seal: All monitoring wells shall be constructed with a continuous pour concrete ground surface seal. To avoid frost heaving and to anchor the well, the ground surface seal shall extend to a minimum of 40 inches below the land surface, unless the well meets one of the requirements of the exemption described in Rule 8.4 of this Appendix. The ground surface seal shall be flared such that the diameter at the top is greater than the diameter at the bottom. The top of the ground surface seal shall be sloped away from the well casing and shall be imprinted with the designation of the monitoring well.

8.4 Exemption from 40 Inch Ground Surface Seal Requirement: As stated in Rule 8.3 of this Appendix, the ground surface seal shall extend at least 40 inches down the hole from the land surface. Exemptions from this rule are limited to the following circumstances: 1) where the seal would interfere with proper placement or functioning of the well screen; and 2) where a road box is used and sand is placed inside and directly below the road box in such a way as to ensure that any seepage into the road box drains away from the well.

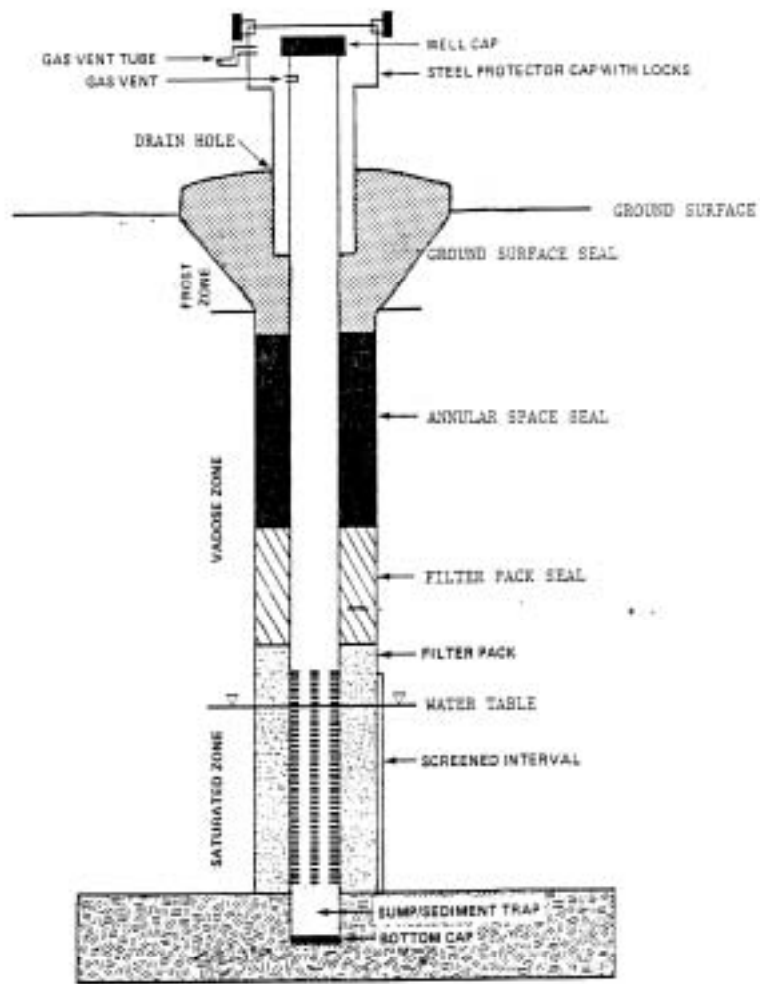
- 9.0 Protective Cover Pipe: The protective pipe shall consist of a minimum 4 inch diameter metal casing with locking cap. The protective pipe shall extend from the bottom of the ground surface seal to a minimum of 24 inches above the land surface. There shall be no more than 4 inches between the top of the well casing and the top of the protective pipe. The monitoring well designation shall be indicated clearly on the protective cover pipe. A gas vent and a drain hole shall be installed. A high visibility guard post to prevent destruction of the well may be required. The Director may request additional protective devices as necessary.
- 10.0 Road Box: Road boxes are acceptable in locations where protective cover pipes are not suitable. All road boxes shall be secured and water tight and prevent easy access to the well. The well shall be fitted with a locking, water tight cap. The ground surface seal for the road box shall be competent such that vehicle traffic will not cause it to fail. The annular space seal shall extend upward to within one foot of the ground surface seal. One or two feet of permeable material may be emplaced between the ground surface seal and the annular space seal in order to allow for the drainage of runoff which may leak into the road box from the ground surface.
- 11.0 Well Development: Development of all monitoring wells shall be performed no earlier than 48 hours after completion and before the initial water quality samples are taken. The goal of well development is to produce water free of fine sand, coarser material, drill cuttings, and drilling fluids. The formation shall be allowed to stabilize for at least 24 hours before groundwater sampling.
- 12.0 Innovative Well Installation: Innovative wells, including but not limited to Microwells or Geoprobes, that are small-diameter and are non-destructive to the formation, and which are capable of providing samples representative of groundwater, need not meet the construction requirements set forth in Rules 4.0 through 11.0 of this Appendix.
- 13.0 Monitoring Well and Piezometer Abandonment:

- 13.1 General:

- (a): All monitoring wells and applicable piezometers as described in Rule 1.0 of this Appendix that are no longer used to gather information on geologic or groundwater properties shall be abandoned pursuant to the provisions of Rule 13.2 of this Appendix. Well abandonment shall take place within 60 days after its use has been terminated, unless a written exemption is received from the Director for continued use.
- (b) Innovative wells: Innovative wells as described in Rule 12.0 of this Appendix shall be abandoned at the end of use in order to remove the conduit to groundwater. Abandonment of innovative wells shall consist of removal of the well and grouting of the borehole. Innovative wells are exempted from the abandonment procedures described in Rule 13.2 of this Appendix.

13.2 Abandonment Procedures: The well shall be inspected from the land surface through the entire depth of the well before it is sealed to ensure against the presence of any obstructions that will interfere with sealing operations.

- (a) Wells constructed with an impermeable annular seal shall be abandoned by cutting off the casing a minimum of 4 feet below land surface. The remaining casing shall be completely filled with a neat cement grout or bentonite-cement grout. The remaining hole volume shall be backfilled with natural material, with the following exception: where backfilling with natural material would result in a grout plug less than 4 feet long, the hole shall be filled to approximately one foot from the ground surface with the neat cement grout or bentonite-cement grout.
- (b) Wells not known to be constructed with an impermeable annular seal shall be abandoned by completely removing the well casing and sealing with neat cement or bentonite-cement grout to approximately one foot from the ground surface. If the casing cannot be removed during the abandonment of a well, the casing shall be thoroughly ripped or perforated from top to bottom, except that perforations will not be required over intervals of the well that are sealed with cement. The screened portion of the well and the annular space between the casing and the drillhole wall shall be effectively and completely filled with cement or bentonite-cement grout applied under pressure.



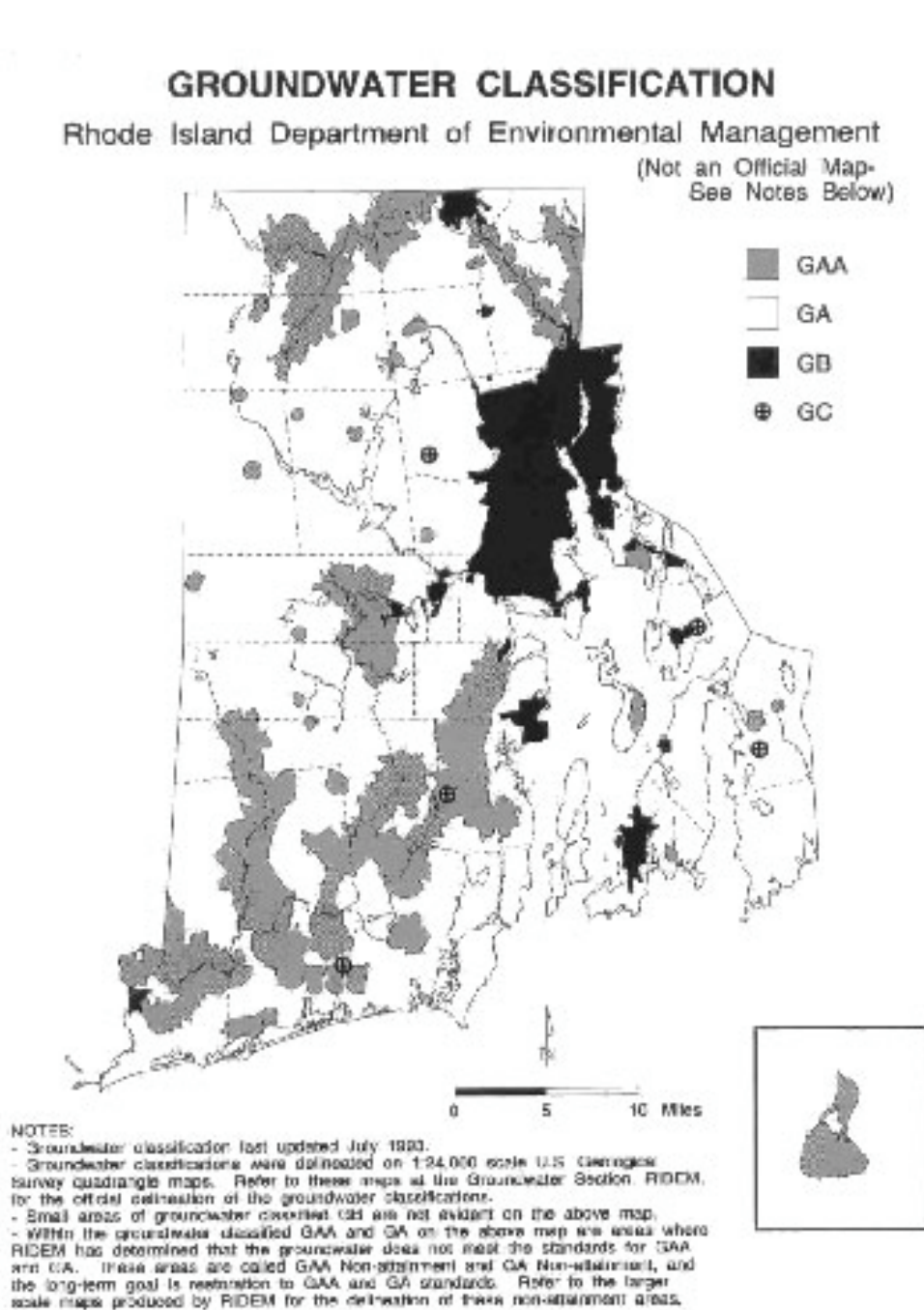
CROSS-SECTION OF TYPICAL MONITORING WELL

After US EPA, 1986, RCRA Groundwater Monitoring Technical Enforcement Guidance Document

APPENDIX 2

Groundwater Classification Map (8.5" x 11")

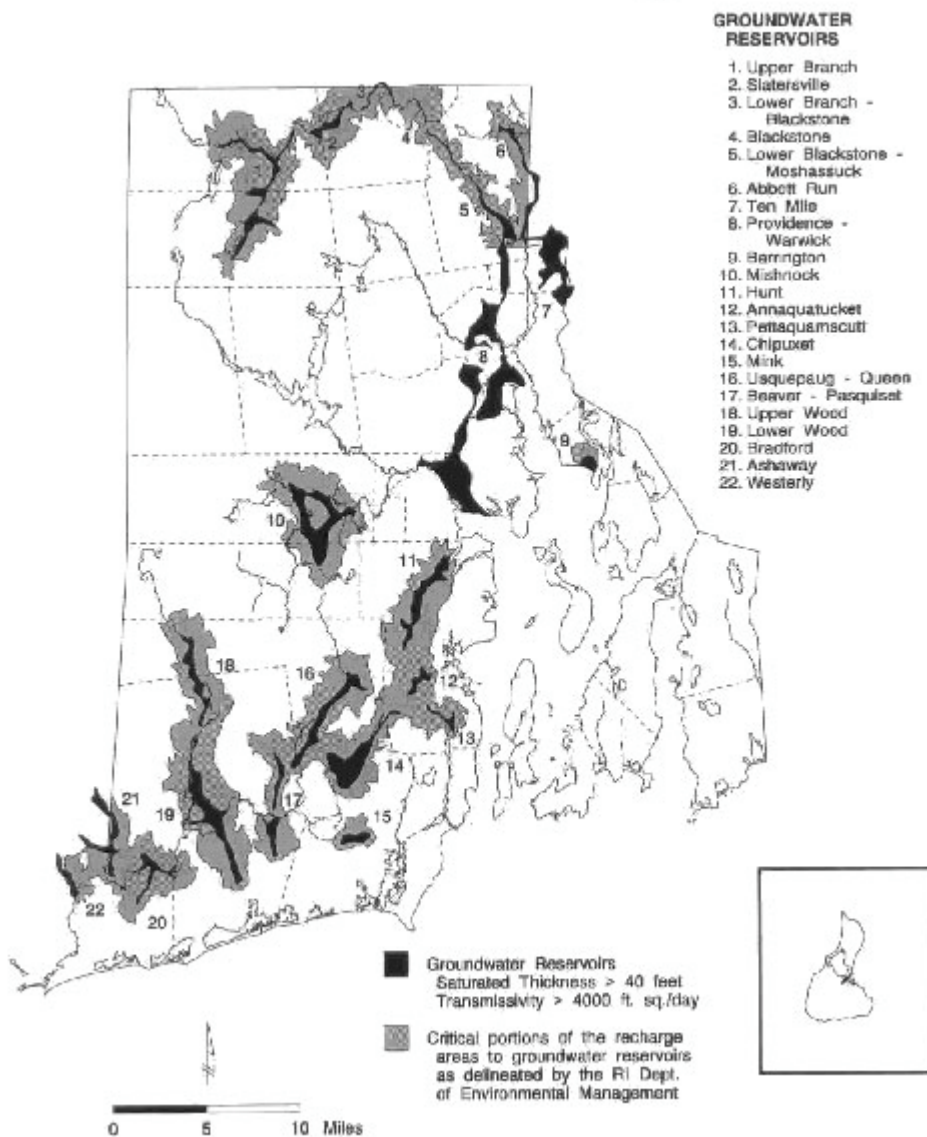
Note: This is a generalized, unofficial map of the groundwater classifications. The official delineations were done at the 1:24,000 scale using the United States Geological Survey 7.5 minute quadrangle maps. These delineations are on file at the office of the Department's Groundwater Section.



APPENDIX 3

Map of Groundwater Reservoirs and the Critical Portions of Their Recharge Areas (8.5" x 11")

Groundwater Reservoirs and the Critical Portions of Their Recharge Areas

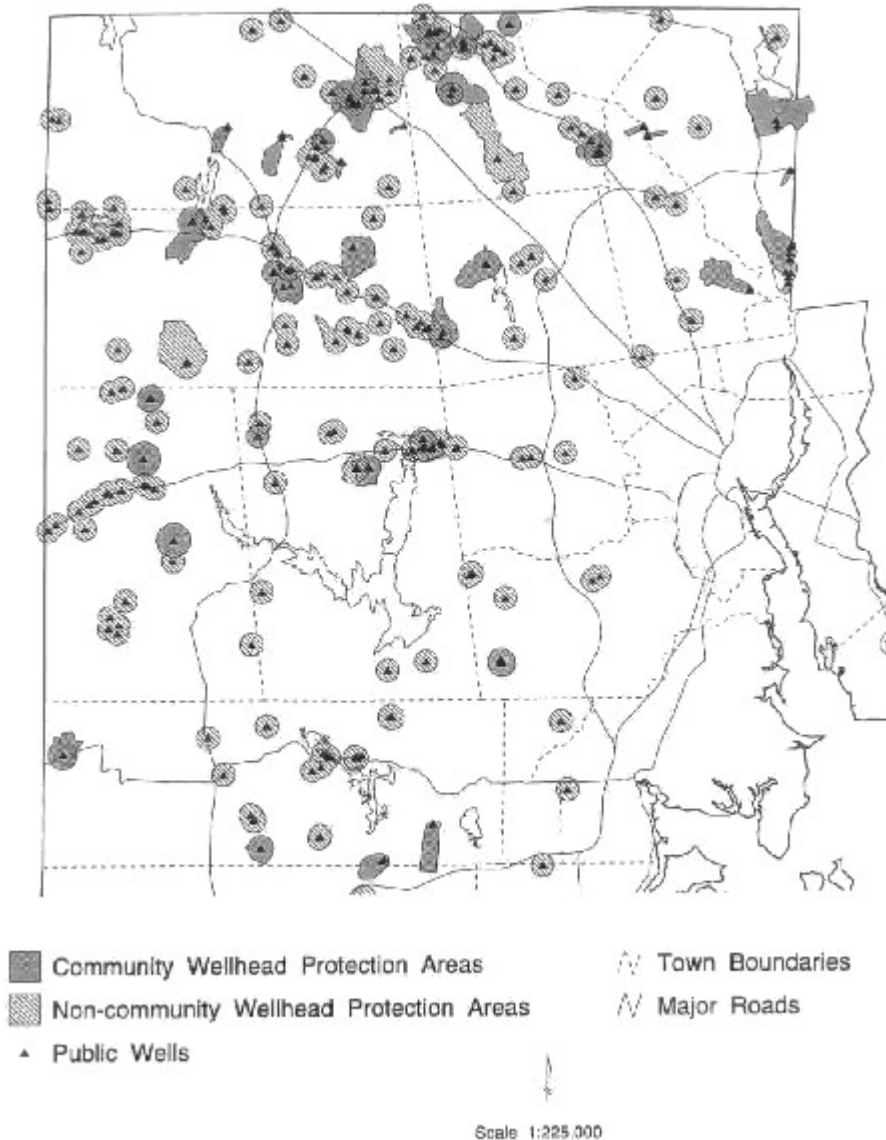


APPENDIX 4:

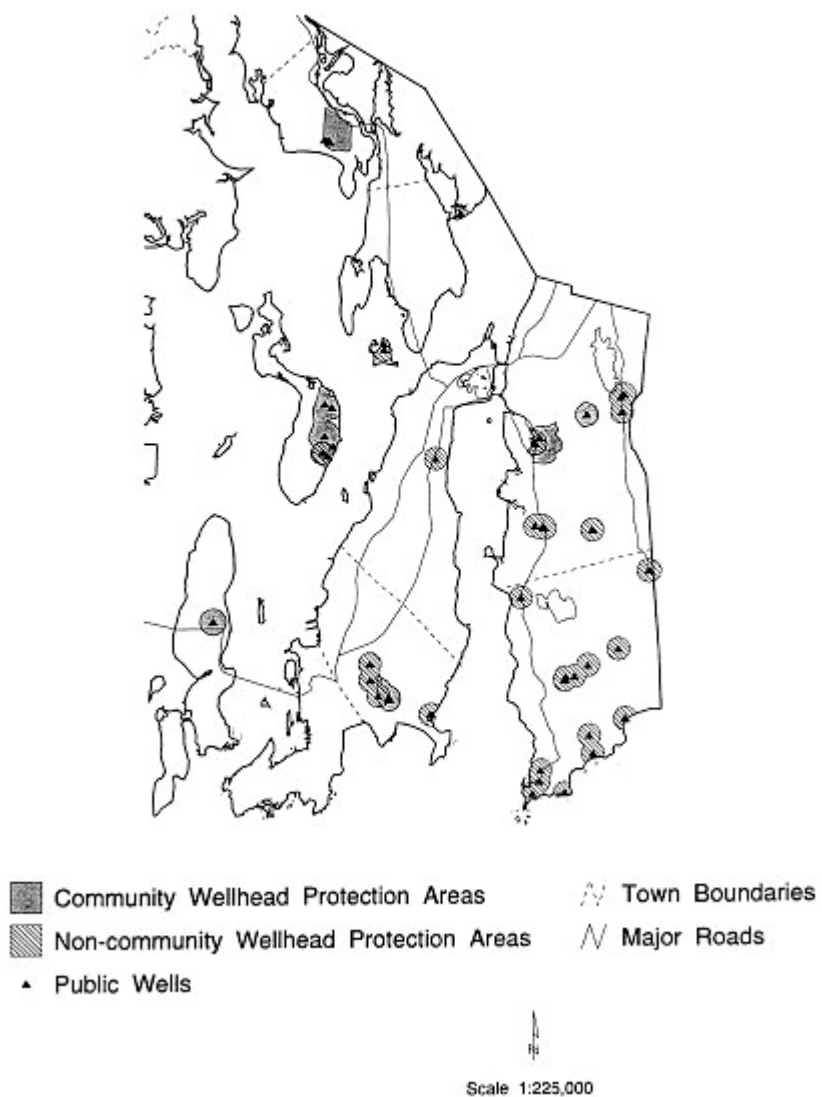
Maps of Wellhead Protection Areas in Rhode Island Northern, Eastern and Southern Rhode Island (8.5" x 11")

Note: The official wellhead protection area delineations were done at 1:24,000 scale using the United States Geological Survey 7.5 minute quadrangle maps. These delineations are on file at the office of the Department's Groundwater Section.

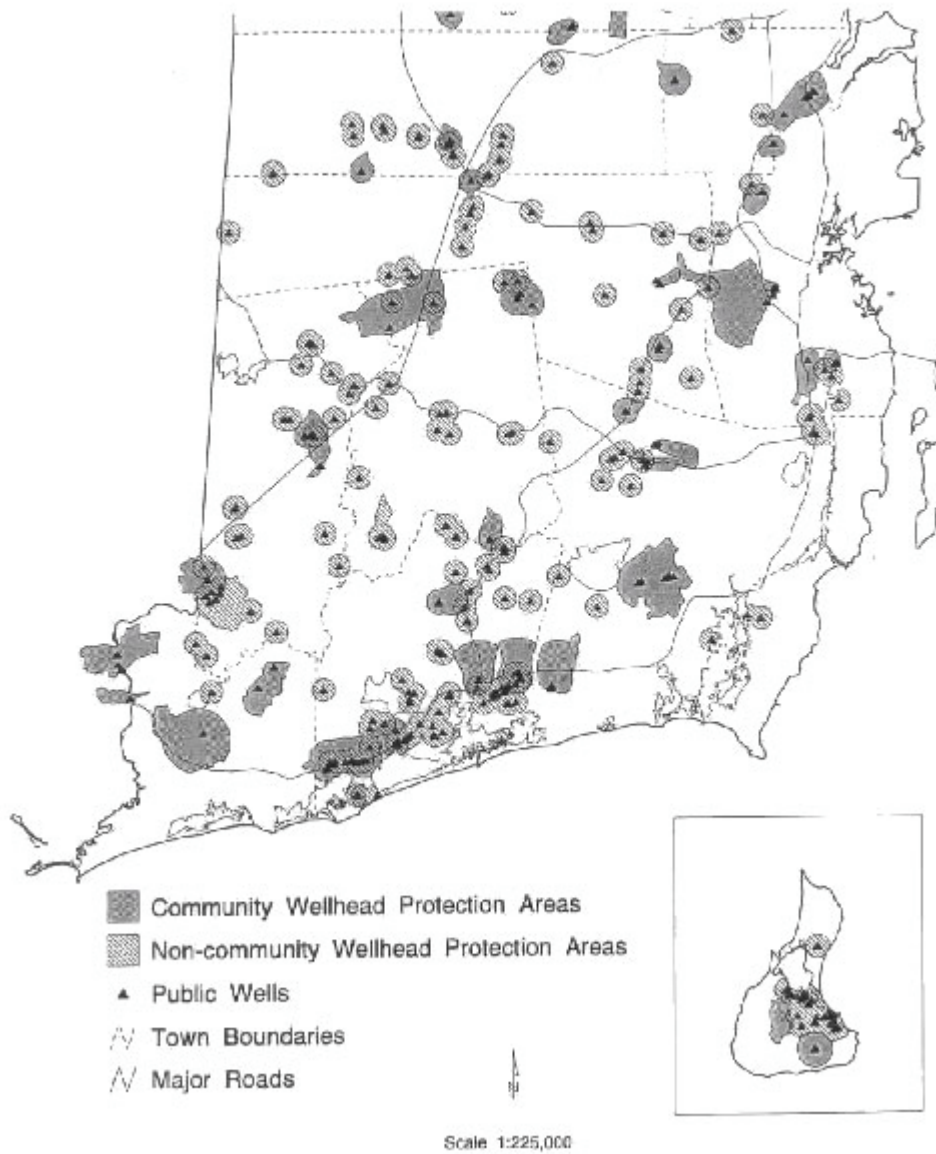
Wellhead Protection Areas in Northern Rhode Island



Wellhead Protection Areas in Eastern Rhode Island



Wellhead Protection Areas in Southern Rhode Island



RULE 24. EFFECTIVE DATE

The foregoing " Rules and Regulations for Groundwater Quality", after due notice, are hereby adopted and filed with the Secretary of State this _____ day of _____, 1996 to become effective twenty (20) days thereafter, in accordance with the provisions of Chapters 42-35, 42-17.1, 42-17.6, 46-12, 46-13.1, 23-18.9, and 23-19.1 of the General Laws of Rhode Island, 1956, as amended.

Timothy R. E. Keeney, Director
Department of Environmental Management

Notice given on: May 2, 1996

Filing date: _____

Effective date: _____