WEST VIRGINIA SECRETARY OF STATE

MAC WARNER

ADMINISTRATIVE LAW DIVISION

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Office of West Virginia
Secretary Of State

NOTICE OF PUBLIC COMMENT PERIOD

AGENCY: Water Resources Division Of Water And Waste Management

TITLE-SERIES: 47-13

RULE TYPE: Legislative

Amendment to Existing Rule: Yes

Repeal of existing rule: No

RULE NAME: UNDERGROUND INJECTION CONTROL

CITE STATUTORY AUTHORITY: W. Va. Code §22-11-8(B)(7)

COMMENTS LIMITED TO:

Oral and Written

DATE OF PUBLIC HEARING: 07/18/2023 5:30 PM

LOCATION OF PUBLIC HEARING:

Coopers Rock Conference Hall, WV Department of Environmental Protection, 601 57th Street SE., Charleston, WV 25304

DATE WRITTEN COMMENT PERIOD ENDS: 07/18/2023 6:00 PM

COMMENTS MAY BE MAILED OR EMAILED TO:

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PLEASE INDICATE IF THIS FILING INCLUDES:

RELEVANT FEDERAL STATUTES OR REGULATIONS: No

(IF YES, PLEASE UPLOAD IN THE SUPPORTING DOCUMENTS FIELD)

INCORPORATED BY REFERENCE: No

(IF YES, PLEASE UPLOAD IN THE SUPPORTING DOCUMENTS FIELD)

PROVIDE A BRIEF SUMMARY OF THE CONTENT OF THE RULE:

In this revision to the Underground Injection Control Rule, WVDEP has proposed to update and formalize current requirements to better ensure consistency with federal regulations. These rules set forth criteria and standards for the requirements which apply to the State Underground Injection Control Program (U.I.C.). The UIC permit program regulates underground injections by six (6) classes of wells. The six (6) classes of wells are set forth in section 4 of this rule. All owners or operators of these injection wells must be authorized either by permit or rule by the Director.

SUMMARIZE IN A CLEAR AND CONCISE MANNER CONTENTS OF CHANGES IN THE RULE AND A STATEMENT OF CIRCUMSTANCES REQUIRING THE RULE:

PROPOSED CHANGES TO UIC RULE 47CSR13:
The current rule addresses six classifications of Injection Wells. The changes affect all six types.
Class 1 wells are for disposal of hazardous wastes.
Class 2 wells are for injecting fluids associated with oil and gas production.
Class 3 wells are used to inject fluids to dissolve and extract minerals.
Class 4 wells Radioactive wells that dont meet the criteria for a Class 1 are considered Class 4, but Class 4 are no longer allowed under federal rule.
Class 5 wells are shallow wells and are not Class 1-4 or 6.
Class 6 wells are for carbon capture and sequestration.
Proposed changes to Class 1-6 wells are to update and formalize current requirements to better ensure consistency with federal regulations.

STATEMENT OF CIRCUMSTANCES WHICH REQUIRE THE RULE:
West Virginia currently has primary enforcement authority for underground injection control. The rule must be updated to maintain primacy from the EPA. Also, West Virginia intends to apply for primacy over carbon capture and sequestration wells, which are currently managed by the EPA.

SUMMARIZE IN A CLEAR AND CONCISE MANNER THE OVERALL ECONOMIC IMPACT OF THE PROPOSED RULE:

A. ECONOMIC IMPACT ON REVENUES OF STATE GOVERNMENT:

None

B. ECONOMIC IMPACT ON SPECIAL REVENUE ACCOUNTS:

None

C. ECONOMIC IMPACT OF THE RULE ON THE STATE OR ITS RESIDENTS:

None

D. FISCAL NOTE DETAIL:

Effect of Proposal	Fiscal Year		
	2023 Increase/Decrease (use "-")	2024 Increase/Decrease (use "-")	Fiscal Year (Upon Full Implementation)
1. Estimated Total Cost	0	0	0
Personal Services	0	0	0
Current Expenses	0	0	0
Repairs and Alterations	0	0	0
Assets	0	0	0
Other	0	0	0
2. Estimated Total Revenues	0	0	0

E. EXPLANATION OF ABOVE ESTIMATES (INCLUDING LONG-RANGE EFFECT):

None

BY CHOOSING 'YES', I ATTEST THAT THE PREVIOUS STATEMENT IS TRUE AND CORRECT.

Yes
Jason E Wandling -- By my signature, I certify that I am the person authorized to file legislative rules, in accordance with West Virginia Code §29A-3-11 and §39A-3-2.

TITLE 47
LEGISLATIVE RULE
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER RESOURCES

SERIES 13
UNDERGROUND INJECTION CONTROL

§47-13-1. General.

1.1. Scope. -- These rules set forth criteria and standards for the requirements which apply to the State Underground Injection Control Program (U.I.C.). The UIC permit program regulates underground injections by six (6) classes of wells. The six (6) classes of wells are set forth in section 4 of this rule. All owners or operators of these injection wells must be authorized either by permit or rule by the Director.

~~a~~1.1.1. Specific inclusions. The following wells are included among those types of injection activities which are covered by the UIC rules (this list is not intended to be exclusive but is for clarification only):

~~b~~1.1.2. Any dug hole or well that is deeper than its largest surface dimension, where the principal function of the hole is emplacement of fluids.

~~c~~1.1.3. Any septic tank or cesspool used by generators of hazardous waste, or by owners or operators of hazardous waste management facilities, to dispose of fluids containing hazardous waste.

~~d~~1.1.4. Any septic tank, cesspool, or other well used by multiple dwelling, community, or regional system for the injection of waste.

~~e~~1.1.5. Specific exclusions. The following are not covered by this rule:

~~e.1~~1.1.5.a. Individual or single family residential waste disposal systems such as domestic cesspools or septic systems.

~~e.2~~1.1.5.b. Any dug hole which is not used for emplacement of fluids underground.

~~e.3~~1.1.5.c. Nonresidential cesspools, septic systems or similar waste disposal systems if such systems are used solely for the disposal of sanitary wastes and have the capacity to serve fewer than twenty (20) persons a day.

~~e~~41.1.5.d. Injection wells are used for injection of hydrocarbons which are of pipeline quality and are gases at standard temperature and pressure for the purpose of storage.

NOTE: The specification of exclusions under subdivision 1.1.~~e~~5 of this section shall not relieve any person of any requirements imposed under the State Act and rules, other than this Series, including State permit requirements.

NOTE: Interim Status under RCRA for Class 1 Hazardous Waste Injection Wells. The minimum national standards which define acceptable injection of hazardous waste during the period of interim status under RCRA are set out in the applicable provisions of 40 CFR parts 144, 146, 147, and 40 CFR section 265.430. A UIC permit does not automatically terminate upon issuance to that well of a RCRA

permit-by-rule under 40 CFR section 270.60(b). Thus, until a Class I well injecting hazardous waste receives a RCRA permit or permit-by-rule, the well's interim status requirements are the applicable requirements imposed pursuant to 40 CFR parts 144, 146, 147 and 40 CFR part 265, including any requirements imposed in the UIC permit.

1.2. Authority -- W. Va. Code §22-11-8(B)(7).

1.3. Filing Date -- ~~March 9, 2022~~.

1.4. Effective Date -- ~~March 9, 2022~~.

1.5. Sunset Provision – This rule is not subject to a sunset provision and does not expire.

§47-13-2. Definitions.

The definitions set forth in W. Va. Code §22-11-3 shall apply to this rule along with the following definitions unless the context clearly indicates otherwise:

2.1. "Abandoned well" means a well whose use has been permanently discontinued or which is in a state of disrepair such that it cannot be used for its intended purpose or for observation purposes.

2.2. "Acidizing" means the injection of acid through the borehole or "well" into a "formation" to increase permeability and porosity by dissolving the acid-soluble portion of the rock constituents.

2.3. "Application" means the State standard forms for applying for a permit or permit modification, including any additions, revisions or modifications to the forms.

2.4. "Aquifer" means a geological "formation", group of formations, or part of a formation that is capable of yielding a usable amount of water to a well or spring.

2.5. "Area of review" means the area surrounding an injection well described according to the criteria set forth in subsection 5.2, or in the case of an area permit, the project area plus a circumscribing area the width of which is either 1/4 of a mile or a number calculated according to the criteria set forth in subsection 5.3.

~~a~~2.5.1. For Class 6 well types, "area of review" means the region surrounding the geologic sequestration project where underground sources of drinking water (USDWs) may be endangered by the injection activity. The area of review is delineated using computational modeling that accounts for the physical and chemical properties of all phases of the injected carbon dioxide stream and displaced fluids, and is based on available site characterization, monitoring, and operational data as set forth in section 5.4.

2.6. "Authorized representatives of the Director" means the personnel of the Division of Water and Waste Management, Division of Mining and Reclamation, and the personnel of the Office of Oil and Gas and the Commissioner.

2.7. "Carbon dioxide plume" means the extent underground, in three dimensions, of an injected carbon dioxide stream.

2.8. "Carbon dioxide stream" means carbon dioxide that has been captured from an emission source (e.g., a power plant), plus incidental associated substances derived from the source materials and the capture process, and any substances added to the stream to enable or improve the injection process. This subpart

does not apply to any carbon dioxide stream that meets the definition of a hazardous waste under 40 CFR part 261.

2.9. "Casing" means a pipe or tubing of appropriate material, of varying diameter and weight, lowered into a borehole during or after drilling in order to support the sides of the hole and thus prevent the walls from caving, to prevent loss of drilling mud into porous ground, or to prevent water, gas, or other fluid from entering or leaving the hole.

2.10. "Catastrophic collapse" means the sudden and utter failure of overlying "strata" caused by removal of underlying materials.

2.11. "Cementing" means the operation whereby a cement slurry is pumped into a drilled hole and/or forced behind the casing.

2.12. "Commissioner" means the Commissioner of the West Virginia Oil and Gas Conservation Commission.

2.13. "Confining bed" means a body of impermeable or distinctly less permeable material stratigraphically adjacent to one or more aquifers.

2.14. "Confining zone" means a geological formation, group of formations, or part of a formation stratigraphically overlying the injection zone(s) that acts as barrier to fluid movement above an injection zone. For Class 6 wells operating under an injection depth waiver, confining zone means a geologic formation, group of formations, or part of a formation stratigraphically overlying and underlying the injection zone(s).

2.15. "Contaminant" means any man induced physical, chemical, biological or radiological substance or matter in water.

2.16. "Conventional mine" means an open pit or underground excavation for the production of minerals.

2.17. "Corrective action" means the use of Director-approved methods to ensure that wells within the area of review do not serve as conduits for the movement of fluids into USDWs.

2.18. "Draft permit" means a document indicating the Director's tentative decision to issue, modify, suspend, revoke, revoke and reissue, or reissue a "permit". A notice of intent to revoke a permit is a type of "draft permit". A denial of a request for modification, suspension, revocation, or revocation and reissuance, is not a "draft permit".

2.19. "Drilling mud" means a heavy suspension used in drilling an "injection well", introduced down the drill pipe and through the drill bit.

2.20. "Dry Well" means a bored, drilled, or driven shaft or a dug hole, that is not an improved sinkhole or subsurface fluid distribution system, whose depth is greater than its largest surface dimension which is completed above the water table so that its bottom and sides are typically dry except when receiving fluids.

2.21. "Environmental Protection Agency" (EPA) means the United States Environmental Protection Agency.

2.22. "Exempted aquifer" means an "aquifer" or its portion that meets the criteria in the definition of "underground source of drinking water" but which has been exempted according to the procedures in subsection 3.1.

2.23. "Existing injection well" means an "injection well" other than a "new injection well".

2.24. "Experimental technology" means a technology which has not been proven feasible under the conditions in which it is being tested.

2.25. "Facility or activity" means any "injection well" that is subject to rule under the UIC program.

2.26. "Fault" means a surface or zone of rock fracture along which there has been displacement.

2.27. "Flow rate" means the volume per time unit given to the flow of gases or other fluid substance which emerges from an orifice, pump, turbine, or passes along a conduit or channel.

2.28. "Fluid" means any material or substance which flows or moves whether in a semisolid, liquid, sludge, gas, or any other form or state.

2.29. "Formation" means a body of rock characterized by a degree of lithologic homogeneity which is prevailingly, but not necessarily, tabular and is mappable on the earth's surface or traceable in the subsurface.

2.30. "Formation fluid" means "fluid" present in a "formation" under natural conditions as opposed to introduced fluids, such as "drilling mud".

2.31. "Generator" means any person, by site location, whose act or process produces hazardous waste identified or listed in 33CSR20, Hazardous Waste Management Rule, or whose act first causes a hazardous waste to become subject to this rule.

2.32. "Geologic sequestration" means the long-term containment of a gaseous, liquid, or supercritical carbon dioxide stream in subsurface geologic formations. This term does not apply to carbon dioxide capture or transport.

2.33. "Geologic sequestration project" means an injection well or wells used to emplace a carbon dioxide stream beneath the lowermost formation containing a USDW; or, wells used for geologic sequestration of carbon dioxide that have been granted a waiver of the injection depth requirements pursuant to requirements at § 47CSR13.14.8.~~d~~4.; or, wells used for geologic sequestration of carbon dioxide that have received an expansion to the areal extent of an existing Class II enhanced oil recovery or enhanced gas recovery aquifer exemption pursuant to 47CSR13-3 and 47CSR13-14.22. It includes the subsurface three-dimensional extent of the carbon dioxide plume, associated area of elevated pressure, and displaced fluids, as well as the surface area above that delineated region.

2.34. "Groundwater" means water below the land surface in a zone of saturation.

2.35. "Hazardous waste" means a hazardous waste as defined in 33CSR20-2.1.1~~a~~.

2.36. "Hazardous Waste Management facility" ("HWM facility") means all contiguous land, and structures, other appurtenances, and improvements on the land, used for treating, storing, or disposing of "hazardous waste". A facility may consist of several "treatment", "storage", or "disposal" operational units.

2.37. "Improved Sinkhole" means a naturally occurring karst depression or other natural crevice found in volcanic terrain and other geologic settings which have been modified by man for the purposes of directing and emplacing fluids into the subsurface.

2.38. "Injection well" means a well, subsurface distribution system, or an improved sinkhole into which fluids are being injected.

2.39. "Injection zone" means a geological "formation", group of formations or part of a formation receiving fluids through a "well" and for Class 6 Wells, the formation that is of sufficient areal extent, thickness, porosity, and permeability to receive carbon dioxide through a well or wells associated with a geologic sequestration project.

2.40. "Large Capacity Cesspool" means a dry well that receives untreated sanitary waste containing human excreta, and which sometimes have an open bottom and/or perforated sides. Large-capacity cesspools serve multiple dwellings and community or regional establishments. Non-residential large capacity cesspools must have the capacity to serve more than 20 persons per day.

2.41. "Lithology" means the description of rocks on the basis of their physical and chemical characteristics.

2.42. "Manifest" means the form used for identifying the quantity, composition and the origin, routing and destination of the hazardous waste during its transportation off-site from the point of generation to the point of disposal, treatment or storage.

2.43. "Maximum Contaminant Level (MCL)" means as defined in the Safe Drinking Water Act as "the maximum permissible level of a contaminant in water which is delivered to any user of a public water system."

2.44. "Motor Vehicle Waste Disposal Wells (MVWDW)" mean dry wells or septic tank and leachfield combinations that receive or have received fluids from motor vehicle repair or maintenance activities, such as an auto body repair shop, automotive repair shop, new and used car dealership, specialty repair shop (e.g. transmission and muffler repair shop), or any facility that does any vehicular repair work.

2.45. "New injection well" means a "well" which began injection after the effective date of this rule.

2.46. "Owner or operator" means the owner or operator of a facility or activity subject to regulation under the UIC program.

2.47. "Packer" means a device lowered into a "well" to produce a fluid-tight seal.

2.48. "Permit" means an authorization, license, or equivalent control document issued by the State to implement the requirements of the UIC Program. "Permit" includes an area permit and a UIC Emergency Permit. "Permit" does not include UIC authorization by rule or any permit which has not yet been the subject of final agency action, such as a "draft permit".

2.49. "Person" means an individual, association, partnership, corporation, municipality, State, Federal, or Tribal agency, or an agency or employee thereof.

2.50. "Plugging" means the act or process of stopping the flow of water, oil or gas into or out of a "formation" through a borehole or well penetrating that formation.

2.51. "Plugging record" means a systematic listing of permanent or temporary abandonment of water, oil, gas, test, exploration and waste injection wells, and may contain a well log, description of amounts and types of plugging material used, the method employed for plugging, a description of formations which are sealed and a graphic log of the well showing formation location, formation thickness, and location of plugging structures.

2.52. "Point of Injection" means for a Class 5 well the last accessible sampling point before the release of waste fluids into the subsurface environment. For example, the point of injection of a septic system might be the distribution box-the last accessible sampling point before the waste fluids drain into the leachfield and the underlying soils. For a dry well, it is likely to be the well bore itself.

2.53. "Post-injection site care" means appropriate monitoring and other actions (including corrective action) needed following cessation of injection to ensure that USDWs are not endangered by Class 6 wells, as required under subsection 13.9.

2.54. "Pressure" means the total load or force per unit area acting on a surface.

2.55. "Pressure front" means the zone of elevated pressure that is created by the injection of carbon dioxide into the subsurface. For the purposes of this subpart, the pressure front of a carbon dioxide plume refers to a zone where there is a pressure differential sufficient to cause the movement of injected fluids or formation fluids into a USDW.

2.56. "Project" means a group of "wells" in a single operation.

2.57. "Public water system" means a system for the provision to the public of piped water for human consumption, if such system has at least fifteen (15) individuals. Such term includes (a) any collection, treatment, storage, and distribution facilities under control of the operator of such system and used primarily in connection with such system, and (b) any collection or pretreatment storage facilities not under such control which are used primarily in connection with such system.

2.58. "Radioactive waste" means any waste which contains radioactive material in concentrations which exceed those listed in (10) CFR Part 20, Appendix B, Table II, Column 2.

2.59. "RCRA" means the Solid Waste Disposal Act as amended by the Resource Conservation and Recovery Act of 1976 (Pub. 1. 94-580, as amended by Pub. L. 95-609, 42 USC 6901 et seq.)

2.60. "Regional Administrator" means the Regional Administrator of Region 3 of the U.S. Environmental Protection Agency or the authorized representative of the Regional Director.

2.61. "Safe Drinking Water Act" (SDWA) means the Safe Drinking Water Act (Pub. L. 95-523 as amended by Pub. L. 95-1900; 42 USC section 3000 et seq.

2.62. "Sanitary waste" means liquid or solid waste originating solely from humans and human activities, such as wastes collected from toilets, showers, wash basins, sinks used for cleaning domestic areas, sinks used for food preparation, clothes washing operations, and sinks or washing machines where food and beverage serving dishes, glasses, and utensils are cleaned. Sources of these wastes may include single or multiple residences, hotels and motels, restaurants, bunkhouses, schools, ranger stations, crew quarters, guard stations, campgrounds, picnic grounds, day-use recreation areas, other commercial facilities, and industrial facilities provided the waste is not mixed with industrial waste.

2.63. "Schedule of compliance" means a schedule of remedial measures included in a "permit", including an enforceable sequence of interim requirements (for example, actions, operations, or milestone events) leading to compliance with the SDWA and State Act and rules.

2.64. "Septic system" means a "well" that is used to emplace sanitary waste below the surface and is typically comprised of a septic tank and subsurface fluid distribution system or disposal system.

2.65. "Site" means the land or water where any "facility or activity" is physically located or conducted, including adjacent land used in connection with the facility or activity.

2.66. "Site closure" means the point/time, as determined by the Director following the requirements under subsection 13.9., at which the owner or operator of a geologic sequestration site is released from post-injection site care responsibilities.

2.67. "Sole or principal source aquifer" means an aquifer which has been designated by the Administrator pursuant to section 1424 (a) or (e) of the SDWA.

2.68. "State" means the State of West Virginia.

2.69. "State Act" means the State Water Pollution Control Act, W. Va. Code §22-11-1 et seq.

2.70. "State/EPA agreement" means an agreement between the Regional Administrator and the State which coordinates EPA and State activities, responsibilities and programs.

2.71. "Stratum" (plural strata) means a single sedimentary bed or layer, regardless of thickness, that consists of generally the same kind of rock material.

2.72. "Subsidence" means the lowering of the natural land surface in response to: Earth movements; lowering of fluid pressure; removal of underlying supporting material by mining or solution of solids, either artificially or from natural causes; compaction due to wetting (Hydro compaction); oxidation of organic matter in soils; or added load on the land surface.

2.73. "Subsurface distribution system" means an assemblage of perforated pipes, drain tiles, or other similar mechanisms intended to distribute fluids below the surface of the ground.

2.74. "Surface casing" means the first string of well casing to be installed in the well.

2.75. "Total dissolved solids" means the total dissolved (filterable) solids as determined by use of the method specified in 40 CFR Part 136.

2.76. "Transmissive Fault" is a type of fault or fracture that has sufficient permeability and vertical extent to allow fluids to move between formations.

2.77. "UIC" means the Underground Injection Control program under Part C of the Safe Drinking Water Act, including an approved State program.

2.78. "Underground injection" means the subsurface emplacement of fluids into a well, subsurface distribution system, or improved sinkhole.

2.79. "Underground source of drinking water" (USDW) means an "aquifer" or its portion:

~~a~~2.79.1. which supplies any public water system; or

~~b~~2.79.2. which contains a sufficient quantity of groundwater to supply a public water system; and

~~b.1~~2.79.2.a. currently supplies drinking water for human consumption; or

~~b.2~~2.79.2.b. contains fewer than 10,000 mg/1 total dissolved solids; and

~~c~~2.79.3. which is not an exempted aquifer.

2.80. "Well" for the purpose of the State UIC Program, means a bored, drilled or driven shaft, or a dug hole whose depth is greater than the largest surface dimension, an improved sinkhole; or, a subsurface fluid distribution system.

2.81. "Well injection" means the subsurface emplacement of fluids through a well.

2.82. "Well plug" means a watertight and gastight seal installed in a borehole or well to prevent movement of fluids.

2.83. "Well stimulation" means several processes used to clean the well bore, enlarge channels, and increase pore space in the interval to be injected thus making it possible for wastewater to move more readily into the formation, and includes (1) surging, (2) jetting, (3) blasting, (4) acidizing, (5) hydraulic fracturing.

2.84. "Well monitoring" means the measurement, by on-site instruments or laboratory methods, of the quality of water in a well.

2.85. "Wetlands" means those areas that are inundated and saturated by surface groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar areas such as sloughs, wet meadows, mudflats, sandflats and natural ponds.

§47-13-3. Criteria for Exempted Aquifer Status.

3.1. An aquifer or a portion thereof which meets the criteria for an "underground source of drinking water" in section 2 may be determined to be an exempted aquifer if it meets the following criteria:

~~a~~3.1.1. It does not currently serve as a source of drinking water; and

~~b~~3.1.2. It cannot now and will not in the future serve as a source of drinking water because:

~~b.1~~3.1.2.a. It is a mineral, hydrocarbon or geothermal energy producing, or can be demonstrated by a permit applicant as part of a permit application for a Class 2 or 3 operation to contain minerals or hydrocarbons that considering their quantity and location are expected to be commercially producible;

~~b.2~~3.1.2.b. It is situated at a depth or location which makes recovery of water for drinking water purposes economically or technologically impractical;

~~b.3~~3.1.2.c. It is so contaminated that it would be economically or technologically impractical to render the water fit for human consumption; or

~~b.4~~3.1.2.d. It is located over a Class 3 well mining area subject to subsidence or catastrophic collapse; or

~~c~~3.1.3. The Total Dissolved Solids content of the groundwater is more than three thousand (3,000) and less than ten thousand (10,000) mg/1 and it is not reasonably expected to supply a public water system.

~~d~~3.1.4. The areal extent of an aquifer exemption for a Class II EOR/EGR well may be expanded for the exclusive purpose of Class 6 injection for geologic sequestration if:

~~d.1~~ 3.1.4.a. It is not currently a source of drinking water; and

~~d.2~~ 3.1.4.b. Total dissolved solids content of the ground water is >3,000 but <10,000 mg/l; and

~~d.3~~ 3.1.4.c. It is not reasonably expected to supply a public water system.

§47-13-4. Classes of Wells.

4.1. Class 1.

~~a~~4.1.1. Wells used by generators of hazardous waste or owners or operators of hazardous waste management facilities to inject hazardous waste beneath the lowermost formation containing, within 1/4 mile of the well bore, an underground source of drinking water.

~~b~~4.1.2. Other industrial and municipal disposal wells which inject fluids beneath the lowermost formation containing, within 1/4 mile of the well bore, an underground source of drinking water.

~~c~~4.1.3. It also includes wells not covered in Class 4 that inject radioactive material listed in 10 CFR Part 20, Appendix B, Table II, Column 2.

4.2. Class 2. Wells injecting fluids:

~~a~~4.2.1. Which are brought to the surface in connection with natural gas storage, or oil or natural gas production and may be commingled with waste waters from gas plants which are an integral part of production operations, unless those waters are classified as a hazardous waste at the time of injection;

~~b~~4.2.2. For enhanced recovery of oil or natural gas; and

~~c~~4.2.3. For storage of hydrocarbons which are liquid at standard temperature and pressure.

4.3. Class 3. Wells which inject for extraction of minerals including:

~~a~~4.3.1. Mining of sulphur by the Frasch process;

~~b~~4.3.2. In situ production of uranium or other metals. This category includes only in situ production from ore bodies which have not been conventionally mined. Solution mining of conventional mines such as stopes leaching is included in Class 5;

~~c~~4.3.3. Solution mining of salts or potash; and

~~4.3.d. In situ combustion of fossil fuel.~~

4.4. Class 4.

~~a~~4.4.1. Wells used by generators of hazardous waste or by owners or operators of hazardous waste management facilities, or by owners or operators of radioactive waste disposal sites, to dispose of hazardous wastes which cannot be classified under subdivisions 4.1.~~a~~1., 4.1.~~b~~2., or 4.1.~~c~~3.

4.5. Class 5. Injection wells not included in Classes 1, 2, 3, 4, or 6. Class 5 wells include, but are not limited to:

~~a~~4.5.1. Cesspools, including multiple dwelling, community or regional cesspools, or other devices that receive wastes, which have an open bottom and sometimes have perforated sides. The UIC requirements do not apply to single family residential cesspools nor to nonresidential cesspools which receive solely sanitary wastes and have the capacity to serve fewer than twenty (20) persons a day.

~~b~~4.5.2. Sand backfill and other backfill wells used to inject a mixture of water and sand, mill tailings or other solids into mined out portions of subsurface mines provided what is injected is not a radioactive waste.

~~c~~4.5.3. Septic system wells used to inject the waste or effluent from a multiple dwelling, business establishment, community or regional business establishment septic tank. The UIC requirements do not apply to single family residential septic system wells, nor to nonresidential septic system wells which are used solely for the disposal of sanitary waste and have the capacity to serve fewer than twenty (20) persons a day.

~~d~~4.5.4. Injection wells associated with the recovery of geothermal energy for heating, aquaculture and production of electric power.

~~e~~4.5.5. Wells used for solution mining of conventional mines such as stopes leaching.

~~f~~4.5.6. Injection wells used for in situ recovery of lignite, coal, tar sands, and oil shale.

~~g~~4.5.7. Wells used to inject spent brine into the same formation from which it was withdrawn after extraction of halogens or their salts.

~~h~~4.5.8. Injection wells used in experimental technologies.

~~i~~4.5.9. Wells for waste disposal into solution cavities in carbonate formations.

~~j~~4.5.10. Sinkholes used for the disposal of sewage or any other waste.

~~k~~4.5.11. Air conditioning return flow wells used to return to the supply aquifer the water used for heating or cooling in a heat pump.

~~l~~4.5.12. Cooling water return flow wells used to inject water previously used for cooling.

~~m~~4.5.13. Drainage wells used to drain surface fluid, primarily storm runoff, into a subsurface formation.

~~n~~4.5.14. Dry wells used for the injection of wastes into a subsurface formation.

~~o~~4.5.15. Recharge wells used to replenish the water in an aquifer.

~~p~~4.5.16. Salt water intrusion barrier wells used to inject water into the fresh water aquifer to prevent the intrusion of salt water into the fresh water.

~~q~~4.5.17. Subsidence control wells (not used for the purpose of oil or natural gas production) used to inject fluids into a non-oil or gas producing zone to reduce or eliminate subsidence associated with the overdraft of fresh water.

4.6. Class 6.

~~a~~4.6.1. Wells used to inject carbon dioxide (CO_2) into rock formations. Wells that are not experimental in nature that are used for geologic sequestration of carbon dioxide beneath the lowermost formation containing a USDW; or, wells used for geologic sequestration of carbon dioxide that have been granted a waiver of the injection depth requirements pursuant to requirements at subsection 14.8.~~d~~4. of this chapter; or, wells used for geologic sequestration of carbon dioxide that have received an expansion to the areal extent of an existing Class 2 enhanced oil recovery or enhanced gas recovery aquifer exemption pursuant to section 13.3 and 40 CFR 144.7(d).

§47-13-5. Area of Review.

5.1. The Director shall select the methods by which the area of review shall be established for each injection well or each field, project, or area of the State.

5.2. The area of review may be defined as either:

~~a~~5.2.1. The zone of endangering influence as determined in accordance with subdivision 5.3.~~a~~1; or

~~b~~5.2.2. An area within a fixed radius around each injection well as determined in accordance with subdivision ~~c~~5.3.3.

5.3. Zone of endangering influence. The zone of endangering influence shall be:

~~a~~5.3.1. In case of application(s) for well permit(s) under subsection 14.3, that area the radius of which is the horizontal distance from the injection well in which the pressures in the injection zone may cause the migration of the injection and/or formation fluid into an underground source of drinking water; or

~~b~~5.3.2. In the case of an application for an area permit under subsection 14.4, the area of the project plus a circumscribing area, the width of which is the horizontal distance for the perimeter of the project, in which the pressures in the injection zone may cause the migration of the injection and/or formation fluid into an underground source of drinking water. Computation of the zone of endangering influence should be based upon but not limited to, the parameters listed below and should be calculated for an injection time period equal to the expected life of the facility. The ~~Thesis~~ Theis equation is an example of one possible objective method:

Where "r" is equal to the square root of a quantity which consists of a numerator divided by the denominator where the numerator is equal to 2.25 multiplied by "K" multiplied by "H" multiplied by "t"; and, the denominator is equal to "S" multiplied by 10 to the "x" power. And, where "x" is equal to a

numerator divided by a denominator, where the numerator is equal to four multiplied by "pi" multiplied by "K" multiplied by "H" multiplied [by the quantity equal to the product of ("h(subscript w)" minus "h(subscript bo)")] multiplied by "S(subscript p)G(subscript b)"; and, the denominator is equal to 2.3 multiplied by "Q". (See Figure 47-13-5 at the end of this rule)

~~b.1~~ 5.3.2.a. Where "r" is equal to the radius of endangering influence from injection well (length):

~~b.1.A~~ 5.3.2.a.1. "K" is equal to hydraulic conductivity of the injection zone (length/time);

~~b.1.B~~ 5.3.2.a.2. "H" is equal to thickness of the injection zone (length);

~~b.1.C~~ 5.3.2.a.3. "t" is equal to time of injection (time);

~~b.1.D~~ 5.3.2.a.4. "S" is equal to storage coefficient (dimensionless);

~~b.1.E~~ 5.3.2.a.5. "Q" is equal to injection rate (volume/time);

~~b.1.F~~ 5.3.2.a.6. "h(subscript bo)" is equal to observed original hydrostatic head of injection zone (length) measured from the base of the lowermost underground source of drinking water;

~~b.1.G~~ 5.3.2.a.7. "h(subscript w)" is equal to hydrostatic head of underground source of drinking water (length) measured from the base of the lowest underground source of drinking water;

~~b.1.H~~ 5.3.2.a.8. "S(subscript p)G(sub-script b)" is equal to specific gravity of fluid in the injection zone (dimensionless);

~~b.1.I~~ 5.3.2.a.9. "pi" is equal to 3.142 (dimensionless)

~~b.2~~ 5.3.2.b. The above equation is based on the following assumptions:

~~b.2.A~~ 5.3.2.b.1. The injection zone is homogenous and ~~isotrophic;~~ isotropic;

~~b.2.B~~ 5.3.2.b.2. The injection zone has infinite area extent;

~~b.2.C~~ 5.3.2.b.3. The injection well penetrates the entire thickness of the injection zone;

~~b.2.D~~ 5.3.2.b.4. The well diameter is infinitesimal compared to "r" when injection time is longer than a few minutes; and

~~b.2.E~~ 5.3.2.b.5. The emplacement of fluid into the injection zone creates instantaneous increase in pressure.

~~c~~5.3.3. Fixed radius:

~~c.1~~ 5.3.3.a. In the case of application(s) for well permit(s), a fixed radius around the well may be used but not less than 1/4 mile, except for:

~~c.1.A~~ 5.3.3.a.1. For Class1 hazardous waste wells, the area of review is a 2 mile radius.

~~c.2~~ 5.3.3.b. In the case of an application for an area permit, a fixed width may be used but not less than 1/4 mile for the circumscribing area.

~~c.3~~ 5.3.3.c. In determining the fixed radius, the following factors shall be taken into consideration: the chemistry of the injected and formation fluids; geology; hydrogeology; population and groundwater use and dependence; and historical practices in the area.

5.4. For Class 6 wells, the area of review is the region surrounding the geologic sequestration project where USDWs may be endangered by the injection activity. The area of review is delineated using computational modeling that accounts for the physical and chemical properties of all phases of the injected carbon dioxide stream and is based on available site characterization, monitoring, and operational data.

§47-13-6. Corrective Action and Mechanical Integrity.

6.1. Corrective Action. In determining the adequacy of corrective action proposed by the applicant and in determining the additional steps needed to prevent fluid migration into underground sources of drinking water, the Director shall consider the following criteria and factors:

~~a~~6.1.1. Nature and volume of injected fluid;

~~b~~6.1.2. Nature of native fluids or by-products of injection;

~~c~~6.1.3. Geology;

~~d~~6.1.4. Hydrology;

~~e~~6.1.5. History of the injection operation;

~~f~~6.1.6. Completion and plugging reports;

~~g~~6.1.7. Abandonment procedures in effect at the time the well was abandoned;

~~h~~6.1.8. Hydraulic connections with the underground sources of drinking water; and

~~i~~6.1.9. Potentially effected population.

~~j~~6.1.10. Reliability of the procedures used to identify abandoned wells; and

~~k~~6.1.11. Any other factors which might affect the movement of fluids into or between USDWs.

6.2. Mechanical Integrity.

~~a~~6.2.1. An injection well has mechanical integrity if:

~~a.1~~ 6.2.1.a. There is no significant leak in the casing, tubing, or packer; and

~~a.2~~ 6.2.1.b. There is no significant fluid movement into an underground source of drinking water through vertical channels adjacent to the injection well bore.

~~b~~6.2.2. One of the following methods must be used to evaluate the absence of significant leaks under paragraph 6.2.~~a.1~~1.a. of this section:

~~b.1~~ 6.2.2.a. Monitoring of annulus pressure; or

~~b.2~~ 6.2.2.b. Pressure test with liquid or gas.

~~c~~6.2.3. The absence of significant fluid movement under paragraph 6.2.~~a.2~~1.b. of this section may be demonstrated by:

~~c.1~~ 6.2.3.a. For Class 2 wells, any requirements determined necessary under subdivision 9.1.~~a~~1.;

~~c.2~~ 6.2.3.b. For Class 3 wells where the nature of the casing precludes the use of logging techniques prescribed at 6.2.~~c.3~~3.c. of this section, cementing records demonstrating the presence of adequate cement to prevent such migration;

~~c.3~~ 6.2.3.c. The results of a temperature or noise log;

~~c.4~~ 6.2.3.d. For Class 3 wells where the Director elects to rely on cementing records to demonstrate the absence of significant fluid movement, the monitoring program prescribed by subsection 10.4 shall be designed to verify the absence of significant fluid movement;

~~c.5~~ 6.2.3.e. For Class 6 wells, to evaluate the absence of significant leaks under 6.2.~~a~~1. of this section, owners or operators must, following an initial annulus pressure test, continuously monitor injection pressure, rate, injected volumes; pressure on the annulus between tubing and long-string casing; and annulus fluid volume as specified in subsection 13.6.~~a.5~~1.e.;

~~c.5.A~~ 6.2.3.e.1. At least once per year, the owner or operator must use an approved tracer survey such as an oxygen-activation log or a temperature or noise log to determine the absence of significant fluid movement under 6.2.~~b~~2. of this section.

~~c.5.B~~ 6.2.3.e.2. If required by the Director, at a frequency specified in the testing and monitoring plan required at subsection 13.6.~~b~~2., the owner or operator must run a casing inspection log to determine the presence or absence of corrosion in the long-string casing.

~~c.5.C~~ 6.2.3.e.3. The Director may require any other test to evaluate mechanical integrity under 6.2.3.e ~~c.5~~. of this section. Also, the Director may allow the use of a test to demonstrate mechanical integrity other than those listed above with the written approval of the Administrator. To obtain approval for a new mechanical integrity test (MIT), the Director must submit a written request to the Administrator setting forth the proposed test and all technical data supporting its use. The Administrator may approve the request if he or she determines that it will reliably demonstrate the mechanical integrity of wells for which its use is proposed. Any alternate method approved by the Administrator will be published in the FEDERAL REGISTER and may be used in all States in accordance with applicable State law unless its use is restricted at the time of approval by the Administrator.

~~c.5.D~~ 6.2.3.e.4. In conducting and evaluating the tests enumerated in this section or others to be allowed by the Director, the owner or operator and the Director must apply methods and standards generally accepted in the industry. When the owner or operator reports the results of mechanical integrity tests to the Director, he/she shall include a description of the test(s) and the method(s) used. In making

his/her evaluation, the Director must review monitoring and other test data submitted since the previous evaluation.

~~e.5.E~~ 6.2.3.e.5. The Director may require additional or alternative tests if the results presented by the owner or operator under paragraphs A through D of this subsection are not satisfactory to the Director to demonstrate that there is no significant leak in the casing, tubing, or packer, or to demonstrate that there is no significant movement of fluid into a USDW resulting from the injection activity as stated in 6.2.~~a~~1. of this section; or

~~d~~6.2.4. The Director may allow the use of a test to demonstrate mechanical integrity other than those listed in subdivisions 6.2.~~b~~2. and 6.2.~~c~~3. of this section with the written approval of the Director of the U.S. Environmental Protection Agency.

~~e~~6.2.5. In conducting and evaluating the tests enumerated in this section or others to be allowed by the Director, the owner or operator and the Director shall apply methods and standards generally accepted in the industry. When the owner or operator reports the results of mechanical integrity tests to the Director, he shall include a description of the test(s) and the method(s) used. In making his/her evaluation, the Director shall review monitoring and other test data submitted since the previous evaluation.

§47-13-7. Requirements for Wells Injecting Hazardous Waste.

7.1. Applicability. The rules in this section and section 8 apply to all generators of hazardous waste, and to the owners or operators of all hazardous waste management facilities, using any Class 1 well to inject hazardous waste accompanied by a manifest.

7.2. Authorization. The owner or operator of any Class 1 well that is used to inject hazardous wastes accompanied by a manifest or delivery document shall apply for authorization to inject within six (6) months of the effective date of this rule.

7.3. Requirements. In addition to requiring compliance with the applicable requirements of section 8, the Director shall, for each facility meeting the requirements of subsection 7.2 require that the owner or operator comply with the following:

~~a~~7.3.1. Notification. The owner or operator shall comply with the notification requirements in the Hazardous Waste Management Rule, 33CSR20-4, (W. Va. Code §22-18).

~~b~~7.3.2. Identification number. The owner or operator shall comply with the requirements in the Hazardous Waste Management Rule, 33CSR20-8. (W. Va. Code §22-18).

~~c~~7.3.3. Manifest system. The owner or operator shall comply with the applicable record keeping and reporting requirements for manifested wastes in the Hazardous Waste Management Rules, 33CSR20-8. (W. Va. Code §22-18).

~~d~~7.3.4. Manifest discrepancies. The owner or operator shall comply with the Hazardous Waste Management Rules, 33CSR20-8. (W. Va. Code §22-18).

~~e~~7.3.5. Operating record. The owner or operator shall comply with the Hazardous Waste Management Rules, 33CSR20-8. (W. Va. Code §22-18).

~~f~~7.3.6. Annual report. The owner or operator shall comply with the Hazardous Waste Management Rules, 33CSR20-8. (W. Va. Code §22-18).

~~g~~7.3.7. Unmanifested waste report. The owner or operator shall comply with the Hazardous Waste Management Rules, 33CSR20-8. (W. Va. Code §22-18).

~~h~~7.3.8. Personnel training. The owner or operator shall comply with the applicable personnel training requirements in the Hazardous Waste Management Rules, 33CSR20-8. (W. Va. Code §22-18).

~~i~~7.3.9. Certification of closure. When abandonment is completed, the owner or operator must submit to the Director certification by the owner or operator and certification by an independent registered professional engineer that the facility has been closed in accordance with the specifications in subsection 14.7.~~f~~ 6. of this rule.

7.4. Location Standards. Owners and operators of all new hazardous waste injection wells shall comply with the following location standards:

~~a~~7.4.1. Seismic Risk Zones. Wells shall not be located in Seismic Risk Zone 2 (Expected Moderate Damage). The following counties are located in Seismic Risk Zone 2: Jefferson, Berkeley, Morgan (east of Cacapon District), Hampshire (Bloomery, Capon Districts), Hardy (Capon, Lost River Districts), Pendleton (Bethel, Sugar Grove Districts), Pocahontas (south of the Green Bank District), Greenbrier, Monroe, Summers, Mercer, Raleigh (Slab Fork, Shady Spring, and Richmond Districts), McDowell and Wyoming (south of Oceana District).

~~b~~7.4.2. Subsurface Mining Areas. The borehole of any hazardous waste injection well shall not pass through a cavity created by subsurface mining.

~~c~~7.4.3. Carbonate Formations. The borehole of any hazardous waste injection well shall not pass through any cavity created by solution of carbonate rock above the injection zone.

~~d~~7.4.4. Inundation Danger Zone. Hazardous waste injection wells shall not be located where inundation from dam failure or a 100 year flood could occur.

~~e~~7.4.5. Designated Wetlands. Hazardous waste injection wells shall not be located in wetlands.

§47-13-8. Criteria and Standards Applicable to Class 1 Wells.

8.1. General. This section sets forth requirements for underground injection control programs to regulate Class 1 wells.

~~a~~8.1.1. Existing well means a Class I well which was authorized prior to August 25, 1988 or a well which has become a Class I well as a result of a change in the definition of the injected waste into a hazardous waste.

8.2. Construction Requirements. The Director shall prescribe requirements for the construction of Class 1 injection wells. Existing wells shall achieve compliance with such requirements according to a specific compliance schedule established by the Director as a condition of the permit. New wells shall be in compliance with construction requirements before injection operations begin. The owner or operator of a proposed injection well shall submit plans to the Director for testing, drilling, and construction and obtain the approval of the initial plans as a condition of the permit. The Director's approval of any modifications of the plan shall be obtained before incorporating them into the construction of the injection well. At a minimum, such requirements shall prescribe that:

~~a~~8.2.1. Each Class 1 well shall be sited in such a fashion that it injects into a formation which is below the lowermost formation containing within 1/4 mile of the well bore, an underground source of drinking water, and which has an overlying confining bed that is free of known faults or fractures within the area of review. The injection zone shall have sufficient permeability, porosity, thickness and areal extent to prevent migration of fluids into USDWs. The confining zone shall be laterally continuous and free of transecting, transmissive faults or fractures over an area sufficient to prevent the movement of fluids into a USDW. The siting shall contain at least one formation of sufficient thickness and with lithologic and stress characteristics capable of preventing vertical propagation of fractures.

~~a.1~~ 8.2.1.a. Owners or operators must demonstrate that: 1) the confining zone is separated by at least one sequence of permeable and less permeable strata to prevent fluid migration; or 2) the piezometric surface of the fluid in the injection zone is less than the piezometric surface of the lowermost USDW; or 3) no USDW is present; or 4) would not endanger USDWs if the site does not meet the requirements in (1), (2), or (3).

~~b~~8.2.2. Each Class 1 well shall be cased, and cemented to prevent the movement of fluids into or between underground sources of drinking water~~.~~, and to prevent potential leaks of fluids from the well. The casing and cement used in the construction of each newly drilled well shall be designed for the life expectancy of the well and post-closure period. The well construction must permit use of appropriate testing devices and workover tools, and continuous monitoring of tubing and casing. In determining and specifying casing and cementing requirements, the Director shall consider the following factors:

~~b.1~~ 8.2.2.a. Depth to the injection zone;

~~b.2~~ 8.2.2.b. Injection pressure (external pressure, internal pressure, axial loading, etc.);

~~b.3~~ 8.2.2.c. Hole size;

~~b.4~~ 8.2.2.d. Size and grade of all casing strings (wall thickness, diameter, nominal weight, length, joint specification, construction material, etc.);

~~b.5~~ 8.2.2.e. Corrosiveness of injected fluid, formation fluids, and temperatures;

~~b.6~~ 8.2.2.f. Lithology of possible injection and confining intervals; and

~~b.7~~ 8.2.2.g. Type or grade of cement.

8.2.2.h. Quantity and chemical composition of the injected fluid.

~~c~~8.2.3. All Class 1 injection wells, except for those municipal wells injecting only non-corrosive wastes, shall inject fluids through tubing and packer set immediately above the injection zone. The tubing and packer shall be designed for the expected service.

~~c.1~~ 8.2.3.a. The use of other alternatives to a packer may be allowed with the written approval of the Director. To obtain approval, the operator shall submit a written request to the Director, which shall set forth the proposed alternative and all technical data supporting its use. The Director shall approve the request only if the alternative method will reliably provide a comparable level of protection to underground sources of drinking water. The Director may approve an alternative method solely for an individual well or for general use.

~~e.2~~ 8.2.3.b. In determining and specifying requirements for tubing and packer, the Director shall consider the following factors:

~~e.2.A~~ 8.2.3.b.1. Depth of setting;

~~e.2.B~~ 8.2.3.b.2. Characteristics of injection fluid (chemical content, density, etc.);

~~e.2.C~~ 8.2.3.b.3. Injection pressure;

~~e.2.D~~ 8.2.3.b.4. Annular pressure;

~~e.2.E~~ 8.2.3.b.5. Rate, temperature and volume of injected fluid; and

~~e.2.F~~ 8.2.3.b.6. Size of casing; and

~~e.2.G~~ 8.2.3.b.7. Tubing tensile, burst, and collapse strengths.

~~e.3~~ 8.2.3.c. The Director may approve the use of a fluid seal if the conditions in this section are met.

~~e.3.A~~ 8.2.3.c.1. Operator demonstrates that seal will provide a level of protection comparable to a packer;

~~e.3.B~~ 8.2.3.c.2. Operator demonstrates that staff is adequately trained to operate and maintain the well;

~~e.3.C~~ 8.2.3.c.3. The permit specifies limitations on variations in annular pressure and loss of annular fluid;

~~e.3.D~~ 8.2.3.c.4. The design and construction of the well allow continuous monitoring of the annular pressure and mass balance of annular fluid; and

~~e.3.E~~ 8.2.3.c.5. A secondary system is used to monitor the interface between the annulus fluid and the injection fluid and the permit contains requirements for testing the system every three months and recording the results.

~~e.4~~ 8.2.3.d. One surface casing string shall extend into the confining bed below the lowest formation that contains a USDW and be cemented by circulating cement from the base of the casing to the surface, using a minimum of 120% of the calculated annular volume.

~~e.5~~ 8.2.3.e. At least one long string casing, using a sufficient number of centralizers, shall extend to the injection zone and shall be cemented by circulating cement to the surface in one or more stages of sufficient quantity and quality to withstand the maximum operating pressure; and in a quantity no less than 120% of the calculated volume necessary to fill the annular space. The Director may require more than 120% when the geology or other circumstances warrant it.

~~e.6~~ 8.2.3.f. Circulation of cement may be accomplished by staging. The Director may approve an alternative method of cementing in cases where the cement cannot be recirculated to the surface, provided the cement is continuous and does not allow fluid movement behind the well bore.

~~e.7~~ 8.2.3.g. Casings must be rated to have sufficient structural strength to withstand:

First, the maximum burst and collapse pressures which may be experienced during construction, operation and closure of the well; and second, the maximum tensile stress which may be experienced at any point along the length of the casing during the construction, operation, and closure of the well. Cement and cement additives must be of sufficient quality and quantity to maintain integrity over the design life of the well.

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~~d~~8.2.4. All parts of Class 1 wells which will come into contact with corrosive fluids (whether injected or in the native environment) shall be constructed of corrosion resistant material.

~~e~~8.2.5. Logs and other tests shall be conducted during the drilling and construction of new Class 1 wells. A descriptive report interpreting the results of such logs and tests shall be prepared by a knowledgeable log analyst and submitted to the Director. At a minimum such logs and tests shall include:

~~e.1~~ 8.2.5.a. Directional surveys conducted on all holes, including pilot holes, at sufficiently frequent intervals to assure that vertical avenues for fluid migration in the form of diverging holes are not created during drilling.

~~e.2~~ 8.2.5.b. For surface casing intended to protect underground sources of drinking water:

~~e.2.A~~ 8.2.5.b.1. Resistivity, spontaneous potential and caliper logs before the casing is installed; and

~~e.2.B~~ 8.2.5.b.2. A cement bond, temperature, or density log after the casing is set and cemented.

~~e.3~~ 8.2.5.c. For intermediate and long strings of casing intended to facilitate injection:

~~e.3~~.A 8.2.5.c.1. Resistivity, spontaneous potential, porosity, caliper and gamma ray logs before the casing is installed;

~~e.3~~.B 8.2.5.c.2. Fracture finder logs in appropriate situations as prescribed by the Director; and

~~e.3~~.C 8.2.5.c.3. A cement bond, temperature, or density log after the casing is set and cemented.

~~e.4~~ 8.2.5.d. Cores of the injection and confining zones must be taken. Fluid temperature, pH, conductivity, pressure, and static fluid level must be measured in the injection zone.

~~f~~8.2.6. At a minimum, the measurements required in subsection 8.2.~~e.4~~5.d. and the following information concerning the injection formation shall be determined for the new Class 1 wells, and submitted to the Director:

~~f.1~~ 8.2.6.a. Fluid pressure;

~~f.2~~ 8.2.6.b. Temperature;

~~f.3~~ 8.2.6.c. Fracture pressure;

~~f.4~~ 8.2.6.d. Other physical and chemical characteristics of the injection matrix;

~~f.5~~ 8.2.6.e. Physical and chemical characteristics of the formation fluids;

~~f.6~~ 8.2.6.f. Compatibility of injected fluids with formation fluids; and

~~f.7~~ 8.2.6.g. Fracture pressure and other physical and chemical characteristics of the confining zones must be recorded.

~~g~~8.2.7. Information requirements for Class 1 Hazardous Waste Injection Well Permits.

~~g.1~~ 8.2.7.a. The following is required for each active Class 1 hazardous waste injection well at a facility seeking a UIC permit:

~~g.1.A~~ 8.2.7.a.1. Dates well was operated.

~~g.1.B~~ 8.2.7.a.2. Specifications of all wastes which have been injected in the well, if available.

~~g.2~~ 8.2.7.b. The owner or operator of any existing facility containing one or more active hazardous waste injection wells must submit all available information pertaining to any release of hazardous waste or constituents from any active hazardous waste injection well at the facility.

~~g.3~~ 8.2.7.c. The owner or operator of any facility containing one or more active Class 1 hazardous waste injection wells must conduct preliminary site investigations as are necessary to determine whether a release is occurring, has occurred, or is likely to have occurred.

~~g.4~~ 8.2.7.d. Permit requirements for hazardous waste wells which inject wastes which can react with the injection formation to generate gases shall include 1) Conditions limiting the temperature, pH or acidity of the injected waste and 2) Procedures necessary to assure that pressure imbalances which might cause a backflow or blowout do not occur.

~~h~~8.2.8. Hydrogeologic characteristics of the injection zone should be verified through pump or injectivity tests before injection begins. The Director may witness all logging and testing by this Subpart if desired.

8.3. Abandonment of Class 1 Wells.

~~a~~8.3.1. Class 1 wells shall be abandoned in a manner to be prescribed by the Director under subdivision 14.7.~~f~~6. At a minimum, the well shall be plugged with cement in a manner which will not allow the movement of fluids either into or between underground sources of drinking water.

~~b~~8.3.2. Placement of cement plugs shall be accomplished by one of the following:

~~b.1~~ 8.3.2.a. The Balance Method;

~~b.2~~ 8.3.2.b. The Dump Bailer Method;

~~b.3~~ 8.3.2.c. The Two-Plug method; or

~~b.4~~ 8.3.2.d. An alternative method approved by the Director which will reliably provide a comparable level of protection to USDW'S.

~~e~~8.3.3. Prior to closure, the owner or operator shall observe and record the pressure decay for a time specified by the Director. The Director shall determine whether the injection activity has conformed with predicted values.

~~d~~8.3.4. Prior to closure, MIT is required to ensure integrity of the long string casing and cement that will be left in the ground. Testing methods may include pressure tests with liquid or gas; radioactive tracer surveys; noise, temperature, pipe evaluation, or cement bond logs; and any other test required by the Director.

~~e~~8.3.5. Prior to closure, the well shall be flushed with a buffer fluid. Each plug used shall be appropriately tagged and tested for seal and stability before closure is completed.

~~f~~8.3.6. The well to be abandoned shall be in a state of static equilibrium with the mud weight equalized top to bottom, either by circulating the mud in the well at least once or a comparable method prescribed by the Director, prior to the placement of the cement plug(s).

~~g~~8.3.7. The owner or operator shall assure, through a performance bond or other appropriate means, the availability of resources necessary for the proper abandonment of the well as required in subdivision 14.7.~~g~~7.

8.4. Operating, Monitoring, and Reporting Requirements.

~~a~~8.4.1. Operating Requirements: The Director shall, under subdivision 14.7.~~e~~3. prescribe requirements governing the operation of injection wells in the permit. Requirements for Class 1 wells shall, at a minimum, specify that:

~~a.1~~ 8.4.1.a. Except during stimulation, injection pressure at the wellhead shall not exceed a maximum which shall be calculated so as to assure that the pressure in the injection zone during injection does not initiate new fractures or propagate existing fractures in the injection zone. In no case shall injection pressure initiate fractures in the confining zone or cause the movement of injection or formation fluids into an underground source of drinking water;

~~a.2~~ 8.4.1.b. Injection between the outermost casing protecting underground sources of drinking water and the well bore is prohibited; and

~~a.3~~ 8.4.1.c. Unless alternative to tubing and packer has been approved, the annulus between the tubing and the long string of casings shall be filled with a fluid approved by the Director and a pressure, also approved by the Director, shall be maintained on the annulus that is greater than the injection pressure.

~~a.4~~ 8.4.1.d. The owner/operator must notify the Director by writing at least 30 days before conducting any workovers.

~~b~~8.4.2. Monitoring Requirements: The Director shall prescribe requirements for the monitoring of the injection fluids, the injection well, and the underground sources of drinking water that could potentially be affected by the injection. Monitoring requirements shall, at a minimum, include:

~~b.1~~ 8.4.2.a. Testing of the injected fluids with sufficient frequency to yield representative data of its characteristics;

~~b.2~~ 8.4.2.b. Continuous recording devices to monitor injection pressure, temperature, flow rate and volume, and the pressure on the annulus between the tubing and the long strings of casing;

~~b.3~~ 8.4.2.c. Mechanical integrity must be maintained at all times. Demonstration of mechanical integrity at least every five (5) years during the life of the well;

~~b.4~~ 8.4.2.d. Type, number and location of wells within the area of review to monitor any migration of fluids into and pressure in the underground sources of drinking water with the parameters to be measured and the frequency of monitoring specified; and

~~b.5~~ 8.4.2.e. The maintenance of the results of required monitoring for at least three (3) years.

~~b.6~~ 8.4.2.f. The owner/operator must also install automatic alarms and shut off systems as described in this section~~.~~, designed to sound and shut-in the well when pressures and flow rates or other parameters approved by the Director exceed a range and/or gradient specified in the permit. If an automatic alarm or shutdown is triggered, the owner or operator shall immediately investigate the cause. If the well appears or is found to be lacking mechanical integrity, the owner or operator shall:

~~b.6.A~~ 8.4.2.f.1. Cease injection unless authorized by the Director to continue or resume injection;

~~b.6.B~~ 8.4.2.f.2. Take all necessary steps to determine the presence or absence of a leak; and

~~b.6.C~~ 8.4 2.f.3. Notify the Director within 24 hours after the alarm or shutdown.

~~b.7~~ 8.4.2.g. Owners/operators must show that well design will not be compromised by adverse reactions between well materials and waste stream. The Director shall require continuous corrosion monitoring of the construction materials in wells injecting corrosive waste, and may require such monitoring for other waste, by placing coupons of the well construction materials in contact with the waste stream; routing the waste stream through a loop constructed with well material; or using an alternative method approved by the Director. If a corrosion monitoring program is required: One, the test shall use materials identical to those used in well's construction, and such materials must be continuously exposed to the operating pressures and temperatures and flow rates; and Two, the owner or operator shall monitor the materials for loss of mass, thickness, cracking, pitting and other signs of corrosion quarterly.

~~b.8~~ 8.4.2.h. Owners of Class 1 wells injecting hazardous waste shall conduct mechanical integrity testing as follows:

~~b.8.A~~ 8.4.2.h.1. The long string casing, injection tube, and annular seal shall be tested by an approved pressure test with a liquid or gas annually and whenever there has been a well workover;

~~b.8.B~~ 8.4.2.h.2. The bottom-hole cement shall be tested by means of an approved radioactive tracer survey annually;

~~b.8.C~~ 8.4.2.h.3. An approved temperature, noise, or other approved log shall be run at least once every five years to test for movement of fluid along the borehole;

~~b.8.D~~ 8.4.2.h.4. Casing inspection logs shall be run whenever the owner or operator conducts a workover in which the injection string is pulled, unless the Director waives this requirement due to well construction or other factors which limit the test's reliability, or based upon the satisfactory results of a casing inspection log run within the previous five years. The Director may require a casing inspection log every five years, if he is concerned about the integrity of the long string casing; and

~~b.8.E~~ 8.4.2.h.5. Any other test approved by the Director may also be used.

~~b.9~~ 8.4.2.i. Owners shall develop an ambient monitoring program based on an assessment of the potential for fluid movement. At a minimum, the Director shall require monitoring of the pressure buildup in the injection zone annually, including a shut down of the well for a time sufficient to observe the pressure fall-off curve. The Director may also require:

~~b.9.A~~ 8.4.2.i.1. Continuous monitoring for pressure changes in the first aquifer overlying the confining zone. When such a well is installed, the owner or operator shall, sample the aquifer quarterly and analyze for constituents specified by the Director;

~~b.9.B~~ 8.4.2.i.2. The use of geophysical techniques to determine the position of the waste front, the water quality in a formation designated by the Director, or to provide other site specific data;

~~b.9.C~~ 8.4.2.i.3. Periodic monitoring of ground water quality in the first aquifer overlying the injection zone and in the lowermost USDW;

~~b.9.D~~ 8.4.2.i.4. Any additional monitoring necessary to determine whether fluids are moving into or between USDWs; and

~~b.9.E~~ 8.4.2.i.5. The Director may require seismicity monitoring when he has reason to believe that the injection activity may cause seismic disturbances.

8.4.2.j. For Class 1 hazardous waste injection wells, testing and monitoring requirements shall include the following requirements for monitoring of the injected wastes:

8.4.2.j.1. The owner or operator shall develop and follow an approved written waste analysis plan that describes the procedures to be carried out to obtain a detailed chemical and physical analysis of a representative sample of the waste, including the quality assurance procedures used. At a minimum, the plan shall specify:

8.4.2.j.1.A. The parameters for which the waste will be analyzed and the rationale for the selection of these parameters;

8.4.2.j.1.B. The test methods that will be used to test for these parameters; and

8.4.2.j.1.C. The sampling method that will be used to obtain a representative sample of the waste to be analyzed.

8.4.2.j.2. The owner or operator shall repeat the analysis of the injected wastes as described in the waste analysis plan at frequencies specified in the waste analysis plan and when process or operating changes occur that may significantly alter the characteristics of the waste stream.

8.4.2.j.3. The owner or operator shall conduct continuous or periodic monitoring of selected parameters as required by the Director.

8.4.2.j.4. The owner or operator shall assure that the plan remains accurate and the analyses remain representative.

e8.4.3. Reporting requirements: The Director shall prescribe the form, manner, content and frequency of reporting by the operator. The operator shall be required to identify the types of tests and methods used to generate the monitoring data. At a minimum, requirements shall include:

e.1 8.4.3.a. Quarterly reports to the Director on:

e.1.A 8.4.3.a.1. The physical, chemical, and other relevant characteristics of injection fluids;

e.1.B 8.4.3.a.2. Monthly average, maximum, and minimum values for injection pressure, flow rate and volume, and annular pressure;

e.1.C 8.4.3.a.3. Monitoring of pressure and quality in underground sources of drinking water as prescribed under paragraph 8.4.b.42.d.; and

e.1.D 8.4.3.a.4. Descriptions of any event where operating parameters exceed permit requirements and/or any event that triggered an alarm or shut down device including the response taken.

8.4.3.a.5. The total volume of fluid injected

8.4.3.a.6. Any change in the annular fluid volume;"

e.2 8.4.3.b. Reporting with the first quarterly report after the completion of:

e.2.A 8.4.3.b.1. Periodic demonstration of mechanical integrity;

e.2.A 8.4.3.b.2. Any other test of injection well conducted by the permittee if required by the Director; and

e.2.A 8.4.3.b.3. Any well workover results.

e.3 8.4.3.c. Written notice to the Director within thirty (30) days after any compliance schedule date whether the permittee has or has not complied with the requirements in question;

e.4 8.4.3.d. Immediate reports to the Director of any violation of a permit condition or malfunction of the injection system which may cause fluid migration into or between underground sources of drinking water.

8.5. Information to be Considered by the Director Prior to the Issuance of a Permit.

a8.5.1. Prior to the issuance of a permit for an existing or new Class 1 well, the Director shall consider the following information: For an existing Class 1 well the Director may rely on the existing State permit file for those items of information listed below which are current and accurate in the State file. For a new Class 1 well, the Director shall require the submission of all the information listed below. For both existing and new Class 1 wells, paragraphs 8.5.a.31.c., 8.5.a.41.d., and 8.5.a.61.f. of this section may be included in the application by reference if the reference is specific in identifying the maps in question and the maps are readily available to the Director. The following information is required:

a.1 8.5.1.a. Any increase in the amount of hazardous waste or change in the type of hazardous waste injected;

~~a.2~~ 8.5.1.b. A map showing the injection well(s) for which a permit is sought and the applicable area of review. Within the area of review, the map must show the number or name, and location of all producing wells, injection wells, abandoned wells, dry holes, surface bodies of water, springs, mines (surface and subsurface), quarries, water wells and other pertinent surface features including residences and roads. The map should also show faults, if known or suspected. ~~Only information of public record is required to be included on this map;~~

~~a.3~~ 8.5.1.c. A tabulation of data on all wells within the area of review which penetrate into the proposed injection zone and/or confining zone. Such data shall include a description of each well's type, construction, date drilled, location, depth, record of plugging and/or completion, and any additional information on these wells as the Director may require;

~~a.3.A~~ 8.5.1.c.1. The protocol used to identify all wells within the area of review, and to determine if the wells are properly plugged.

~~a.4~~ 8.5.1.d. Maps and cross sections indicating the general vertical and lateral limits of all underground source of drinking water within the area of review, their position relative to the injection formation and the direction of water movement, where known, in each underground source of drinking water which may be affected by the proposed injection;

~~a.5~~ 8.5.1.e. Maps and cross sections detailing the geologic structure of the local area;

~~a.6~~ 8.5.1.f. Generalized maps and cross sections illustrating the regional geologic setting;

~~a.7~~ 8.5.1.g. Operating data:

~~a.7.A~~ 8.5.1.g.1. The anticipated average and maximum pressure and flow rate at which the permittee will operate; and

~~a.7.B~~ 8.5.1.g.2. Source and an analysis of the chemical, physical, radiological and biological characteristics of injection fluids;

~~a.8~~ 8.5.1.h. Formation testing program to obtain analysis of the chemical, physical, and radiological characteristics of and other information on the receiving formation;

~~a.8.A~~ 8.5.1.h.1. A determination that the geology of the area can be described confidently and that limits of waste fate and transport can be accurately predicted through the use of models.

~~a.9~~ 8.5.1.i. Stimulation program;

~~a.10~~ 8.5.1.j. Injection procedure;

~~a.11~~ 8.5.1.k. Schematic or other appropriate drawings of the surface and subsurface construction details of the well;

~~1.12~~ 8.5.1.l. Contingency plans to cope with all shut-ins or well failures so as to prevent migration of contaminating fluids into any underground source of drinking water;

~~1.13~~ 8.5.1.m. All available logging and testing program data on the well;

~~a.14~~ 8.5.1.n. Plans for meeting the monitoring requirements, including an Ambient monitoring plan. Owners/operators must develop a monitoring plan based on the site-specific assessment of the fluid migration potential. Pressure build up in the injection zone must be monitored annually;

~~a.15~~ 8.5.1.o. For wells within the area of review which penetrate the injection zone and/or confining zone but are not properly completed or plugged, the corrective action proposed to be taken under subsections 6.1 and 14.9;

~~a.16~~ 8.5.1.p. Construction procedures including a cementing and casing program, well materials specifications and their life expectancy, logging procedures, directional survey, and a drilling, testing, and coring program;

~~a.17~~ 8.5.1.q. Feasibility of monitoring permeable strata located between the injection zone and underground sources of drinking water;

~~a.18~~ 8.5.1.r. Compatibility of injected waste with fluids in the injection zone and minerals in both the injection zone and the confining strata including proving that injection fluid will not react with formation fluids and change relevant characteristics if the confining or injection zones so they would no longer meet requirements in 8.5.~~a~~1.;

~~a.19~~ 8.5.1.s. A certificate that the applicant has assured, through a performance bond or other appropriate means, the resources necessary to close, plug, or abandon the well and for post-closure care under subdivision 8.7, 8.8, 14.7.~~g~~7. and 8.5.~~b~~2.;

~~a.20~~ 8.5.1.t. A satisfactory demonstration of mechanical integrity under subdivision 14.7.8 ~~h.~~ and subsection 6.2;

~~a.21~~ 8.5.1.u. The calculated area of review;

~~a.22~~ 8.5.1.v. Owner/operator must have certification that the hazardous waste generator has a program to reduce the volume and toxicity of waste stream to the extent economically feasible; and injection of such waste minimizes the present and future threats to human health and the environment; and

~~a.23~~ 8.5.1.w. Such other information as the Director may reasonably require.

~~b~~8.5.2. Prior to granting approval for the plugging and abandonment of a Class 1 well the Director shall consider the following information:

~~b.1~~ 8.5.2.a. The type and number of plugs to be used;

~~b.2~~ 8.5.2.b. The placement of each plug including the elevation of the top and bottom;

~~b.3~~ 8.5.2.c. The type and grade and quantity of cement to be used;

~~b.4~~ 8.5.2.d. The method for placement of the plugs;

~~b.5~~ 8.5.2.e. The procedure to be used to meet the requirements of subsection 8.3;

~~b.6~~ 8.5.2.f. Any proposed test or measure to be made;

~~b.7~~ 8.5.2.g. The amount, size, and location (by depth) of casing and any other materials to be left in the well;

~~b.8~~ 8.5.2.h. The method and location where casing is to be parted, if applicable; and

~~b.9~~ 8.5.2.i. The estimated cost of closure;

8.6. Post-Closure Care

~~a~~8.6.1. The owner or operator of a Class 1 hazardous waste well shall prepare, maintain, and comply with a plan for post-closure care. The obligation to implement the plan survives the termination of a permit or the cessation of injection activities. The requirement to maintain an approved plan is directly enforceable regardless of whether the requirement is a condition of the permit. Any revision to the plan must be submitted no later than the date of the closure report. The plan shall assure financial responsibility. The owner or operator shall submit the plan as a part of the permit application and, upon approval by the Director, such plan shall be a condition of any permit issued. The plan shall include the following information:

~~a.1~~ 8.6.1.a. The pressure in the injection zone before injection began;

~~a.2~~ 8.6.1.b. The anticipated pressure in the injection zone at the time of closure;

~~a.3~~ 8.6.1.c. The predicted time until pressure in the injection zone decays to the point that the well's cone of influence no longer intersects the base of the lowermost USDW;

~~a.4~~ 8.6.1.d. Predicted position of waste front at closure;

~~a.5~~ 8.6.1.e. The status of any cleanups; and

~~a.6~~ 8.6.1.f. The estimated cost of post-closure care.

~~a.6.A~~ 8.6.1.f.1. The Director may modify the post-closure plan after submission of the closure report~~.~~ following the procedures in subdivision 14.18.

~~b~~8.6.2. Owners/operators shall:

~~b.1~~ 8.6.2.a. Continue any clean up actions and ground water monitoring until the cone of influence no longer intersects the base of the lowermost USDW;

~~b.2~~ 8.6.2.b. Retain records for 3 years~~;~~. The Director shall require the owner or operator to deliver the records to the Director at the conclusion of the retention period, and the records shall thereafter be retained at a location designated by the Director for that purpose;

~~b.3~~ 8.6.2.c. Submit a survey plat to the local zoning authority as well as to the Regional Administrator indicating the location of the well;

~~b.4~~ 8.6.2.d. Notify appropriate State agencies responsible for drilling activities; and

~~b.5~~ 8.6.2.e. Include a note on the property deed that the land was used to manage hazardous waste; the type and volume of waste injected.

~~e~~8.6.3. Each owner of a Class I hazardous waste injection well, and the owner of the property on which the well is located, must record a notation on the deed to the facility property that will in perpetuity provide the following information:

~~e.1~~ 8.6.3.a. The fact that land has been used to manage hazardous waste;

~~e.2~~ 8.6.3.b. The name of the Agency or local authority with which the plat was filed; and

~~e.3~~ 8.6.3.c. The type and volume of waste injected, the injection interval or intervals into which it was injected, and the period over which injection occurred.

~~d~~8.6.4. The owner/operator must demonstrate and maintain financial responsibility for post-closure care by using a trust fund, surety bond, letter of credit, financial test, insurance or corporate guarantee that meets the specifications for the mechanisms and instruments revised as appropriate to cover closure and post-closure care in 47-13-8.7 and 47-13-8.8. The amount of the funds available shall be no less than the amount identified in subdivision 8.6.1.f ~~6~~. The obligation to maintain financial responsibility for post-closure care survives the termination of a permit or the cessation of injection. This requirement is enforceable regardless of the fact that it is a permit condition.

8.7. Adoption of 40 CFR part 144, subpart f (financial responsibility: Class 1 hazardous waste injection wells):

Except as otherwise provided, the regulations of the United States environmental protection agency set forth in 40 CFR Part 144, Subpart F are hereby incorporated by reference.

8.8. Modifications, Exceptions, and Omissions. Except as otherwise provided, the following modifications, exceptions, and omissions are made to the incorporated federal regulations.

8.8.1. The following term defined in 40 CFR Section 144.61 has the meaning set forth herein, in lieu of the meaning set forth in 40 CFR Section 144.61: "plugging and abandonment plan" means the plan for plugging and abandonment prepared in accordance with the requirements of 47-13-14.7.6.

8.8.2. The following terms not defined in 40 CFR Part 144, Subsection F have the meanings set forth herein when the terms are used in this part:

8.8.2.a. "Administrator," "regional administrator" and other similar variations means the director of the Division of the Water and Waste Management , Department of Environment Protection, West Virginia or his/her designee;

8.8.2.b. "United States environmental protection agency" or "EPA" means Division of the Water and Waste Management , Department of Environment Protection, West Virginia except when used in 40 CFR Section 144.70(f).

8.8.3. The following provisions of 40 CFR Part 144, Subpart F are modified in 47-13-8.8:

8.8.3.a. Cross references to 40 CFR Part 144 shall be replaced by cross references to 47-13-7 through 47-13-8;

8.8.3.b. The cross reference to Sections 144.28 and 144.51 in Section 144.62(a) shall be replaced by a cross reference to 47-13-14.7.6;

8.8.3.c. References to EPA identification numbers in financial assurance documents shall be replaced by references to API well numbers (US well numbers);

8.8.3.d. Trust agreements prepared in accordance with 40 CFR Section 144.70(a) must state that they will be administered, construed, and enforced according to the laws of West Virginia;

8.8.3.e. The cross references to 40 CFR Parts 264, Subpart H and 265, Subpart H shall be modified to include cross references to 40 CFR Parts 264, Subpart H and 265, Subpart H and 33 CSR 20, sections 33-20-7.5 and 33-20-8.3.

8.8.4. The following provisions of 40 CFR Part 144, Subpart F are omitted from 47-13-8.7,

8.8.4.a. Section 144.65;

8.8.4.b. Section 144.66;

8.8.4.c. the third sentence in 40 CFR Section 144.63(h).

8.9. The Provisions of 40 CFR 148 subpart A and B are hereby adopted and incorporated by reference with modifications, exceptions, and additions set forth in this section.

8.9.1. The following provisions of 40 C.F.R. Part 148, Subparts A and B are excepted from incorporation by reference:

8.9.1.a. Section 148.1(c)(2);

8.9.1.b. Section 148.10(e)(2);

8.9.1.c. Section 148.11(b)(2);

8.9.1.d. Section 148.12(c)(2);

8.9.1.e. Section 148.14(j)(2);

8.9.1.f. Section 148.15(g)(2);

8.9.1.g. Section 148.16(g)(2);

8.9.1.h. Section 148.17(e)(2); and

8.9.1.i. Section 148.18(m)(2).

§47-13-9. Criteria and Standards Applicable to Class 2 Wells.

9.1. General

~~a~~9.1.1. The criteria and standards applicable to Class 2 wells shall be those which are required pursuant to W. Va. Code §§22-6 et seq. and 22C-9-1 et seq. and the rules thereunder, including W. Va. Code of State Rules §35-4, this rule, and any other requirements that the Director considers reasonably necessary to ensure that no pollution of USDWs occurs.

~~b~~9.1.2. Owners and operators of Class 2 wells shall obtain permits in accordance with the requirements of this section and section 14 of this rule.

9.2. Construction Requirements.

~~a~~9.2.1. All new Class 2 wells shall be cased and cemented to prevent the migration of fluids into or between underground sources of drinking water. The casing and cement used in the construction of

each newly drilled well shall be designed for the life expectancy of the well. In determining and specifying casing and cementing requirements, the Director shall consider the following factors:

~~a.1~~ 9.2.1.a. Depth to the injection zone;

~~a.2~~ 9.2.1.b. Estimated maximum and average injection pressures; and

~~a.3~~ 9.2.1.c. Depth to the bottom of all USDWs.

~~b~~9.2.2. Appropriate logs and other tests shall be conducted during the drilling and construction of new Class 2 wells. A descriptive report interpreting the results of such logs and tests shall be prepared by a knowledgeable log analyst and submitted to the Director. The Director may specify, as may be needed, the logs and tests appropriate to each type of Class 2 well based on the intended function, depth, construction and other characteristics of the well, availability of similar data in the area of the drilling site and the need for additional information that may arise from time to time as the construction of the well progresses. At a minimum, such logs and tests to be considered by the Director, may, as appropriate, include:

~~b.1~~ 9.2.2.a. Deviation checks at sufficiently frequent intervals to assure no fluid movement.

~~b.2~~ 9.2.2.b. For surface casing intended to protect underground sources of drinking water:

~~b.2.A~~ 9.2.2.b.1. Resistivity, spontaneous potential, and caliper logs before the casing is installed; and

~~b.2.B~~ 9.2.2.b.2. A cement bond, temperature, or density log after casing is set and cemented.

~~b.3~~ 9.2.2.c. For intermediate and long strings of casing intended to facilitate injection:

~~b.3.A~~ 9.2.2.c.1. Resistivity, spontaneous potential, porosity, and gamma ray logs before the casing is installed;

~~b.3.B~~ 9.2.2.c.2. Fracture finder logs in appropriate situations as prescribed by the Director; and

~~b.3.C~~ 9.2.2.c.3. A cement bond, temperature, or density log after the casing is set and cemented.

~~c~~9.2.3. The following information concerning the injection zone shall be determined or calculated for new Class 2 wells or projects:

~~c.1~~ 9.2.3.a. Fluid pressure;

~~c.2~~ 9.2.3.b. Fracture pressure; and

~~c.3~~ 9.2.3.c. Physical and chemical characteristics of the formation fluids.

9.3. Abandonment of Class 2 Wells.

~~a~~9.3.1. Class 2 wells shall be abandoned in a manner, prescribed by the Director, under subdivision 14.7.~~f~~6, and W. Va. Code §22-6 et seq. and the rules thereunder. At a minimum the well shall be plugged

with cement in a manner which will not allow movement of fluids either into or between underground sources of drinking water. The Director may allow Class 2 wells to use other plugging materials if he is satisfied that such materials will prevent movement of fluids into or between underground sources of drinking water.

~~b~~9.3.2. Placement of the cement plugs shall be accomplished by one of the following:

~~b.1~~ 9.3.2.a. The Balance Method;

~~b.2~~ 9.3.2.b. The Dump Bailer Method;

~~b.3~~ 9.3.2.c. The Two-Plug Method; or

~~b.4~~ 9.3.2.d. An alternative method approved by the Director, which will reliably provide a comparable level of protection to underground sources of drinking water.

~~c~~9.3.3. The well to be abandoned shall be in a state of static equilibrium before plugging commences with the mud weight equalized top to bottom, either by circulating the mud in the well at least once or a comparable method prescribed by the Director, prior to the placement of the cement plug(s).

9.4. Operating, Monitoring, and Reporting Requirements

~~a~~9.4.1. Operating Requirements: The Director shall prescribe requirements governing the operation of injection wells in the permit. Requirements for Class 2 wells shall, at a minimum, include that:

~~a.1~~ 9.4.1.a. Except during well stimulation the injection pressure at the wellhead shall be calculated so as to assure that the pressure in the injection zone during injection does not initiate new fractures or propagate existing fractures in the injection zone. In no case shall injection pressure initiate fractures in the confining zone or cause the migration of injection or formation fluids into an underground source of drinking water; and

~~a.2~~ 9.4.1.b. Injection between the outermost casing protecting underground sources of drinking water and the well bore shall be prohibited.

~~b~~9.4.2. Monitoring Requirements:

~~b.1~~ 9.4.2.a. Monitoring of the nature of injected fluids with sufficient frequency to yield representative data on its characteristics. Whenever the injection fluid is modified to the extent that the analysis required by subparagraph 9.5.~~a.6.B~~1.f.2. is incorrect or incomplete, a new analysis shall be provided to the Director;

~~b.2~~ 9.4.2.b. Monitoring of injection pressure, flow rate, and cumulative volume shall be conducted as follows: weekly for produced fluid disposal; monthly for enhanced recovery; daily during the injection of liquid hydrocarbons and injection for withdrawal of stored hydrocarbons; and daily during the injection phase of cyclic steam operations. Recording of one observation of injection pressure, flow rate, and cumulative volume shall be conducted at reasonable intervals not to exceed 30 days.

~~b.3~~ 9.4.2.c. Demonstration of mechanical integrity pursuant to subsection 6.2 shall be conducted at least every five (5) years during the life of the Class 2 injection well;

~~b.4~~ 9.4.2.d. Facilities must keep monitoring results until the next permit review; and

~~b.5~~ 9.4.2.e. All Class 2 hydrocarbon storage and enhanced recovery wells may be monitored on a field or project basis rather than an individual well basis by manifold monitoring. Manifold monitoring may be used in cases of facilities consisting of more than one injection well, operating with a common manifold. Separate monitoring systems for each well are not required provided the owner/operator demonstrates that manifold monitoring is comparable to individual well monitoring.

9.5. Information to be Considered by the Director Prior to the Issuance of a Permit.

~~a~~9.5.1. Prior to the issuance of a permit for an existing or new Class 2 well, the Director shall consider the following information at a minimum. For an existing Class 2 injection operation the Director may rely upon the existing permit file for these items of information listed below which are current and accurate in the State file. For a new Class 2 injection well, the Director shall require the submission of all the information listed below. For both existing and new Class 2 wells, paragraphs 9.5.~~a.2~~1.b., 9.5.~~a.3~~1.c. and 9.5.~~a.6~~1.f. of this section may be included by reference if the maps are specifically identified and readily available to the Director:

~~a.1~~ 9.5.1.a. A map showing the injection well or project area for which a permit is sought and the applicable area of review. Within the area of review, the map must show the number or name and location of all existing producing wells, injection wells, abandoned wells, and water wells. The map should also show surface bodies of water, mines (surface and subsurface), quarries and other pertinent surface features including residence and roads, and faults if known. All new class 2 injection wells shall be sited in such a manner that they inject into a formation which is separated from any USDW by a confining zone that is free of known open faults or fractures within the area of review. Only information of public record and pertinent information known to the applicant is required to be included on this map;

~~a.2~~ 9.5.1.b. Geologic name and depth to bottom of all USDW's affected by the injection.

~~a.3~~ 9.5.1.c. Maps and cross sections detailing the geologic structure of the local area; and

~~a.4~~ 9.5.1.d. Generalized maps and cross sections illustrating the regional geologic setting.

~~a.5~~ 9.5.1.e. A tabulation of data reasonably available for public records or otherwise known to the applicant on wells within the area of review. Such data shall include a description of each well's type, construction, date drilled, location, depth, record of plugging and completion, and any additional information the Director may require.

~~a.6~~ 9.5.1.f. Operating data:

~~a.6.A~~ 9.5.1.f.1. The anticipated average and maximum pressure and daily flow rate and injection volumes at which the permittee will operate;

~~a.6.B~~ 9.5.1.f.2. Characteristics and source of the injection fluid; and

~~a.6.C~~ 9.5.1.f.3. Geological data on the injection and confining zones.

~~a.7~~ 9.5.1.g. Schematic or other appropriate drawings of the surface and subsurface construction details of the well;

~~a.8~~ 9.5.1.h. The corrective action proposed to be taken under subsection 6.1;

~~a.9~~ 9.5.1.i. A certificate that the applicant has assured, through a performance bond or other appropriate means, the resources necessary to close, plug or abandon the well under subdivision 14.7.~~g~~7.; and

~~a.10~~ 9.5.1.j. A satisfactory demonstration of mechanical integrity for all new wells as required by subsection 6.2.

§47-13-10. Criteria and Standards Applicable to Class 3 Wells.

10.1. General. This section sets forth requirements for underground injection control programs to regulate Class 3 wells.

10.2. Construction Requirements. The Director shall prescribe requirements for the construction of Class 3 injection wells. Existing wells shall achieve compliance with such requirements according to a specific compliance schedule established by the Director as a condition of the permit. New wells shall be in compliance with construction requirements before injection operations begin. The owner or operator of a proposed injection well shall submit plans for testing, drilling and construction to the Director and obtain the approval of the Director of the initial plans as a condition of the permit. The Director's approval of any modifications of the plans shall be obtained before incorporating them into the construction of the injection well. At a minimum, such requirements shall specify that:

~~a~~10.2.1. All new Class 3 wells shall be cased and cemented to prevent the migration of fluids into or between underground sources of drinking water. The Director may waive the cementing requirements for new wells in existing projects or portions of existing projects where he has substantial evidence that no contamination of underground sources of drinking water would result. The casing and cement used in the construction of each newly drilled well shall be designed for the life expectancy of the well. In determining and specifying casing and cementing requirements, the Director shall consider the following factors:

~~a.1~~ 10.2.1.a. Depth to the injection zone;

~~a.2~~ 10.2.1.b. Injection pressure (external pressure, internal pressure, axial loading, etc.);

~~a.3~~ 10.2.1.c. Hole size;

~~a.4~~ 10.2.1.d. Size and grade of all casing strings (wall thickness, diameter, nominal weight, length, joint specification, construction material, etc.);

~~a.5~~ 10.2.1.e. Corrosiveness of injected and formation ~~fields~~; fluids;

~~a.6~~ 10.2.1.f. Lithology of possible injection and confining zones; and

~~a.7~~ 10.2.1.g. Type and grade of cement.

~~b~~10.2.2. All parts of Class 3 wells which will come into contact with corrosive fluids (whether injected or in the native environment) shall be constructed of corrosive resistant material.

~~c~~10.2.3. Appropriate logs and other tests shall be conducted during the drilling and construction of new Class 3 wells. A descriptive report interpreting the results of such logs and tests shall be prepared by a knowledgeable log analyst and submitted to the Director. The Director shall specify the logs and tests appropriate to each type of Class 3 well based on the intended function, depth, construction and other characteristics of the well, availability of similar data in the area of the drilling site and the need for

additional information that may arise from time to time as the construction of the well progresses. At a minimum, such logs and tests, shall, as appropriate, include:

~~c.1~~ 10.2.3.a. Deviation checks conducted on all holes where pilot holes and reaming are used, unless the hole will be cased and cemented by circulating cement to the surface. Where deviation checks are necessary, they shall be conducted at sufficiently frequent intervals to assure that vertical avenues for fluid migration in the form of diverging holes are not created during drilling;

~~c.2~~ 10.2.3.b. For surface casing intended to protect underground sources of drinking water:

~~c.2.A~~ 10.2.3.b.1. Resistivity, spontaneous potential, and caliper logs before the casing is installed; and

~~c.2.B~~ 10.2.3.b.2. A cement bond, temperature, or density log after casing is set and cemented.

~~c.3~~ 10.2.3.c. For intermediate and long strings of casing intended to facilitate injection:

~~c.3.A~~ 10.2.3.c.1. Resistivity, spontaneous potential, porosity, and gamma ray logs before the casing is installed;

~~c.3.B~~ 10.2.3.c.2. Fracture finder logs in appropriate situations as prescribed by the Director; and

~~c.3.C~~ 10.2.3.c.3. A cement bond, temperature, or density log after the casing is set and cemented.

~~d~~10.2.4. Where the injection zone is a formation which is naturally water bearing the following information concerning the injection zone shall be determined or calculated for new Class 3 wells or projects:

~~d.1~~ 10.2.4.a. Fluid pressure;

~~d.2~~ 10.2.4.b. Fracture pressure;

~~d.3~~ 10.2.4.c. Physical and chemical characteristics of the formation fluids; and

~~d.4~~ 10.2.4.d. The nature and volume of the injected fluid, the formation water and the process by-products.

~~e~~10.2.5. Where the injection formation is not a water bearing formation, the information in paragraph 10.2.~~d.2~~4.b. of this section must be submitted.

~~f~~10.2.6. Where injection is into a formation which contains water with less than ten thousand (10,000) mg/1 TDS monitoring wells shall be completed into the injection zone and into any underground sources of drinking water above the injection zone which could be affected by the mining operation. These wells shall be located in such a fashion as to detect any excursion of injection fluids, process by-products, or formation fluids outside the mining area or zone. If the operation may be affected by subsidence or catastrophic collapse the monitoring wells shall be located so that they will not be physically affected.

~~g~~10.2.7. Where injection is into a formation which does not contain water with less than ten thousand (10,000) mg/1 TDS, no monitoring wells are necessary in the injection stratum.

~~h~~10.2.8. Where the injection wells penetrate an USDW in an area subject to subsidence or catastrophic collapse an adequate number of monitoring wells shall be completed into the USDW to detect any movement of injected fluids, process by-products or formation fluids into the USDW. The monitoring wells shall be located outside the physical influence of the subsidence or catastrophic collapse.

~~i~~10.2.9. Determining the number, location, construction and frequency of monitoring of the monitoring wells the following criteria shall be considered:

~~i.1~~ 10.2.9.a. The population relying on the USDW affected or potentially affected by the injection operation;

~~i.2~~ 10.2.9.b. The proximity of the injection operation to points of withdrawal of drinking water;

~~i.3~~ 10.2.9.c. The local geology and hydrology;

~~i.4~~ 10.2.9.d. The operating pressures and whether a negative pressure gradient is being maintained;

~~i.5~~ 10.2.9.e. The nature and volume of the injected fluid, the formation water and the process by-products; and

~~i.6~~ 10.2.9.f. The injection well density.

10.3. Abandonment of Class 3 Wells.

~~a~~10.3.1. Class 3 wells shall be abandoned in a manner, prescribed by the Director, under subdivision 14.7.6~~f~~. At a minimum the well shall be plugged with cement in a manner which will not allow movement of fluids either into or between underground sources of drinking water. The Director may allow Class 3 wells to use other plugging materials if he is satisfied that such materials will prevent movement of fluids into or between underground sources of drinking water.

~~b~~10.3.2. Placement of the cement plugs shall be accomplished by one of the following:

~~b.1~~ 10.3.2.a. The Balance Method;

~~b.2~~ 10.3.2.b. The Dump Bailer Method;

~~b.3~~ 10.3.2.c. The Two-Plug Method; or

~~b.4~~ 10.3.2.d. An alternative method approved by the Director, which will reliably provide a comparable level of protection to underground sources of drinking water.

~~c~~10.3.3. The well to be abandoned shall be in a state of static equilibrium with the mud weight equalized top to bottom, either by circulating the mud in the well at least once or a comparable method prescribed by the Director, prior to the placement of the cement plug(s).

~~d~~10.3.4. The owners and operators shall assure, through a performance bond or other appropriate means, the availability of resources necessary for the proper abandonment of the well as required under subdivision 14.7.~~f~~6.

~~e~~10.3.5. The plugging and abandonment plan required in subdivision 14.7.~~f~~6. shall, in the case of a Class 3 project which underlies or is in an aquifer which has been exempted under section 3, also demonstrate adequate protection of USDWs. The Director shall prescribe aquifer cleanup and monitoring where he deems it necessary and feasible to insure adequate protection of USDWs.

10.4. Operating, Monitoring, and Reporting Requirements

~~a~~10.4.1. Operating Requirements: The Director shall prescribe requirements governing the operation of injection wells in the permit. Requirements for Class 3 wells shall, at a minimum, include that:

~~a.1~~ 10.4.1.a. Except during well stimulation the injection pressure at the wellhead shall be calculated so as to assure that the pressure in the injection zone during injection does not initiate new fractures or propagate existing fractures in the injection zone. In no case shall injection pressure initiate fractures in the confining zone or cause the migration of injection or formation fluids into an underground source of drinking water; and

~~a.2~~ 10.4.1.b. Injection between the outermost casing protecting underground sources of drinking water and the well bore shall be prohibited.

~~b~~10.4.2. Monitoring Requirements:

~~b.1~~ 10.4.2.a. Monitoring of the nature of injected fluids with sufficient frequency to yield representative data on its characteristics. Whenever the injection fluid is modified to the extent that the analysis required by subparagraph 10.5.~~a.6.B~~1.f.2. is incorrect or incomplete, a new analysis shall be provided to the Director;

~~b.2~~ 10.4.2.b. Monitoring of injection pressure and either flow rate or volume semi-monthly, or metering and daily recording of injected and produced fluid volumes as appropriate;

~~b.3~~ 10.4.2.c. Demonstration of mechanical integrity pursuant to subsection 6.2 at least every five (5) years during the life of the well for salt solution mining;

~~b.4~~ 10.4.2.d. Monitoring of the fluid level in the injection zone semi-monthly, where appropriate and monitoring of the parameters chosen to measure quality of water in the monitoring wells required by subdivision 10.2.~~f~~6 semi-monthly;

~~b.5~~ 10.4.2.e. Quarterly monitoring of wells required by subdivision 10.2.~~h~~8; and

~~b.6~~ 10.4.2.f. All Class 3 wells may be monitored on a field or project basis rather than an individual well basis by manifold monitoring. Manifold monitoring may be used in cases of facilities consisting of more than one injection well, operating with a common manifold. Separate monitoring systems for each well are not required provided the owner/operator demonstrates that manifold monitoring is comparable to individual well monitoring.

~~c~~10.4.3. Reporting Requirements: The Director shall prescribe the form, manner, content, and frequency of reporting by the permittee. The permittee shall be required to identify the types of tests and methods used to generate the monitoring data. At a minimum, requirements shall include:

~~c.1~~ 10.4.3.a. Quarterly monitoring of wells;

~~c.2~~ 10.4.3.b. Results of mechanical integrity and any other periodic test required by the Director reported with the first regular quarterly report after the completion of the test;

~~c.3~~ 10.4.3.c. Written notice to the Director within thirty (30) days of any compliance schedule date of whether the permittee has or has not complied with the requirements in question; and

~~c.4~~ 10.4.3.d. Immediate reports to the Director on any violation of a permit condition or malfunction of the injection system which may cause fluid migration into underground sources of drinking water.

10.5. Information to be Considered by the Director Prior to the Issuance of a Permit.

~~a~~10.5.1. Prior to the issuance of a permit for an existing or new Class 3 well, the Director shall consider the following information. For an existing Class 3 injection operation the Director may rely upon the existing permit file for these items of information listed below which are current and accurate in the State file. For a new Class 3 injection well the Director shall require the submission of all the information listed below. For both existing and new Class 3 wells, paragraphs 10.5.~~a.2~~1.b., 10.5.~~a.3~~1.c., and 10.5.~~a.6~~1.f. of this section may be included by reference if the maps are specifically identified and readily available to the Director:

~~a.1~~ 10.5.1.a. A map showing the injection well or project area for which a permit is sought and the applicable area of review. Within the area of review, the map must show the number or name and location of all existing producing wells, injection wells, abandoned wells, ~~and~~ dry holes, public water systems and water wells. The map may also show surface bodies of water, mines (surface and subsurface), quarries and other pertinent surface features including residence and roads, and faults if known or suspected. Only information of public record and pertinent information known to the applicant is required to be included on this map;

~~a.2~~ 10.5.1.b. Maps and cross sections indicating the vertical and lateral limits of all underground sources of drinking water within the area of review, their position relative to the injection formation, and the direction of water movement, where known, in every underground source of drinking water which may be affected by the proposed injection.;

~~a.3~~ 10.5.1.c. Maps and cross sections detailing the geologic structure of the local area;

~~a.4~~ 10.5.1.d. Generalized maps and cross sections illustrating the regional geologic setting;

~~a.5~~ 10.5.1.e. A tabulation of data reasonably available for public records or otherwise known to the applicant on all wells within the area of review included on the map which penetrate the proposed injection zone. Such data shall include a description of each well's type, construction, date drilled, location, depth, record of plugging and completion, and any additional information the Director may require. In cases where the information may be repetitive and the wells are of similar age, type and construction the Director may elect to only require data on a representative number of wells;

~~a.6~~ 10.5.1.f. Operating data:

~~a.6.A~~ 10.5.1.f.1. The anticipated average and maximum pressure and flow rate at which the permittee will operate;

~~a.6.B~~ 10.5.1.f.2. Qualitative analysis and ranges in concentrations of all constituents of injected fluids. The applicant may request confidentiality;

If the information is proprietary an applicant may, in lieu of the ranges in concentrations, choose to submit maximum concentrations which shall not be exceeded. In such a case the applicant shall retain records of the undisclosed concentrations and provide them upon request to the Director as part of any enforcement investigation; and

~~a.6.C~~ 10.5.1.f.3. An analysis of the physical and chemical characteristics of the formation.

~~a.7~~ 10.5.1.g. Formation testing program;

~~a.8~~ 10.5.1.h. Stimulation program;

~~a.9~~ 10.5.1.i. Injection procedure;

~~a.10~~ 10.5.1.j. Schematic or other appropriate drawings of the surface and subsurface construction details of the well;

~~a.11~~ 10.5.1.k. Plans (including maps) for meeting the monitoring requirements of subdivision 10.4.b;

~~a.12~~ 10.5.1.l. Expected changes in pressure, native fluid displacement, direction of movement of injection fluid;

~~a.13~~ 10.5.1.m. Contingency plans to cope with all shut-ins or well failures so as to prevent the migration of contaminating fluids into underground sources of drinking water;

~~a.14~~ 10.5 1.n. All available logging and testing data on the well;

~~a.15~~ 10.5.1.o. The corrective action proposed to be taken under subsection 6.1;

~~a.16~~ 10.5.1.p. A certificate that the applicant has assured, through a performance bond or other appropriate means, the resources necessary to close, plug or abandon the well under subdivision 14.7.~~f~~6.; and

~~a.17~~ 10.5.1.q. A satisfactory demonstration of mechanical integrity for all new wells and for all existing salt solution wells as required by subsection 6.2.

~~b~~10.5.2. Prior to granting approval for the plugging and abandonment of a Class 3 well the Director shall consider the following information:

~~b.1~~ 10.5.2.a. The type and number of plugs to be used;

~~b.2~~ 10.5.2.b. The placement of each plug including the elevation of the top and bottom;

~~b.3~~ 10.5.2.c. The type, grade and quantity of cement to be used;

~~b.4~~ 10.5.2.d. The method of placement of the plugs; and

~~b.5~~ 10.5.2.e. The procedure to be used to meet the requirements of subsection 10.3.

§47-13-11. Criteria and Standards Applicable to Class 4 Wells.

11.1. General.

~~a~~11.1.1. This section sets forth criteria and standards for underground injection control programs to regulate wells, including non-residential septic system wells, used by generators of hazardous wastes or owners and operators of hazardous waste management facilities to inject into or above strata that contain an underground source of drinking water.

~~b~~11.1.2. All new Class 4 wells are prohibited.

11.2. Notification by Owners and Operators. The owner or operator of an existing Class 4 well shall submit to the Director:

~~a~~11.2.1. Notice of the existence of any Class 4 well under his control; and

~~b~~11.2.2. Information regarding the well.

11.3. Closure of Class 4 Wells.

~~a~~11.3.1. The operation of any existing Class 4 well shall be prohibited six (6) months after the effective date of this rule.

~~b~~11.3.2. In determining the enforcement strategy and time allowed for closure, the Director shall consider the following criteria:

~~b.1~~ 11.3.2.a. Population relying on the underground source of drinking water affected or potentially affected by the injection;

~~b.2~~ 11.3.2.b. Local geology and hydrology;

~~b.3~~ 11.3.2.c. Toxicity and volume of injected fluid; and

~~b.4~~ 11.3.2.d. Injection well density.

~~c~~11.3.3. The owners or operators of Class 4 wells shall be notified by certified mail of the time by which closure must be accomplished as decided upon by the Director and, if appropriate, of a compliance schedule leading to closure.

~~d~~11.3.4. Nothing in this section is intended to limit the Director in taking immediate action necessary to protect the health of persons.

~~e~~11.3.5. Class 4 Wells should not be in operation unless as part of an EPA administered program. Therefore, closure shall follow federal rules 40 CFR 144.23.

11.4. Monitoring and Reporting Requirements. The Director shall prescribe monitoring and reporting requirements for existing Class 4 wells while they are operating.

~~a~~11.4.1. Monitoring requirements shall, at a minimum include:

~~a.1~~ 11.4.1.a. Record keeping as required in W. Va. Code §22-18 and rules thereunder.

~~a.3~~ 11.4.1.b. Weekly monitoring of existing water supply wells in the vicinity for parameters based upon the characteristics of the injection fluids.

~~a.3~~ 11.4.1.c. Maintenance of the results of monitoring under subdivision 14.6.~~b~~2. and paragraph 14.12.~~j.2~~10.b.

~~b~~11.4.2. Reporting requirements shall prescribe the form, manner, content and frequency of reports to the Director. The permittee shall be required to identify the types of tests and methods used to generate the monitoring data. At a minimum, the requirements shall include:

~~b.1~~ 11.4.2.a. Quarterly reporting of the results of monitoring required under subdivision 11.4.~~a~~1. of this section;

~~b.2~~ 11.4.2.b. Immediate notification to the Director of any change in the concentration of any parameter measured at an existing water supply well; and

~~b.3~~ 11.4.2.c. Written notification to the Director within thirty (30) days after any compliance schedule date of whether the owner or operator has or has not complied with the requirements in question.

§47-13-12. Criteria and Standards Applicable to Class 5 Injection Wells.

12.1. General. This section sets forth requirements for underground injection control programs to regulate all injection not regulated in sections 8, 9, 10, 11, and 13. Generally, wells covered in this section inject non-hazardous fluids into strata that contain underground sources of drinking water. It includes, but is not limited to, the following types of injection wells: Waste disposal wells, such as drainage wells, cooling water return flow wells, air conditioning return flow wells, salt water barrier wells and subsidence control wells (not associated with oil and gas production).

~~a~~12.1.1. All new large capacity cesspools are prohibited.

~~b~~12.1.2. All existing large capacity cesspools must be closed by April 5, 2005.

~~c~~12.1.3. All new motor vehicle waste disposal wells are prohibited.

~~d~~12.1.4. All existing motor vehicle waste disposal wells must be closed by January 1, 2005, or operated in compliance with Section 14.1.2. and 4~~b.and d~~. of this rule such that the Director will require wells to be permitted and maintained.

~~e~~12.1.5. Applicants for permits for existing MVWDWs must meet MCLs at the point of injection while the permit application is under review. If a permit is issued for a MVWDW, the permittee must comply with permit requirements including requirements to meet MCLs and other health-based standards at the point of injection.

12.2. Inventory and Assessment.

~~a~~12.2.1. The owner or operator of any Class 5 well shall within one (1) year of the effective date of this rule notify the Director of the existence of any well meeting the definition of Class 5 under his control, and submit a description of:

~~a.1~~ 12.2.1.a. The construction features of the well;

~~a.2~~ 12.2.1.b. The nature and volume of injected fluids;

~~a.3~~ 12.2.1.c. The alternative means of disposal available to the operator;

~~a.4~~ 12.2.1.d. The environmental and economic consequences of well disposal and its alternatives;

~~a.5~~ 12.2.1.e. Facility name and location;

~~a.6~~ 12.2.1.f. Name and address of legal contact;

~~a.7~~ 12.2.1.g. Ownership of facility;

~~a.8~~ 12.2.1.h. Nature and type of injection wells; and

~~a.9~~ 12.2.1.i. Operating status of injection wells.

12.3. Requirement. If at any time the Director gains knowledge of a Class 5 well which presents a significant risk to the health of persons, he/she shall prescribe such action as necessary (including the immediate closure of the injection well) to remove such risk.

12.4. Wells Regulated by Rule and Permit.

~~a~~12.4.1. Certain Class 5 wells may be authorized by rule pursuant to subsection 14.2., unless the Director requires an individual permit. Permits shall be for continuous injection of Class 5 liquids such as septic system drain field discharges and stormwater. While rule authorization is intended for temporary (based on timing or number of injections) or limited injections, including but not limited to remediation treatment fluids.

~~b~~12.4.2. Information to be considered by the Director prior to issuance of a permit.

~~12.4.b.1. (Reserved).~~

§47-13-13. Criteria and Standards Applicable to Class 6 Wells.

13.1. General. This section sets forth requirements for underground injection control programs to regulate Class 6 carbon dioxide geologic sequestration wells. This section establishes criteria and standards for underground injection control programs to regulate any Class 6 carbon dioxide geologic sequestration injection wells, for long-term containment of a gaseous, liquid, or supercritical carbon dioxide stream in subsurface geologic formations.

~~a~~13.1.1. This subpart also applies to owners or operators of permit or rule-authorized Class 1, Class 2, or Class 5 experimental carbon dioxide injection projects who seek to apply for a Class 6 geologic sequestration permit for their well or wells. Owners or operators seeking to convert existing Class 1, Class 2, or Class 5 experimental wells to Class 6 geologic sequestration wells must demonstrate to the Director that the wells were engineered and constructed to meet the requirements at subsection 13.3.~~a~~1.and ensure protection of USDWs, in lieu of requirements at subsection 13.3.~~b~~2., 13.3.~~b.1~~2.a. and 13.5. By December 10, 2011, owners or operators of either Class 1 wells previously permitted for the

purpose of geologic sequestration or Class 5 experimental technology wells no longer being used for experimental purposes that will continue injection of carbon dioxide for the purpose of GS must apply for a Class 6 permit. A converted well must still meet all other requirements under section 13-13.

~~a.1~~ 13.1.1.a. The construction, operation or maintenance of any non-experimental Class V geologic sequestration well is prohibited.

~~a.2~~ 13.1.1.b. Owners or operators of Class 6 wells must obtain a permit. Class 6 wells cannot be authorized by rule to inject carbon dioxide.

~~b~~13.1.2. Existing well means a Class 6 well which was authorized prior to August 25, 1988 or a well which has become a Class 6 well as a result of a change in the definition of the injected waste into a waste hazardous waste.

~~c~~13.1.3. Transitioning to a Class 6 Well from a Class II Well. Owners or operators that are injecting carbon dioxide for the primary purpose of long-term storage into an oil and gas reservoir must apply for and obtain a Class 6 geologic sequestration permit when there is an increased risk to USDWs compared to Class II operations. In determining if there is an increased risk to USDWs, the owner or operator as well as the Director must consider:

~~c.1~~ 13.1.3.a. Increase in reservoir pressure within the injection zone(s);

~~c.2~~ 13.1.3.b. Increase in carbon dioxide injection rates;

~~c.3~~ 13.1.3.c. Decrease in reservoir production rates;

~~c.4~~ 13.1.3.d. Distance between the injection zone(s) and USDWs;

~~c.5~~ 13.1.3.e. Suitability of the Class II area of review delineation;

~~c.6~~ 13.1.3.f. Quality of abandoned well plugs within the area of review;

~~c.7~~ 13.1.3.g. The owner's or operator's plan for recovery of carbon dioxide at the cessation of injection;

~~c.8~~ 13.1.3.h. The source and properties of injected carbon dioxide; and

~~c.9~~ 13.1.3.i. Any additional site-specific factors as determined by the Director.

13.2. Minimum Criteria for Siting.

~~a~~13.2.1. Owners or operators of Class 6 wells must demonstrate to the satisfaction of the Director that the wells will be sited in areas with a suitable geologic system. The owners or operators must demonstrate that the geologic system comprises:

~~a.1~~ 13.2.1.a. An injection zone(s) of sufficient areal extent, thickness, porosity, and permeability to receive the total anticipated volume of the carbon dioxide stream;

~~a.2~~ 13.2.1.b. Confining zone(s) free of transmissive faults or fractures and of sufficient areal extent and integrity to contain the injected carbon dioxide stream and displaced formation fluids and

allow injection at proposed maximum pressures and volumes without initiating or propagating fractures in the confining zone(s).

~~b~~13.2.2. The Director may require owners or operators of Class 6 wells to identify and characterize additional zones that will impede vertical fluid movement, are free of faults and fractures that may interfere with containment, allow for pressure dissipation, and provide additional opportunities for monitoring, mitigation, and remediation.

13.3. Construction Requirements. The Director shall prescribe requirements for the construction of Class 6 injection wells. Existing wells shall achieve compliance with such requirements according to a specific compliance schedule established by the Director as a condition of the permit. New wells shall be in compliance with construction requirements before injection operations begin. The owner or operator of a proposed injection well shall submit plans to the Director for testing, drilling, and construction and obtain the approval of the initial plans as a condition of the permit. The Director's approval of any modifications of the plan shall be obtained before incorporating them into the construction of the injection well. At a minimum, such requirements shall prescribe that:

~~a~~13.3.1. Each Class 6 well is constructed and completed to:

~~a.1~~ 13.3.1.a. Prevent the movement of fluids into or between USDWs or into any unauthorized zones;

~~a.2~~ 13.3.1.b. Permit the use of appropriate testing devices and workover tools; and

~~a.3~~ 13.3.1.c. Permit continuous monitoring of the annulus space between the injection tubing and long string casing.

~~b~~13.3.2. Casing and cementing of Class 6 wells.

~~b.1~~ 13.3.2.a. Casing and cement or other materials used in the construction of each Class 6 well must have sufficient structural strength and be designed for the life of the geologic sequestration project. All well materials must be compatible with fluids with which the materials may be expected to come into contact and must meet or exceed standards developed for such materials by the American Petroleum Institute, ASTM International, or comparable standards acceptable to the Director.
The casing and cementing program must be designed to prevent the movement of fluids into or between USDWs. In order to allow the Director to determine and specify casing and cementing requirements, the owner or operator must provide the following information:

~~b.1.A~~ 13.3.2.a.1. Depth to the injection zone(s);

~~b.1.B~~ 13.3.2.a.2. Injection pressure, external pressure, internal pressure, and axial loading;

~~b.1.C~~ 13.3.2.a.3. Hole size;

~~b.1.D~~ 13.3.2.a.4. Size and grade of all casing strings (wall thickness, external diameter, nominal weight, length, joint specification, and construction material);

~~b.1.E~~ 13.3.2.a.5. Corrosiveness of the carbon dioxide stream and formation fluids;

~~b.1.F~~ 13.3.2.a.6. Down-hole temperatures;

~~b.1.G~~ 13.3.2.a.7. Lithology of injection and confining zone(s);

~~b.1.H~~ 13.3.2.a.8. Type or grade of cement and cement additives; and

~~b.1.I~~ 13.3.2.a.9. Quantity, chemical composition, and temperature of the carbon dioxide stream.

~~b.2~~ 13.3.2.b. Surface casing must extend through the base of the lowermost USDW and be cemented to the surface through the use of a single or multiple strings of casing and cement.

~~b.3~~ 13.3. 2.c. At least one long string casing, using a sufficient number of centralizers, must extend to the injection zone and must be cemented by circulating cement to the surface in one or more stages.

~~b.4~~ 13.3.2.d. Circulation of cement may be accomplished by staging. The Director may approve an alternative method of cementing in cases where the cement cannot be recirculated to the surface, provided the owner or operator can demonstrate by using logs that the cement does not allow fluid movement behind the well bore.

~~b.5~~ 13.3.2.e. Cement and cement additives must be compatible with the carbon dioxide stream and formation fluids and of sufficient quality and quantity to maintain integrity over the design life of the geologic sequestration project. The integrity and location of the cement shall be verified using technology capable of evaluating cement quality radially and identifying the location of channels to ensure that USDWs are not endangered.

~~c~~13.3.3. Tubing and packer.

~~c.1~~ 13.3.3.a. Tubing and packer materials used in the construction of each Class 6 well must be compatible with fluids with which the materials may be expected to come into contact and must meet or exceed standards developed for such materials by the American Petroleum Institute, ASTM International, or comparable standards acceptable to the Director.

~~c.2~~ 13.3.3.b. All owners or operators of Class 6 wells must inject fluids through tubing with a packer set at a depth opposite a cemented interval at the location approved by the Director.

~~c.3~~ 13.3.3.c. In order for the Director to determine and specify requirements for tubing and packer, the owner or operator must submit the following information:

~~c.3.A~~ 13.3.3.c.1. Depth of setting;

~~c.3.B~~ 13.3.3.c.2. Characteristics of the carbon dioxide stream (chemical content, corrosiveness, temperature, and density) and formation fluids;

~~c.3.C~~ 13.3.3.c.3. Maximum proposed injection pressure;

~~c.3.D~~ 13.3.3.c.4. Maximum proposed annular pressure;

~~c.3.F~~ 13.3.3.c.5. Proposed injection rate (intermittent or continuous) and volume and/or mass of the carbon dioxide stream;

~~c.3.G~~ 13.3.3.c.6. Size of tubing and casing; and

~~c.3.H~~ 13.3.3.c.7. Tubing tensile, burst, and collapse strengths.

13.4. Abandonment of Class 6 Wells. Owners and operators shall abandon Class 6 wells in a manner to be prescribed by the Director under sub-division 14.7.~~f~~6., in addition to the following:

~~a~~13.4.1. Prior to the well plugging, the owner or operator must flush each Class 6 injection well with a buffer fluid, determine bottomhole reservoir pressure, and perform a final external mechanical integrity test.

~~b~~13.4.2. Well plugging plan. The owner or operator of a Class 6 well must prepare, maintain, and comply with a plan that is acceptable to the Director. The requirement to maintain and implement an approved plan is directly enforceable regardless of whether the requirement is a condition of the permit. The well plugging plan must be submitted as part of the permit application and must include the following information:

~~b.1~~ 13.4.2.a. Appropriate tests or measures for determining bottomhole reservoir pressure;

~~b.2~~ 13.4.2.b. Appropriate testing methods to ensure external mechanical integrity as specified in section 6.2;

~~b.3~~ 13.4.2.c. The type and number of plugs to be used;

~~b.4~~ 13.4.2.d. The placement of each plug, including the elevation of the top and bottom of each plug;

~~b.5~~ 13.4.2.e. The type, grade, and quantity of material to be used in plugging. The material must be compatible with the carbon dioxide stream; and

~~b.6~~ 13.4.2.f. The method of placement of the plugs.

~~c~~13.4.3. Notice of intent to plug. The owner or operator must notify the Director in writing pursuant to subsection 13.6.~~c.1.E~~3.a.5., at least 60 days before plugging of a well. At this time, if any changes have been made to the original well plugging plan, the owner or operator must also provide the revised well plugging plan. The Director may allow for a shorter notice period. Any amendments to the injection well plugging plan must be approved by the Director, must be incorporated into the permit, and are subject to the permit modification requirements at sections 14.18 and 14.20 of this rule, as appropriate.

~~d~~13.4.4. Plugging report. Within 60 days after plugging, the owner or operator must submit, pursuant to subsection 13.6.~~c.1.E~~3.a.5., a plugging report to the Director. The report must be certified as accurate by the owner or operator and by the person who performed the plugging operation (if other than the owner or operator.) The owner or operator shall retain the well plugging report for 10 years following site closure.

13.5. Logging, Sampling, and Testing Prior to Injection Well Operation.

~~a~~13.5.1. During the drilling and construction of a Class 6 injection well, the owner or operator must run appropriate logs, surveys and tests to determine or verify the depth, thickness, porosity, permeability, and lithology of, and the salinity of any formation fluids in all relevant geologic formations to ensure conformance with the injection well construction requirements under section 13.3 and to establish accurate baseline data against which future measurements may be compared. The owner or operator must submit to the Director a descriptive report prepared by a knowledgeable log analyst that includes an interpretation of the results of such logs and tests. At a minimum, such logs and tests must include:

~~a.1~~ 13.5.1.a. Deviation checks during drilling on all holes constructed by drilling a pilot hole which is enlarged by reaming or another method. Such checks must be at sufficiently frequent intervals to determine the location of the borehole and to ensure that vertical avenues for fluid movement in the form of diverging holes are not created during drilling; and

~~a.2~~ 13.5.1.b. Before and upon installation of the surface casing:

~~a.2.A~~ 13.5.1.b.1. Resistivity, spontaneous potential, and caliper logs before the casing is installed; and

~~a.2.B~~ 13.5.1.b.2. A cement bond and variable density log to evaluate cement quality radially, and a temperature log after the casing is set and cemented.

~~a.3~~ 13.5.1.c. Before and upon installation of the long string casing:

~~a.3.A~~ 13.5.1.c.1. Resistivity, spontaneous potential, porosity, caliper, gamma ray, fracture finder logs, and any other logs the Director requires for the given geology before the casing is installed; and

~~a.3.B~~ 13.5.1.c.2. A cement bond and variable density log, and a temperature log after the casing is set and cemented.

~~a.4~~ 13.5.1.d. A series of tests designed to demonstrate the internal and external mechanical integrity of injection wells, which may include:

~~a.4.A~~ 13.5.1.d.1. A pressure test with liquid or gas;

~~a.4.B~~ 13.5.1.d.2. A tracer survey such as oxygen-activation logging;

~~a.4.C~~ 13.5.1.d.3. A temperature or noise log;

~~a.4.D~~ 13.5.1.d.4. A casing inspection log; and

~~a.5~~ 13.5.1.e. Any alternative methods that provide equivalent or better information and that are required by and/or approved of by the Director.

~~b~~13.5.2. The owner or operator must take whole cores or sidewall cores of the injection zone and confining system and formation fluid samples from the injection zone(s), and must submit to the Director a detailed report prepared by a log analyst that includes: Well log analyses (including well logs), core analyses, and formation fluid sample information. The Director may accept information on cores from nearby wells if the owner or operator can demonstrate that core retrieval is not possible and that such cores are representative of conditions at the well. The Director may require the owner or operator to core other formations in the borehole.

~~c~~13.5.3. The owner or operator must record the fluid temperature, pH, conductivity, reservoir pressure, and static fluid level of the injection zone(s).

~~d~~13.5.4. At a minimum, the owner or operator must determine or calculate the following information concerning the injection and confining zone(s):

~~d.1~~ 13.5.4.a. Fracture pressure;

~~d.2~~ 13.5.4.b. Other physical and chemical characteristics of the injection and confining zone(s); and

~~d.3~~ 13.5.4.c. Physical and chemical characteristics of the formation fluids in the injection zone(s).

~~e~~13.5.5. Upon completion, but prior to operation, the owner or operator must conduct the following tests to verify hydrogeologic characteristics of the injection zone(s):

~~e.1~~ 13.5.5.a. A pressure fall-off test; and,

~~e.2~~ 13.5.5.b. A pump test; or

~~e.3~~ 13.5.5.c. Injectivity tests.

~~f~~13.5.6. The owner or operator must provide the Director with the opportunity to witness all logging and testing by this subpart. The owner or operator must submit a schedule of such activities to the Director 30 days prior to conducting the first test and submit any changes to the schedule 30 days prior to the next scheduled test.

13.6. Operating, Monitoring, and Reporting Requirements.

~~a~~13.6.1. Operating Requirements: The Director shall, under subdivision 14.7.~~e~~3., prescribe requirements governing the operation of injection wells in the permit. Requirements for Class 6 wells shall, at a minimum, specify that:

~~a.1~~ 13.6.1.a. Except during stimulation, the owner or operator must ensure that injection pressure does not exceed 90 percent of the fracture pressure of the injection zone(s) so as to ensure that the injection does not initiate new fractures or propagate existing fractures in the injection zone(s). In no case may injection pressure initiate fractures in the confining zone(s) or cause the movement of injection or formation fluids that endangers a USDW. Pursuant to requirements at subsection 13.8.~~a.9~~1.i., all stimulation programs must be approved by the Director as part of the permit application and incorporated into the permit.

~~a.2~~ 13.6.1.b. Injection between the outermost casing protecting underground sources of drinking water and the well bore is prohibited; and

~~a.2.A~~ 13.6.1.b.1. The owner or operator must fill the annulus between the tubing and the long string casing with a non-corrosive fluid approved by the Director. The owner or operator must maintain on the annulus a pressure that exceeds the operating injection pressure, unless the Director determines that such requirement might harm the integrity of the well or endanger USDWs.

~~a.3~~ 13.6.1.c. Other than during periods of well workover (maintenance) approved by the Director in which the sealed tubing-casing annulus is disassembled for maintenance or corrective procedures, the owner or operator must maintain mechanical integrity of the injection well at all times.

~~a.4~~ 13.6.1.d. The owner or operator must install and use:

~~a.4.A~~ 13.6.1.d.1. Continuous recording devices to monitor: The injection pressure; the rate, volume and/or mass, and temperature of the carbon dioxide stream; and the pressure on the annulus between the tubing and the long string casing and annulus fluid volume; and

~~a.4.B~~ 13.6.1.d.2. Alarms and automatic surface shut-off systems or, at the discretion of the Director, down-hole shut-off systems (e.g., automatic shut-off, check valves) for onshore wells or, other mechanical devices that provide equivalent protection; and

~~a.4.C~~ 13.6.1.d.3. Alarms and automatic down-hole shut-off systems for wells located offshore but within State territorial waters, designed to alert the operator and shut-in the well when

operating parameters such as annulus pressure, injection rate, or other parameters diverge beyond permitted ranges and/or gradients specified in the permit.

~~a.5~~ 13.6.1.e. If a shutdown (*i.e.,* down-hole or at the surface) is triggered or a loss of mechanical integrity is discovered, the owner or operator must immediately investigate and identify as expeditiously as possible the cause of the shutoff. If, upon such investigation, the well appears to be lacking mechanical integrity, or if monitoring required under paragraph (e) of this section otherwise indicates that the well may be lacking mechanical integrity, the owner or operator must:

~~a.5.A~~ 13.6.1.e.1. Immediately cease injection;

~~a.5.B~~ 13.6.1.e.2. Take all steps reasonably necessary to determine whether there may have been a release of the injected carbon dioxide stream or formation fluids into any unauthorized zone;

~~a.5.C~~ 13.6.1.e.3. Notify the Director within 24 hours;

~~a.5.D~~ 13.6.1.e.4. Restore and demonstrate mechanical integrity to the satisfaction of the Director prior to resuming injection; and

~~a.5.E~~ 13.6.1.e.5. Notify the Director when injection can be expected to resume.

~~b~~13.6.2. Testing and monitoring requirements. The owner or operator of a Class 6 well must prepare, maintain, and comply with a testing and monitoring plan to verify that the geologic sequestration project is operating as permitted and is not endangering USDWs. The requirement to maintain and implement an approved plan is directly enforceable regardless of whether the requirement is a condition of the permit. The testing and monitoring plan must be submitted with the permit application, for Director approval, and must include a description of how the owner or operator will meet the requirements of this section, including accessing sites for all necessary monitoring and testing during the life of the project. Testing and monitoring associated with geologic sequestration projects must, at a minimum, include:

~~b.1~~ 13.6.2.a. Analysis of the carbon dioxide stream with sufficient frequency to yield data representative of its chemical and physical characteristics;

~~b.2~~ 13.6.2.b. Installation and use, except during well workovers as defined in subsection 13.6.1.c~~a.3~~., of continuous recording devices to monitor injection pressure, rate, and volume; the pressure on the annulus between the tubing and the long string casing; and the annulus fluid volume added;

~~b.3~~ 13.6.2.c. Corrosion monitoring of the well materials for loss of mass, thickness, cracking, pitting, and other signs of corrosion, which must be performed on a quarterly basis to ensure that the well components meet the minimum standards for material strength and performance set forth in subsection 13.3.~~b~~2. and 13.3.~~b.1~~2.a., by:

~~b.3.A~~ 13.6.2.c.1. Analyzing coupons of the well construction materials placed in contact with the carbon dioxide stream; or

~~b.3.B~~ 13.6.2.c.2. Routing the carbon dioxide stream through a loop constructed with the material used in the well and inspecting the materials in the loop; or

~~b.3.C~~ 13.6.2.c.3. Using an alternative method approved by the Director;

~~b.4~~ 13.6.2.d. Periodic monitoring of the ground water quality and geochemical changes above the confining zone(s) that may be a result of carbon dioxide movement through the confining zone(s) or additional identified zones including:

~~b.4.A~~ 13.6.2.d.1. The location and number of monitoring wells based on specific information about the geologic sequestration project, including injection rate and volume, geology, the presence of artificial penetrations, and other factors; and

~~b.4.A~~ 13.6.2.d.2. The monitoring frequency and spatial distribution of monitoring wells based on baseline geochemical data that has been collected under subsection 13.8.1.f ~~a.6~~. and on any modeling results in the area of review evaluation required by subsection 14.9.3~~e~~.

~~b.5~~ 13.6.2.e. A demonstration of external mechanical integrity pursuant to subsection 6.2.3 ~~e~~. at least once per year until the injection well is plugged; and, if required by the Director, a casing inspection log pursuant to requirements at subsection 6.2.3.e.1 ~~e.5.A~~. at a frequency established in the testing and monitoring plan;

~~b.6~~ 13.6.2.f. A pressure fall-off test at least once every five years unless more frequent testing is required by the Director based on site-specific information;

~~b.7~~ 13.6.2.g. Testing and monitoring to track the extent of the carbon dioxide plume and the presence or absence of elevated pressure (e.g., the pressure front) by using:

~~b.7.A~~ 13.6.2.g.1. Direct methods in the injection zone(s); and,

~~b.7.B~~ 13.6.2.g.2. Indirect methods (e.g., seismic, electrical, gravity, or electromagnetic surveys and/or down-hole carbon dioxide detection tools), unless the Director determines, based on site-specific geology, that such methods are not appropriate;

~~b.8~~ 13.6.2.h. The Director may require surface air monitoring and/or soil gas monitoring to detect movement of carbon dioxide that could endanger a USDW.

~~b.8.A~~ 13.6.2.h.1. Design of Class 6 surface air and/or soil gas monitoring must be based on potential risks to USDWs within the area of review;

~~b.8.B~~ 13.6.2.h.2. The monitoring frequency and spatial distribution of surface air monitoring and/or soil gas monitoring must be decided using baseline data, and the monitoring plan must describe how the proposed monitoring will yield useful information on the area of review delineation and/or compliance with standards under § 47 CSR 13-14.1.;

~~b.8.C~~ 13.6.2.h.3. If an owner or operator demonstrates that monitoring employed under § 40 CFR 98.440 to 98.449 of this chapter (Clean Air Act, 42 U.S.C. 7401 *et seq.*) accomplishes the goals of 13.6.~~b.8.A~~2.h.1., and 13.6.~~b.8.B~~2.h.2. above, and meets the requirements pursuant to 13.6.~~e.1.C.v~~3.a.3.E., a Director that requires surface air/soil gas monitoring must approve the use of monitoring employed under § 40 CFR 98.440 to 98.449 of this chapter. Compliance with § 40 CFR 98.440 to 98.449 of this chapter pursuant to this provision is considered a condition of the Class 6 permit;

~~b.9~~ 13.6.2.i. Any additional monitoring, as required by the Director, necessary to support, upgrade, and improve computational modeling of the area of review evaluation required under subsection 14.9.~~e~~3. and to determine compliance with standards under section 14.1 of this rule;

~~b.10~~ 13.6.2.j. The owner or operator shall periodically review the testing and monitoring plan to incorporate monitoring data collected under this subpart, operational data collected under section 13.6., and the most recent area of review reevaluation performed under subsection 14.9.~~e~~5. In no case shall the owner or operator review the testing and monitoring plan less often than once every five years. Based on this review, the owner or operator shall submit an amended testing and monitoring plan or demonstrate to the Director that no amendment to the testing and monitoring plan is needed. Any amendments to the testing

and monitoring plan must be approved by the Director, must be incorporated into the permit, and are subject to the permit modification requirements at sections 14.8 and 14.20 of this rule, as appropriate. Amended plans or demonstrations shall be submitted to the Director as follows:

~~b.10.A~~ 13.6.2.j.1. Within one year of an area of review reevaluation;

~~b.10.B~~ 13.6.2.j.2. Following any significant changes to the facility, such as addition of monitoring wells or newly permitted injection wells within the area of review, on a schedule determined by the Director; or

~~b.10.C~~ 13.6.2.j.3. When required by the Director.

~~b.11~~ 13.6.2.k. A quality assurance and surveillance plan for all testing and monitoring requirements.

~~e~~13.6.3. Reporting requirements: The Director shall prescribe the form, manner, content, and frequency of reporting by the operator. The operator shall be required to identify the types of tests and methods used to generate the monitoring data. At a minimum, requirements shall include:

~~c.1~~ 13.6.3.a. The owner or operator must, at a minimum, provide, as specified in 13.6.~~c.1.E~~3.a.5., the following reports to the Director, for each permitted Class 6 well:

~~c.1.A.~~ 13.6.3.a.1. Semi-annual reports containing:

~~c.1.A.i~~ 13.6.3.a.1.A. Any changes to the physical, chemical, and other relevant characteristics of the carbon dioxide stream from the proposed operating data;

~~c.1.A.ii~~ 13.6.3.a.1.B. Monthly average, maximum, and minimum values for injection pressure, flow rate and volume, and annular pressure;

~~c.1.A.iii~~ 13.6.3.a.1.C. A description of any event that exceeds operating parameters for annulus pressure or injection pressure specified in the permit;

~~c.1.A.iv~~ 13.6.3.a.1.D. A description of any event which triggers a shut-off device required pursuant to subsection 13.6.~~a.4~~1.d. and the response taken;

~~c.1.A.v~~ 13.6.3.a.1.E. The monthly volume and/or mass of the carbon dioxide stream injected over the reporting period and the volume injected cumulatively over the life of the project;

~~c.1.A.vi~~ 13.6.3.a.1.F. Monthly annulus fluid volume added; and

~~c.1.A.vii~~ 13.6.3.a.1.G. The results of monitoring prescribed under subsection 13.6.~~b~~2.

~~c.1.B~~ 13.6.3.a.2. Report, within 30 days, the results of:

~~c.1.B.i~~ 13.6.3.a.2.A. Periodic tests of mechanical integrity;

~~c.1.B.ii~~ 13.6.3.a.2.B. Any well workover; and,

~~c.1.B.iii~~ 13.6.3.a.2.C. Any other test of the injection well conducted by the permittee if required by the Director.

~~c.1.C~~ 13.6.3.a.3. Report, within 24 hours:

~~c.1.C.i~~ 13.6.3.a.3.A. Any evidence that the injected carbon dioxide stream or associated pressure front may cause an endangerment to a USDW;

~~e.1.C.ii~~ 13.6.3.a.3.B. Any noncompliance with a permit condition, or malfunction of the injection system, which may cause fluid migration into or between USDWs;

~~e.1.C.iii~~ 13.6.3.a.3.C. Any triggering of a shut-off system (*i.e.,* down-hole or at the surface);

~~e.1.C.iv~~ 13.6.3.a.3.D. Any failure to maintain mechanical integrity; or.

~~e.1.C.v~~ 13.6.3.a.3.E. Pursuant to compliance with the requirement at subsection 13.6.~~b.8~~2.h. for surface air/soil gas monitoring or other monitoring technologies, if required by the Director, any release of carbon dioxide to the atmosphere or biosphere.

~~e.1.D~~ 13.6.3.a.4. Owners or operators must notify the Director in writing 30 days in advance of:

~~e.1.D.i~~ 13.6.3.a.4.A. Any planned well workover;

13.6.3.a.4.B. Any planned stimulation activities, other than stimulation for formation testing conducted under subsection 13.8.~~e.4~~3.d., and

~~e.1.D.ii~~ 13.6.3.a.4.C. Any other planned test of the injection well conducted by the permittee.

~~e.1.E~~ 13.6.3.a.5. Regardless of whether a State has primary enforcement responsibility, owners or operators must submit all required reports, submittals, and notifications under subpart H of § 40 CFR 146 to EPA in an electronic format approved by EPA.

~~e.1.F~~ 13.6.3.a.6. Records shall be retained by the owner or operator as follows:

~~e.1.F.i~~ 13.6.3.a.6.A. All data collected under §47-13-13.8. for Class permit applications shall be retained throughout the life of the geologic sequestration project and for 10 years following site closure.

~~e.1.F.ii~~ 13.6. 3.a.6.B. Data on the nature and composition of all injected fluids collected pursuant to subsection 13.6.b.1. shall be retained until 10 years after site closure. The Director may require the owner or operator to deliver the records to the Director at the conclusion of the retention period.

~~e.1.F.iii~~ 13.6.3.a.6.C. Monitoring data collected pursuant to subsections 13.6.~~b.2~~2.b. through 13.6.2.i ~~b.9~~. shall be retained for 10 years after it is collected.

~~e.1.F.iv~~ 13.6.3.a.6.D. Well plugging reports, post-injection site care data, including, if appropriate, data and information used to develop the demonstration of the alternative post-injection site care timeframe, and the site closure report collected pursuant to requirements at subsections 13.9.~~f~~6. and 13.9.~~h~~8. shall be retained for 10 years following site closure.

~~e.1.F.v~~ 13.6. 3.a.6.E. The Director has authority to require the owner or operator to retain any records required in this subpart for longer than 10 years after site closure.

13.7. Emergency and Remedial Response.

~~a~~13.7.1. As part of the permit application, the owner or operator must provide the Director with an emergency and remedial response plan that describes actions the owner or operator must take to address movement of the injection or formation fluids that may cause an endangerment to a USDW during

construction, operation, and post-injection site care periods. The requirement to maintain and implement an approved plan is directly enforceable regardless of whether the requirement is a condition of the permit.

~~b~~13.7.2. If the owner or operator obtains evidence that the injected carbon dioxide stream and associated pressure front may cause an endangerment to a USDW, the owner or operator must:

~~b.1~~ 13.7.2.a. Immediately cease injection;

~~b.2~~ 13.7.2.b. Take all steps reasonably necessary to identify and characterize any release;

~~b.3~~ 13.7.2.c. Notify the Director within 24 hours; and

~~b.4~~ 13.7.2.d. Implement the emergency and remedial response plan approved by the Director.

~~c~~13.7.3. The Director may allow the operator to resume injection prior to remediation if the owner or operator demonstrates that the injection operation will not endanger USDWs.

~~d~~13.7.4. The owner or operator shall periodically review the emergency and remedial response plan developed under paragraph (a) of this section. In no case shall the owner or operator review the emergency and remedial response plan less often than once every five years. Based on this review, the owner or operator shall submit an amended emergency and remedial response plan or demonstrate to the Director that no amendment to the emergency and remedial response plan is needed. Any amendments to the emergency and remedial response plan must be approved by the Director, must be incorporated into the permit, and are subject to the permit modification requirements at sections 14.8 and 14.20 of this rule, as appropriate. Amended plans or demonstrations shall be submitted to the Director as follows:

~~d.1~~ 13.7.4.a. Within one year of an area of review reevaluation;

~~d.2~~ 13.7.4.b. Following any significant changes to the facility, such as addition of injection or monitoring wells, on a schedule determined by the Director; or

~~d.3~~ 13.7.4.c. When required by the Director.

13.8. Required Class 6 Permit Information.

~~a~~13.8.1. Prior to the issuance of a permit for the construction of a new Class 6 well or the conversion of an existing Class I, Class 2, or Class 5 well to a Class 6 well, the owner or operator shall submit, pursuant to 13.6.~~c.1.E~~3.a.5., and the Director shall consider the following:

~~a.1~~ 13.8.1.a. Information required in section 10.~~d~~4. of this rule;

~~a.2~~ 13.8.1.b. A map showing the injection well for which a permit is sought and the applicable area of review consistent with section 5.4. and subsection 14.9.~~b.5~~2.c. Within the area of review, the map must show the number or name, and location of all injection wells, producing wells, abandoned wells, plugged wells or dry holes, deep stratigraphic boreholes, State- or EPA-approved subsurface cleanup sites, surface bodies of water, springs, mines (surface and subsurface), quarries, water wells, other pertinent surface features including structures intended for human occupancy, State, Tribal, and Territory boundaries, and roads. The map should also show faults, if known or suspected. Only information of public record is required to be included on this map;

~~a.3~~ 13.8.1.c. Information on the geologic structure and hydrogeologic properties of the proposed storage site and overlying formations, including:

~~a.3.A~~ 13.8.1.c.1. Maps and cross sections of the area of review;

~~a.3.B~~ 13.8.1.c.2. The location, orientation, and properties of known or suspected faults and fractures that may transect the confining zone(s) in the area of review and a determination that they would not interfere with containment;

~~a.3.C~~ 13.8.1.c.3. Data on the depth, areal extent, thickness, mineralogy, porosity, permeability, and capillary pressure of the injection and confining zone(s); including geology/facies changes based on field data which may include geologic cores, outcrop data, seismic surveys, well logs, and names and lithologic descriptions;

~~a.3.D~~ 13.8.1.c.4. Geo-mechanical information on fractures, stress, ductility, rock strength, and in situ fluid pressures within the confining zone(s);

~~a.3.E~~ 13.8.1.c.5. Information on the seismic history including the presence and depth of seismic sources and a determination that the seismicity would not interfere with containment; and

~~a.3.F~~ 13.8.1.c.6. Geologic and topographic maps and cross sections illustrating regional geology, hydrogeology, and the geologic structure of the local area.

~~a.4~~ 13.8.1.d. A tabulation of all wells within the area of review which penetrate the injection or confining zone(s). Such data must include a description of each well's type, construction, date drilled, location, depth, record of plugging and/or completion, and any additional information the Director may require;

~~a.5~~ 13.8.1.e. Maps and stratigraphic cross sections indicating the general vertical and lateral limits of all USDWs, water wells and springs within the area of review, their positions relative to the injection zone(s), and the direction of water movement, where known;

~~a.6~~ 13.8.1.f. Baseline geochemical data on subsurface formations, including all USDWs in the area of review;

~~a.7~~ 13.8.1.g. Proposed operating data for the proposed geologic sequestration site:

~~a.7.A~~ 13.8.1.g.1. Average and maximum daily rate and volume and/or mass and total anticipated volume and/or mass of the carbon dioxide stream;

~~a.7.B~~ 13.8.1.g.2. Average and maximum injection pressure;

~~a.7.C~~ 13.8.1.g.3. The source(s) of the carbon dioxide stream; and

~~a.7.D~~ 13.8.1.g.4. An analysis of the chemical and physical characteristics of the carbon dioxide stream.

~~a.8~~ 13.8.1.h. Proposed pre-operational formation testing program to obtain an analysis of the chemical and physical characteristics of the injection zone(s) and confining zone(s) and that meets the requirements at section 13.5.;

~~a.9~~ 13.8.1.i. Proposed stimulation program, a description of stimulation fluids to be used and a determination that stimulation will not interfere with containment;

~~a.10~~ 13.8.1.j. Proposed procedure to outline steps necessary to conduct injection operation;

~~a.11~~ 13.8.1.k. Schematics or other appropriate drawings of the surface and subsurface construction details of the well;

~~a.12~~ 13.8.1.l. Injection well construction procedures that meet the requirements of section 13.3;

~~a.13~~ 13.8.1.m. Proposed area of review and corrective action plan that meets the requirements under section 5.4. and subsection 14.9.~~b.5~~2.e.;

~~a.14~~ 13.8.1.n. A demonstration, satisfactory to the Director, that the applicant has met the financial responsibility requirements under subsection 14.7.~~g~~7.;

~~a.15~~ 13.8.1.o. Proposed testing and monitoring plan required by subsection 13.6.~~b~~2.;

~~a.16~~ 13.8.1.p. Proposed injection well plugging plan required by subsection 13.4.~~b~~2.;

~~a.17~~ 13.8.1.q. Proposed post-injection site care and site closure plan required by subsection 13.9.~~a~~1.;

~~a.18~~13.8.1.r. At the Director's discretion, a demonstration of an alternative post-injection site care timeframe required by subsection 13.9.~~e~~3.;

~~a.19~~ 13.8.1.s. Proposed emergency and remedial response plan required by subsection 13.7.~~a~~1.;

~~a.20~~ 13.8.1.t. A list of contacts, submitted to the Director, for those States, Tribes, and Territories identified to be within the area of review of the Class 6 project based on information provided in subsection 13.8.~~a.2~~1.b. of this section; and

~~a.21~~ 13.8.1.u. Any other information requested by the Director.

~~b~~13.8.2. The Director shall notify, in writing, any States, Tribes, or Territories within the area of review of the Class 6 project based on information provided in paragraphs (a)(2) and (a)(20) of this section of the permit application and pursuant to the requirements at § 40CFR 145.23(f)(13).

~~e~~13.8.3. Prior to granting approval for the operation of a Class 6 well, the Director shall consider the following information:

~~e.1~~ 13.8.3.a. The final area of review based on modeling, using data obtained during logging and testing of the well and the formation as required by subsections 13.8.~~e.2~~3.b., 13.8.~~e.3~~3.c., 13.8.~~e.4~~3.d., 13.8.~~e.6~~3.f., 13.8.~~e.7~~3.g., and 13.8.~~e.10~~3.j.;

~~e.2~~ 13.8.3.b. Any relevant updates, based on data obtained during logging and testing of the well and the formation as required by subsections 13.8.~~e.3~~3.c., 13.8.~~e.4~~3.d., 13.8.~~e.6~~3.f., 13.8.~~e.7~~3.g., and 13.8.~~e.10~~3.j., to the information on the geologic structure and hydrogeologic properties of the proposed storage site and overlying formations, submitted to satisfy the requirements of subsection 13.8.~~a.3~~1.c.;

~~e.3~~ 13.8 3.c. Information on the compatibility of the carbon dioxide stream with fluids in the injection zone(s) and minerals in both the injection and the confining zone(s), based on the results of the formation testing program, and with the materials used to construct the well;

~~e.4~~ 13.8.3.d. The results of the formation testing program required at subsection 13.8.~~a.8~~1.h.;

~~e.5~~ 13.8.3.e. Final injection well construction procedures that meet the requirements of section 13.3.;

~~e.6~~ 13.8.3.f. The status of corrective action on wells in the area of review;

~~e.7~~ 13.8.3.g. All available logging and testing program data on the well required by section 13.5.;

~~e.8~~ 13.8.3.h. A demonstration of mechanical integrity pursuant to section 6.2;

~~e.9~~ 13.8.3.i. Any updates to the proposed area of review and corrective action plan, testing and monitoring plan, injection well plugging plan, post-injection site care and site closure plan, or the emergency and remedial response plan submitted under subsection 13.8.~~a~~1., which are necessary to address new information collected during logging and testing of the well and the formation as required by all paragraphs of this section, and any updates to the alternative post-injection site care timeframe demonstration submitted under subsection 13.8.~~a~~1., which are necessary to address new information collected during the logging and testing of the well and the formation as required by all paragraphs of this section; and

~~e.10~~ 13.8.3.j. Any other information requested by the Director.

~~d~~13.8.4. Owners or operators seeking a waiver of the requirement to inject below the lowermost USDW must also refer to subsection 14.8.4~~d~~. and submit a supplemental report, as required at subsection 14.8.~~d.1~~4.a. The supplemental report is not part of the permit application.

13.9. Post-injection Site Care and Site Closure.

~~a~~13.9.1. The owner or operator of a Class 6 well must prepare, maintain, and comply with a plan for post-injection site care and site closure that meets the requirements of subsection 13.9.~~a.2~~1.b. and is acceptable to the Director. The requirement to maintain and implement an approved plan is directly enforceable regardless of whether the requirement is a condition of the permit.

~~a.1~~ 13.9.1.a. The owner or operator must submit the post-injection site care and site closure plan as a part of the permit application to be approved by the Director.

~~a.2~~ 13.9.1.b. The post-injection site care and site closure plan must include the following information:

~~a.2.A~~ 13.9.1.b.1. The pressure differential between pre-injection and predicted post-injection pressures in the injection zone(s);

~~a.2.B~~ 13.9.1.b.2. The predicted position of the carbon dioxide plume and associated pressure front at site closure as demonstrated in the area of review evaluation required under subsection 14.9.3.a.~~e.1.~~;

~~a.2.C~~ 13.9.1.b.3. A description of post-injection monitoring location, methods, and proposed frequency;

~~a.2.D~~ 13.9.1.b.4. A proposed schedule for submitting post-injection site care monitoring results to the Director pursuant to subsection 13.6.3.a.5 ~~e.1.E.~~; and,

~~a.2.E~~ 13.9.1.b.5. The duration of the post-injection site care timeframe and, if approved by the Director, the demonstration of the alternative post-injection site care timeframe that ensures non-endangerment of USDWs.

~~a.3~~ 13.9.1.c. Upon cessation of injection, owners or operators of Class 6 wells must either submit an amended post-injection site care and site closure plan or demonstrate to the Director through

monitoring data and modeling results that no amendment to the plan is needed. Any amendments to the post-injection site care and site closure plan must be approved by the Director, be incorporated into the permit, and are subject to the permit modification requirements at sections 14.18 and 14.20 of this rule, as appropriate.

~~a.4~~ 13.9.1.d. At any time during the life of the geologic sequestration project, the owner or operator may modify and resubmit the post-injection site care and site closure plan for the Director's approval within 30 days of such change.

~~b~~13.9.2. The owner or operator shall monitor the site following the cessation of injection to show the position of the carbon dioxide plume and pressure front and demonstrate that USDWs are not being endangered.

~~b.1~~ 13.9.2.a. Following the cessation of injection, the owner or operator shall continue to conduct monitoring as specified in the Director-approved post-injection site care and site closure plan for at least 50 years or for the duration of the alternative timeframe approved by the Director pursuant to requirements in subsection 13.9.~~e~~3., unless he/she makes a demonstration under subsection 13.9.2.b.~~b.2~~. The monitoring must continue until the geologic sequestration project no longer poses an endangerment to USDWs and the demonstration under subsection 13.9.2.b.~~b.2~~. is submitted and approved by the Director.

~~b.2~~ 13.9.2.b. If the owner or operator can demonstrate to the satisfaction of the Director before 50 years or prior to the end of the approved alternative timeframe based on monitoring and other site-specific data, that the geologic sequestration project no longer poses an endangerment to USDWs, the Director may approve an amendment to the post-injection site care and site closure plan to reduce the frequency of monitoring or may authorize site closure before the end of the 50-year period or prior to the end of the approved alternative timeframe, where he or she has substantial evidence that the geologic sequestration project no longer poses a risk of endangerment to USDWs.

~~b.3~~ 13.9.2.c. Prior to authorization for site closure, the owner or operator must submit to the Director for review and approval a demonstration, based on monitoring and other site-specific data, that no additional monitoring is needed to ensure that the geologic sequestration project does not pose an endangerment to USDWs.

~~b.4~~ 13.9.2.d. If the demonstration in subsection 13.9.~~b.3~~2.c. cannot be made (*i.e.,* additional monitoring is needed to ensure that the geologic sequestration project does not pose an endangerment to USDWs) at the end of the 50-year period or at the end of the approved alternative timeframe, or if the Director does not approve the demonstration, the owner or operator must submit to the Director a plan to continue post-injection site care until a demonstration can be made and approved by the Director.

~~e~~13.9.3. Demonstration of alternative post-injection site care timeframe. At the Director's discretion, the Director may approve, in consultation with EPA, an alternative post-injection site care timeframe other than the 50 year default, if an owner or operator can demonstrate during the permitting process that an alternative post-injection site care timeframe is appropriate and ensures non-endangerment of USDWs. The demonstration must be based on significant, site-specific data and information including all data and information collected pursuant to section 13.8. and subsection 13.2.~~a~~1., and must contain substantial evidence that the geologic sequestration project will no longer pose a risk of endangerment to USDWs at the end of the alternative post-injection site care timeframe.

~~e.1~~ 13.9.3.a. A demonstration of an alternative post-injection site care timeframe must include consideration and documentation of:

~~e.1.A~~ 13.9.3.a.1. The results of computational modeling performed pursuant to delineation of the area of review under section 5.4.;

~~e.1.B~~ 13.9.3.a.2. The predicted timeframe for pressure decline within the injection zone, and any other zones, such that formation fluids may not be forced into any USDWs; and/or the timeframe for pressure decline to pre-injection pressures;

~~e.1.C~~ 13.9.3.a.3. The predicted rate of carbon dioxide plume migration within the injection zone, and the predicted timeframe for the cessation of migration;

~~e.1.D~~ 13.9.3.a.4. A description of the site-specific processes that will result in carbon dioxide trapping including immobilization by capillary trapping, dissolution, and mineralization at the site;

~~e.1.E~~ 13.9.3.a.5. The predicted rate of carbon dioxide trapping in the immobile capillary phase, dissolved phase, and/or mineral phase;

~~e.1.G~~ 13.9.3.a.6. The results of laboratory analyses, research studies, and/or field or site-specific studies to verify the information required in subsections 13.9.~~e.1.D~~3.a.4. and 13.9.~~e.1.E~~3.a.5.;

~~e.1.H~~ 13.9.3.a.7. A characterization of the confining zone(s) including a demonstration that it is free of transmissive faults, fractures, and micro-fractures and of appropriate thickness, permeability, and integrity to impede fluid (e.g., carbon dioxide, formation fluids) movement;

~~e.1.I~~ 13.9.3.a.8. The presence of potential conduits for fluid movement including planned injection wells and project monitoring wells associated with the proposed geologic sequestration project or any other projects in proximity to the predicted/modeled, final extent of the carbon dioxide plume and area of elevated pressure;

~~e.1.J~~ 13.9.3.a.9. A description of the well construction and an assessment of the quality of plugs of all abandoned wells within the area of review;

~~e.1.K~~ 13.9.3.a.10. The distance between the injection zone and the nearest USDWs above and/or below the injection zone; and

~~e.1.L~~ 13.9.3.a.11. Any additional site-specific factors required by the Director.

~~e.2~~ 13.9.3.b. Information submitted to support the demonstration in subsection 13.9.~~e.1~~3.a. must meet the following criteria:

~~e.2.A~~ 13.9.3.b.1. All analyses and tests performed to support the demonstration must be accurate, reproducible, and performed in accordance with the established quality assurance standards;

~~e.2.B~~ 13.9.3.b.2. Estimation techniques must be appropriate and EPA-certified test protocols must be used where available;

~~e.2.C~~ 13.9 3.b.3. Predictive models must be appropriate and tailored to the site conditions, composition of the carbon dioxide stream and injection and site conditions over the life of the geologic sequestration project;

~~e.2.D~~ 13.9.3.b.4. Predictive models must be calibrated using existing information (e.g., at Class 1, Class 2, or Class 5 experimental technology well sites) where sufficient data are available;

~~e.2.E~~ 13.9.3.b.5. Reasonably conservative values and modeling assumptions must be used and disclosed to the Director whenever values are estimated on the basis of known, historical information instead of site-specific measurements;

~~e.2.F~~ 13.9.3.b.6. An analysis must be performed to identify and assess aspects of the alternative post-injection site care timeframe demonstration that contribute significantly to uncertainty. The owner or operator must conduct sensitivity analyses to determine the effect that significant uncertainty may contribute to the modeling demonstration.

~~e.2.G~~ 13.9.3.b.7. An approved quality assurance and quality control plan must address all aspects of the demonstration; and,

~~e.2.H~~ 13.9.3.b.8. Any additional criteria required by the Director.

~~d~~13.9.4. Notice of intent for site closure. The owner or operator must notify the Director in writing at least 120 days before site closure. At this time, if any changes have been made to the original post-injection site care and site closure plan, the owner or operator must also provide the revised plan. The Director may allow for a shorter notice period.

~~e~~13.9.5. After the Director has authorized site closure, the owner or operator must plug all monitoring wells in a manner which will not allow movement of injection or formation fluids that endangers a USDW.

~~f~~13.9.6. The owner or operator must submit a site closure report to the Director within 90 days of site closure, which must thereafter be retained at a location designated by the Director for 10 years. The report must include:

~~f.1~~ 13.9.6.a. Documentation of appropriate injection and monitoring well plugging as specified in section 13.4. and subsection 13.9.5~~e~~. The owner or operator must provide a copy of a survey plat which has been submitted to the local zoning authority designated by the Director. The plat must indicate the location of the injection well relative to permanently surveyed benchmarks. The owner or operator must also submit a copy of the plat to the Regional Administrator of the appropriate EPA Regional Office;

~~f.2~~ 13.9.6.b. Documentation of appropriate notification and information to such State, local and Tribal authorities that have authority over drilling activities to enable such State, local, and Tribal authorities to impose appropriate conditions on subsequent drilling activities that may penetrate the injection and confining zone(s); and

~~f.3~~ 13.9.6.c. Records reflecting the nature, composition, and volume of the carbon dioxide stream.

~~g~~13.9.7. Each owner or operator of a Class 6 injection well must record a notation on the deed to the facility property or any other document that is normally examined during title search that will in perpetuity provide any potential purchaser of the property the following information:

~~g.1~~ 13.9.7.a. The fact that land has been used to sequester carbon dioxide;

~~g.2~~ 13.9.7.b. The name of the State agency, local authority, and/or Tribe with which the survey plat was filed, as well as the address of the Environmental Protection Agency Regional Office to which it was submitted; and

~~g.3~~ 13.9.7.c. The volume of fluid injected, the injection zone or zones into which it was injected, and the period over which injection occurred.

~~h~~13.9.8. The owner or operator must retain for 10 years following site closure, records collected during the post-injection site care period. The owner or operator must deliver the records to the Director at the conclusion of the retention period, and the records must thereafter be retained at a location designated by the Director for that purpose.

§47-13-14. Injection Well Permitting Program.

14.1. General Prohibition and Prohibition of Movement of Fluid into Underground Sources of Drinking Water.

~~a~~14.1.1. Underground injection is prohibited unless authorized by permit or rule. The construction of any well required to have a permit is prohibited until the permit has been issued.

~~b~~14.1.2. No owner or operator shall construct, operate, maintain, convert, plug, abandon or conduct any other underground injection activity in a manner which causes or allows the movement of fluid containing any contaminant into underground sources of drinking water, if the presence of that contaminant may cause a violation of any primary drinking water regulation under 40 CFR Part 142 or promulgated pursuant to W. Va. Code §16-1-1 et seq., or may otherwise adversely affect the health of persons. The applicant for a permit shall have the burden of showing that the requirements of this paragraph are met.

~~c~~14.1.3. For Class 1, 2, 3, and 6 wells, if any water quality monitoring of an USDW indicates the movement of any contaminant into USDW except as authorized under this rule, the Director shall prescribe such additional requirements for construction, corrective action, operation, monitoring, or reporting (including closure of the injection well) as are necessary to prevent such movement. In the case of wells authorized by permit, these additional requirements shall be imposed by modifying the permit or the permit may be revoked if cause exists, or appropriate enforcement action may be taken if the permit has been violated. In the case of wells authorized by rule, see subsection 14.2.

~~d~~14.1.4. For Class 5 wells, if at any time the Director learns that a Class 5 well may cause a violation of primary drinking water rules under 40 CFR Part 142 or W. Va. Code §16-1-1 et seq., he or she shall:

~~d.1~~ 14.1.4.a. Require the injector to obtain an individual permit;

~~d.2~~ 14.1.4.b. Order the injector to take such actions (including where required closure of the injection well) as may be necessary to prevent the violation; or

~~d.3~~ 14.1.4.c. Take enforcement action.

~~e~~14.1.5. Whenever the Director learns that a Class 5 well may be otherwise adversely affecting the health of persons, he or she may prescribe such actions as may be necessary to prevent the adverse effect, including any action authorized under subdivision 14.2.~~d~~4. of this section.

~~f~~14.1.6. Notwithstanding any other provision of this section, the Director may take emergency action under W. Va. Code §22-11-19 upon receipt of information that a contaminant which is present in or

is likely to enter a public water system or USDW may present an imminent and substantial endangerment to health of persons.

14.2. Authorization of Underground Injection by Rule.

~~a~~14.2.1. Types of underground injection which may be authorized by rule. Facilities may be authorized by rule under this rule as outlined in this paragraph. Underground injections not authorized by rule or permit are prohibited:

~~a.1~~ 14.2.1.a. Injection into existing or new Class 5 wells may be authorized by rule for periods up to one (1) year from the effective date of this rule. Rule authorizations may be reissued annually; however, all such wells must be issued permits within five (5) years or close down at the end of the fifth year's authorization period.

~~a.2~~ 14.2.1.b. Class 5 rule authorization is limited to groundwater remediation agent injections; and

~~a.3~~ 14.2.1.c. In the case of Class 5 wells, at the time of application for injection approval, the applicability of this rule is undetermined, such as:

~~a.3.A~~ 14.2.1.c.1. Septic systems which receive solely sanitary wastes and the number of people the system has the capacity to serve has not been determined; especially existing systems that must be evaluated by the health department for capacity, however authorization by rule terminates upon establishing the system is incapable of serving at least 20 people in a day; or

~~a.3.B~~ 14.2.1.c.2. For systems deemed capable of serving 20 or more people unless an application for permit is submitted in accordance with 14.3.~~b~~2.

~~a.4~~ 14.2.1.d. An existing or new Class 5 septic system capable of serving less than 20 people but which receives an alternate waste stream may be authorized by rule while a determination of the applicability of this rule is made, such as in the case of:

~~a.4.A~~ 14.2.1.d.1. Meat processing facilities, kennels, beauty salons, or other facilities with waste streams, other than sanitary waste.

~~a.5~~ 14.2.1.e. However, the Director has authority to withdraw the authorization if required under this section. Remediation related injections that are not expected to be continuous are typically authorized by rule, while most septic system and stormwater discharges are authorized by permit.

b14.2.2. Requirements of Rules. Any facility authorized by rule pursuant to this section shall meet the following requirements no later than one (1) year after authorization by such rules:

~~b.1~~ 14.2.2.a. Subdivision 14.6.~~a~~1. - (exemption from rule where authorized by temporary permits);

~~b.2~~ 14.2.2.b. Subdivision 14.6.~~b~~2. - (retention of records);

~~b.3~~ 14.2.2.c. Subdivision 14.6.~~d~~4. - (immediate reporting):

~~b.4~~ 14.2.2.d. Subdivision 14.6.~~e~~5. - (notice of abandonment);

~~b.5~~ 14.2.2.e. Subdivision 14.7.~~f~~6, and subsections 8.3, 9.3, and 10.3. - (plugging and abandonment);

~~c~~14.2.3. Requiring a permit.

~~c.1~~ 14.2.3.a. The Director may require any Class 1, 2, 3, or 5 injection well authorized by rule to apply for and obtain an individual or area UIC permit. Under no circumstances may a Class 6 well be authorized to inject by rule. Cases where individual or area UIC permits may be required include, but are not limited to:

~~c.1.A~~ 14.2.3.a.1. The injection well is not in compliance with any requirement of the rule;

(Note: Any underground injection which violates any rule under this section is subject to appropriate enforcement action).

~~c.1.B~~ 14.2.3.a.2. The injection well is not or no longer is within the category of wells and types of well operations authorized in the rule;

~~c.1.C~~ 14.2.3.a.3. The protection of USDWs requires that the injection operation be regulated by requirements, such as for corrective action, monitoring and reporting, or operation, which are not contained in the rule; and

~~c.1.D~~ 14.2.3.a.4. As a part of the orderly implementation of the UIC Program during the period of authorization by rule.

~~c.2~~ 14.2.3.b. Any owner or operator authorized by a rule may request to be excluded from the coverage of the rule by applying for an individual or area UIC permit. The owner or operator shall submit an application under subsection 14.3 with reasons supporting the request to the Director. The Director may grant any such request.

~~d~~14.2.4. Inventory requirements. All injection wells covered by rule shall submit inventory information to the Director. Any rule under this section shall provide for the automatic termination of authorization for any well which fails to comply within the time specified in paragraph 14.2.~~d.3~~4.c of this section.

~~d.1~~ 14.2.4.a. Contents. The Director shall require:

~~d.1.A~~ 14.2.4.a.1. Information regarding pollutant loads and schedules for attaining compliance with water quality standards;

~~d.1.B~~ 14.2. 4.a.2. Facility name and location;

~~d.1.C~~ 14.2. 4.a.3. Name and address of legal contact;

~~d.1.D~~ 14.2. 4.a.4. Ownership of facility;

~~d.1.E~~ 14.2. 4.a.5. Nature and type of injection wells; and

~~d.1.F~~ 14.2. 4.a.6. Operating status of injection wells.

~~d.2~~ 14.2.4.b. Notice. Upon approval of the State UIC Program, the Director shall notify owners or operators of injection wells of their duty to submit inventory information. The method of notification selected by the Director must assure that the owners or operators will be made aware of the inventory requirement.

~~d.3~~ 14.2.4.c. Deadlines. Owners or operators of injection wells must submit inventory information no later than one (1) year after authorization by rule. The Director need not require inventory information from any facility with interim status under W. Va. Code §22-18.

14.3. Application for a Permit; Authorization by Permit.

~~a~~14.3.1. Permit application. Except as provided in subsection 14.2 (authorization by rule), all underground injections into Class 1, 2, 3, or 6 wells shall be prohibited unless authorized by permit. Those authorized by a rule under subsection 14.2 must still apply for a permit under this section unless authorization was for the life of the well or project. Rules authorizing well injections for which permit applications have been submitted shall lapse for a particular well injection or project upon the effective date of the permit or permit denial for that well injection or project. Expiration will be effective following effective date of a permit, after closure (plugging and abandonment), or after conversion of the well.

~~b~~14.3.2. Time to apply. Any person who performs or proposes an underground injection for which a permit is or will be required shall submit an application to the Director in accordance with the State UIC Program as follows:

~~b.1~~ 14.3.2.a. For existing injection wells as expeditiously as practicable and in accordance with the schedule contained in the State UIC Program description, but no later than four (4) years from the effective date of this rule or as required under subsection 7.3 for wells injecting hazardous waste.

~~b.2~~ 14.3.2.b. For new injection wells, except new wells in projects authorized under paragraph 14.2.~~a.1~~1.a or covered by an existing area permit under subdivision 14.4.~~e~~3., a reasonable time before construction is expected to begin.

~~e~~14.3.3. Contents of UIC application.

(Reserved)

14.4. Area Permits.

~~a~~14.4.1. The Director may issue a permit on an area basis, rather than for each well individually, provided that the permit is for injection wells:

~~a.1~~ 14.4.1.a. Described and identified by location in permit application(s) if they are existing wells, except that the Director may accept a single description of wells with substantially the same characteristics;

~~a.2~~ 14.4.1.b. Within the same well field, facility site, reservoir project, or similar unit in the State;

~~a.3~~ 14.4.1.c. Operated by a single owner or operator;

~~a.4~~ 14.4.1.d. Used to inject other than hazardous waste; and

~~a.5~~ 14.4.1.e. Other than Class 6 Wells.

~~b~~14.4.2. Area permits shall specify:

~~b.1~~ 14.4.2.a. The area within which underground injections are authorized; and

~~b.2~~ 14.4.2.b. The requirements for construction, monitoring, reporting, operation, and abandonment, for all wells authorized by the permit.

~~c~~14.4.3. The area permit may authorize the permittee to construct and operate, convert, or plug and abandon wells within the permit area provided:

~~c.1~~ 14.4.3.a. The permittee notifies the Director at such time as the permit requires;

~~c.2~~ 14.4.3.b. The additional well satisfies the criteria in subdivision 14.4.~~a~~1 of this section and meets the requirements specified in the permit under subdivision 14.4.2~~b~~ of this section; and

~~c.3~~ 14.4.3.c. The cumulative effects of drilling and operation of additional injection wells are considered by the Director during evaluation of the area permit application and are acceptable to the Director.

~~d~~14.4.4. If the Director determines that any well constructed pursuant to subdivision 14.4.3~~c~~ of this section does not satisfy any of the requirements of paragraphs 14.4.~~c.1~~3.a and 14.4.~~c.2~~3.b of this section, the Director may modify the permit under subsection 14.18, revoke under subsection 14.19, or take enforcement action. If the Director determines that cumulative effects are unacceptable, the permit may be modified under subsection 14.18.

14.5. Emergency Permits.

~~a~~14.5.1. Coverage. Notwithstanding any other provision of this rule, the Director may temporarily permit a specific underground injection which has not otherwise been authorized by rule or permit if:

~~a.1~~ 14.5.1.a. An imminent and substantial endangerment to the health of persons will result unless a temporary emergency permit is granted; or

~~a.2~~ 14.5.1.b. A substantial or irretrievable loss of oil or gas resources will occur unless a temporary emergency permit is granted to a Class 2 well; and

~~a.2.A~~ 14.5.1.b.1. Timely application for a permit could not practicably have been made; and

~~a.2.B~~ 14.5.1.b.2. The injection will not result in the movement of fluids into underground sources of drinking water; or

~~a.3~~ 14.5.1.c. A substantial delay in production of oil or gas resources will occur unless a temporary emergency permit is granted to a new Class 2 well and the temporary authorization will not result in the movement of fluids into an underground source of drinking water.

~~b~~14.5.2. Requirements for issuance.

~~b.1~~ 14.5.2.a. Any temporary permit under paragraph 14.5.~~a.1~~1.a. of this section shall be for no longer term than required to prevent the hazard.

~~b.2~~ 14.5.2.b. Any temporary permit under paragraph ~~14.5.b.2~~ 14.5.~~a.2~~1.b of this section shall be for no longer term than ninety (90) days, except that if a permit application has been submitted prior to the expiration date of the ninety (90) day period, the Director may extend the temporary permit until final action on the application.

~~b.3~~ 14.5.2.c. Any temporary permit under paragraph 14.5.~~a.3~~1.c of this section shall be issued only after a complete permit application has been submitted and shall be effective until final action on the application.

~~b.4~~ 14.5.2.d. Notice of any temporary permit under this paragraph shall be published within ten (10) days of the issuance of the permit. Public Notice follows subsections 14.24 and 14.25.

~~b.5~~ 14.5.2.e. The temporary permit under this section may be either oral or written. If oral, it must be followed within five (5) calendar days by a written temporary emergency permit.

~~b.6~~ 14.5.2.f. The Director shall condition the temporary permit in any manner he or she determines is necessary to ensure that the injection will not result in the movement of fluids into an underground source of drinking water.

14.6. Additional Conditions Applicable to all UIC Permits. The following conditions, in addition to those set forth in subsection 14.12, apply to all UIC permits and shall be incorporated into all permits either expressly or by reference. If incorporated by reference, a specific citation to this rule must be given in the permit.

~~a~~14.6.1. In addition to subdivision 14.12.~~a~~1 (duty to comply): the permittee need not comply with the provisions of this permit to the extent and for the duration such non-compliance is authorized in a temporary emergency permit under subsection 14.5.

~~b~~14.6.2. In addition to paragraph 14.12.~~j.2~~10.b (monitoring and records): the permittee shall retain all records concerning the nature and composition of injected fluids until three (3) years after completion of any plugging and abandonment procedures specified under subdivision 14.7.~~f~~6. The Director may require the owner or operator to deliver the records to the Director at the conclusion of the retention period.

~~e~~14.6.3. In addition to paragraph 14.12.~~1.1~~12.a (notice of planned changes): except for all new wells authorized by an area permit under subdivision 14.4.~~e~~3., a new injection well may not commence injection until construction is complete, and:

~~e.1~~ 14.6.3.a. The permittee has submitted notice of completion of construction to the Director; and

~~e.1.A~~ 14.6.3.a.1. The Director has inspected or otherwise reviewed the new injection well and finds it is in compliance with the conditions of the permit; or

~~e.1.B~~ 14.6.3.a.2. The permittee has not received notice from the Director of his or her intent to inspect or otherwise review the new injection well within thirteen (13) days of the date of the notice in paragraph 14.6.3.a.~~12.e.1~~ of this section, in which case prior inspection or review is waived and the permittee may commence injection. The Director shall include in the notice a reasonable time period in which he or she shall inspect the well.

~~d~~14.6.4. The following shall be included as information which must be reported immediately under paragraph 14.12.~~1.6~~12.f:

14.6.4.a. Any monitoring or other information which indicates that any contaminant may cause an endangerment to USDWs; and

14.6.4.b. Any non-compliance with a permit condition or malfunction of the injection system which may cause fluid migration into or between the USDWs.

~~e~~14.6.5. The permittee shall notify the Director as such times as the permit requires before conversion or abandonment of the well or in the case of area permits before closure of the project.

~~f~~14.6.6. If a loss of mechanical integrity is discovered based on alarm shut off or during periodic mechanical integrity testing, the owner or operator shall:

~~f.1~~ 14.6.6.a. Immediately cease injection of waste fluids;

~~f.2~~ 14.6.6.b. Take steps to determine whether there may have been a release of hazardous wastes into any unauthorized zone;

~~f.3~~ 14.6.6.c. Notify the Director within 24 hours;

~~f.4~~ 14.6.6.d. Notify the Director when injection can be expected to resume; and

~~f.5~~ 14.6.6.e Restore and demonstrate mechanical integrity to the satisfaction of the Director prior to resuming injection.

~~g~~14.6.7. Whenever the owner or operator obtains evidence that there may have been a release of injected wastes into an unauthorized zone, he shall:

~~g.1~~ 14.6.7.a. Immediately cease injection of waste fluids,

~~g.2~~ 14.6.7.b. Notify the Director within 24 hours of obtaining such evidence;

~~g.3~~ 14.6.7.c. Take steps to identify and characterize the extent of any release;

~~g.4~~ 14.6.7.d. Comply with any remediation plan specified by the Director;

~~g.5~~ 14.6.7.e. Implement any remediation plan approved by the Director; and

~~g.6~~ 14.6.7.f. Where such release is into a USDW currently serving as a water supply, place a notice in a newspaper of general circulation.

~~h~~14.6.8. Pursuant to 14.6.~~f~~6. and 14.6.~~g~~7. The Director may allow the operator to resume injection prior to completing cleanup if the injection operation will not endanger USDWs.

~~i~~14.6.9. When the Director determines that a Class 1, 2, 3 or 6 well lacks mechanical integrity he/she shall give written notice of his/her determination to the owner or operator. Unless the Director requires immediate cessation, the owner or operator shall cease injection into the well within 48 hours of receipt of the Director's determination. The Director may allow plugging of the well pursuant to the

requirements of 14.7.~~f~~6. of this chapter or require the permittee to perform such additional construction, operation, monitoring, reporting and corrective action as is necessary to prevent the movement of fluid into or between USDWs caused by the lack of mechanical integrity. The owner or operator may resume injection upon written notification from the Director that the owner or operator has demonstrated mechanical integrity pursuant to 14.6.~~f~~6. and 14.6.~~g~~7. of this chapter. The Director may allow the owner or operator of a well which lacks mechanical integrity to continue or resume injection, if the owner or operator has made a satisfactory demonstration that there are no leaks in the casing/tubing/packer and no movement of fluid into or between USDWs.

14.7. Establishing UIC Permit Conditions. In addition to conditions required in all permits (subsections 14.6 and 14.12), the Director shall establish conditions in permits as required on a case-by-case basis, to provide for and assure compliance with all applicable requirements of the SDWA and State Act and rules. An applicable requirement is a State statutory or regulatory requirement which takes effect prior to final administrative disposition of a permit and is also any requirement which takes effect prior to the modification or revocation and reissuance of a permit. Each permit shall include conditions meeting the following requirements when applicable:

~~a~~14.7.1. Construction requirements as set forth in subsections 8.2, 9.2 and 10.2. Existing wells shall achieve compliance with such requirements according to a compliance schedule established as a permit condition. The owner or operator of a proposed new injection well shall submit plans for testing, drilling, and construction as part of the permit application. Except as authorized by an area permit, no construction may commence until a permit has been issued containing construction requirements. New wells shall be in compliance with these requirements prior to commencing injection operations. Changes in construction plans during construction may be approved by the Director as minor modification. No such changes may be physically incorporated into construction of the well prior to approval of the modification by the Director.

~~b~~14.7.2. Corrective action as set forth in subsections 6.1 and 14.9.

~~c~~14.7.3. Operation requirements as set forth in subsections 8.4, 9.4 and 10.4. The permit shall establish any maximum injection volumes and/or pressure necessary to assure that fractures are not initiated in the confining zone, that injected fluids do not migrate into any underground source of drinking water, that formation fluids are not displaced into any underground source of drinking water, and to assure compliance with operation requirements.

~~d~~14.7.4. Requirements for wells managing hazardous waste, as set forth in sections 7 and 11.

~~e~~14.7.5. Monitoring and reporting requirements as set forth in subsections 8.4, 9.4 and 10.4. The permittee shall be required to identify types of tests and methods used to generate the monitoring data.

~~f~~14.7.6. Plugging and abandonment. Any Class 1, 2, 3, or 6 permit shall include, and any Class 5 permit may include, conditions to ensure that plugging and abandonment of the well will not allow the movement of fluids either into an underground source of drinking water or from one underground source of drinking water to another. Any applicant for a UIC permit shall be required to submit a plan for plugging and abandonment. Where the plugging and abandonment plan meets the requirements of this paragraph, the Director shall incorporate it into the permit as a condition. Where the Director's review of an application indicates that the permittee's plan is inadequate, the Director shall require the applicant to revise the plan, prescribe conditions meeting the requirements of this paragraph, or deny the application. For purposes of this paragraph, temporary intermittent cessation of injection operations is not abandonment. The owner or operator shall submit revisions to the method of closure no later than the date on which closure notification is required. The Director should be notified at least 45 days prior to the abandonment of any Class 5 injection well.

~~f.1~~ 14.7.6.a. An owner or operator of a Class I hazardous waste injection well who ceases injection temporarily, may keep the well open provided he has received authorization from the Director and has described actions to be taken to ensure that the well will not endanger USDWs during disuse. These actions include compliance with the technical requirements applicable to active injection wells unless waived by the Director.

~~f.2~~ 14.7.6.b. The owner or operator of a well shall plug and abandon their well(s) within two (2) years of cessation, following their plan, unless:

~~f.2.A~~ 14.7.6.b.1. The owner/operator provides notice to the Director;

~~f.2.B~~ 14.7.6.b.2. Describes actions or procedures, satisfactory to the Director, that the owner or operator will take to ensure that the well will not endanger USDWs during the period of temporary abandonment. These actions and procedures shall include compliance with the technical requirements applicable to active injection wells unless waived by the Director.

14.7.6.c Class 1 hazardous waste injection wells, the obligation to implement the closure plan survives the termination of a permit or the cessation of injection activities. The requirement to maintain and implement an approved plan is directly enforceable regardless of whether the requirement is a condition of the permit.

14.7.6.d. The owner or operator of a Class 1 hazardous waste injection well that has ceased operations for more than two years shall notify the Director 30 days prior to resuming operation of the well.

~~g~~14.7.7. Financial responsibility. The permit shall require the permittee, including the transferor of a permit, to demonstrate and maintain financial responsibility and resources to close, plug, and abandon underground injection wells in a manner prescribed by the Director until: the well has been plugged and abandoned and the report submitted; or the well has been converted; or the transferor of the permit receives notice that the transferee has demonstrated financial responsibility. The permittee must show evidence of financial responsibility to the Director by submission of a surety bond, or other adequate assurance, such as a financial statement or other material acceptable to the Director. The owner or operator of a well injecting hazardous waste must comply with the financial responsibility requirements of subdivision 47-13-8.7 and 47-13-8.8 For Class 6 permits the following provisions also apply:

~~g.1~~ 14.7.7.a. The permittee must show evidence of financial responsibility to the Director by submission of a surety bond, trust fund, insurance, irrevocable standby letter of credit, escrow account, or other adequate assurance, such as a financial statement or other material acceptable to the Director.

~~g.2~~ 14.7.7.b. The qualifying instrument(s) must be sufficient to cover the cost of:

~~g.2.A~~ 14.7.7.b.1. Corrective action (that meets the requirements of section 14.9.);

~~g.2.B~~ 14.7.7.b.2. Injection well plugging (that meets the requirements of section 13.4);

~~g.2.C~~ 14.7.7.b.3. Post injection site care and site closure (that meets the requirements of 13.9.); and

~~g.2.D~~ 14.7.7.b.4. Emergency and remedial response (that meets the requirements of 13.7).

~~g.3~~ 14.7.7.c. The financial responsibility instrument(s) must be sufficient to address endangerment of underground sources of drinking water.

~~g.4~~ 14.7.7.d. The qualifying financial responsibility instrument(s) must comprise protective conditions of coverage.

~~g.4.A~~ 14.7.7.d.1. Protective conditions of coverage must include at a minimum cancellation, renewal, and continuation provisions, specifications on when the provider becomes liable following a notice of cancellation if there is a failure to renew with a new qualifying financial instrument, and requirements for the provider to meet a minimum rating, minimum capitalization, and ability to pass the bond rating when applicable.

~~g.5~~ 14.7.7.e. Cancellation - for purposes of this part, an owner or operator must provide that their financial mechanism may not cancel, terminate or fail to renew except for failure to pay such financial instrument. If there is a failure to pay the financial instrument, the financial institution may elect to cancel, terminate, or fail to renew the instrument by sending notice by certified mail to the owner or operator and the Director. The cancellation must not be final for 120 days after receipt of cancellation notice. The owner or operator must provide an alternate financial responsibility demonstration within 60 days of notice of cancellation, and if an alternate financial responsibility demonstration is not acceptable (or possible), any funds from the instrument being cancelled must be released within 60 days of notification by the Director.

~~g.6~~ 14.7.7.f. Renewal - for purposes of this part, owners or operators must renew all financial instruments, if an instrument expires, for the entire term of the geologic sequestration project. The instrument may be automatically renewed as long as the owner or operator has the option of renewal at the face amount of the expiring instrument. The automatic renewal of the instrument must, at a minimum, provide the holder with the option of renewal at the face amount of the expiring financial instrument.

~~g.7~~ 14.7.7.g. Cancellation, termination, or failure to renew may not occur and the financial instrument will remain in full force and effect in the event that on or before the date of expiration: The Director deems the facility abandoned; or the permit is terminated or revoked or a new permit is denied; or closure is ordered by the Director or a U.S. district court or other court of competent jurisdiction; or the owner or operator is named as debtor in a voluntary or involuntary proceeding under Title 11 (Bankruptcy), U.S. Code; or the amount due is paid.

~~g.8~~ 14.7.7.h. The qualifying financial responsibility instrument(s) must be approved by the Director.

~~g.8.A~~ 14.7.7.h.1. The Director shall consider and approve the financial responsibility demonstration for all the phases of the geologic sequestration project prior to issue a Class 6 permit (13.8).

~~g.8.B~~ 14.7.7.h.2. The owner or operator must provide any updated information related to their financial responsibility instrument(s) on an annual basis and if there are any changes, the Director must evaluate, within a reasonable time, the financial responsibility demonstration to confirm that the instrument(s) used remain adequate for use. The owner or operator must maintain financial responsibility requirements regardless of the status of the Director's review of the financial responsibility demonstration.

~~g.8.C~~ 14.7.7.h.3. The Director may disapprove the use of a financial instrument if he determines that it is not sufficient to meet the requirements of this section.

~~g.9~~ 14.7.7.i. The owner or operator may demonstrate financial responsibility by using one or multiple qualifying financial instruments for specific phases of the geologic sequestration project.

~~g.9.A~~ 14.7.7.i.1. In the event that the owner or operator combines more than one instrument for a specific geologic sequestration phase (e.g., well plugging), such combination must be limited to instruments that are not based on financial strength or performance (*i.e.,* self-insurance or performance bond), for example trust funds, surety bonds guaranteeing payment into a trust fund, letters of credit, escrow account, and insurance. In this case, it is the combination of mechanisms, rather than the single mechanism, which must provide financial responsibility for an amount at least equal to the current cost estimate.

~~g.10~~ 14.7.7.j. When using a third-party instrument to demonstrate financial responsibility, the owner or operator must provide a proof that the third-party providers either have passed financial strength requirements based on credit ratings; or have met a minimum rating, minimum capitalization, and ability to pass the bond rating when applicable.

~~g.10.A~~ 14.7.7.j.1. An owner or operator using certain types of third-party instruments must establish a standby trust to enable the Department and/or EPA to be party to the financial responsibility agreement without the Department and/or EPA being the beneficiary of any funds. The standby trust fund must be used along with other financial responsibility instruments (e.g., surety bonds, letters of credit, or escrow accounts) to provide a location to place funds if needed.

~~g.11~~ 14.7.7.k. An owner or operator may deposit money to an escrow account to cover financial responsibility requirements; this account must segregate funds sufficient to cover estimated costs for Class 6 (geologic sequestration) financial responsibility from other accounts and uses.

~~g.12~~ 14.7.7.l. An owner or operator or its guarantor may use self-insurance to demonstrate financial responsibility for geologic sequestration projects. In order to satisfy this requirement the owner or operator must meet a Tangible Net Worth of an amount approved by the Director, have a Net working capital and tangible net worth each at least six times the sum of the current well plugging, post injection site care and site closure cost, have assets located in the United States amounting to at least 90 percent of total assets or at least six times the sum of the current well plugging, post injection site care and site closure cost, and must submit a report of its bond rating and financial information annually. In addition the owner or operator must either: Have a bond rating test of AAA, AA, A, or BBB as issued by Standard & Poor's or Aaa, Aa, A, or Baa as issued by Moody's; or meet all of the following five financial ratio thresholds: A ratio of total liabilities to net worth less than 2.0; a ratio of current assets to current liabilities greater than 1.5; a ratio of the sum of net income plus depreciation, depletion, and amortization to total liabilities greater than 0.1; A ratio of current assets minus current liabilities to total assets greater than −0.1; and a net profit (revenues minus expenses) greater than 0.

~~g.12.A~~ 14.7.7.l.a. An owner or operator who is not able to meet corporate financial test criteria may arrange a corporate guarantee by demonstrating that its corporate parent meets the financial test requirements on its behalf. The parent's demonstration that it meets the financial test requirement is insufficient if it has not also guaranteed to fulfill the obligations for the owner or operator.

~~g.13~~ 14.7.7.m. An owner or operator may obtain an insurance policy to cover the estimated costs of geologic sequestration activities requiring financial responsibility. This insurance policy must be obtained from a third-party provider.

~~g.14~~ 14.7.7.n. The requirement to maintain adequate financial responsibility and resources is directly enforceable regardless of whether the requirement is a condition of the permit.

~~g.14.A~~ 14.7.7.n.1. The owner or operator must maintain financial responsibility and resources until:

~~g.14.A.i~~ 14.7.7.n.1.A. The Director receives and approves the completed post-injection site care and site closure plan; and

~~g.14.A.ii~~ 14.7.7.n.1.B. The Director approves site closure.

~~g.14.B~~ 14.7.7.n.2. The owner or operator may be released from a financial instrument in the following circumstances:

~~g.14.B.i~~ 14.7.7.n.2.A. The owner or operator has completed the phase of the geologic sequestration project for which the financial instrument was required and has fulfilled all its financial obligations as determined by the Director, including obtaining financial responsibility for the next phase of the GS project, if required; or

~~g.14.B.ii~~ 14.7.7.n.2.B. The owner or operator has submitted a replacement financial instrument and received written approval from the Director accepting the new financial instrument and releasing the owner or operator from the previous financial instrument.

~~g.15~~ 14.7.7.o. The owner or operator must have a detailed written estimate, in current dollars, of the cost of performing corrective action on wells in the area of review, plugging the injection well(s), post-injection site care and site closure, and emergency and remedial response.

~~g.15.A~~ 14.7.7.o.1. The cost estimate must be performed for each phase separately and must be based on the costs to the regulatory agency of hiring a third party to perform the required activities. A third party is a party who is not within the corporate structure of the owner or operator.

~~g.15.B~~ 14.7.7.o.2. During the active life of the geologic sequestration project, the owner or operator must adjust the cost estimate for inflation within 60 days prior to the anniversary date of the establishment of the financial instrument(s) used to comply with paragraph (a) of this section and provide this adjustment to the Director. The owner or operator must also provide to the Director written updates of adjustments to the cost estimate within 60 days of any amendments to the area of review and corrective action plan (6.1), the injection well plugging plan (13.4), the post-injection site care and site closure plan (13.9), and the emergency and remedial response plan (13.7).

~~g.15.C~~ 14.7.7.o.3. The Director must approve any decrease or increase to the initial cost estimate. During the active life of the geologic sequestration project, the owner or operator must revise the cost estimate no later than 60 days after the Director has approved the request to modify the area of review and corrective action plan (6.1), the injection well plugging plan (13.4), the post-injection site care and site closure plan (13.9), and the emergency and response plan (13.7), if the change in the plan increases the cost. If the change to the plans decreases the cost, any withdrawal of funds must be approved by the Director. Any decrease to the value of the financial assurance instrument must first be approved by the Director. The revised cost estimate must be adjusted for inflation as specified at 14.7.~~g.15.B~~7.o.2 of this section.

~~g.15.D~~ 14.7.7.o.4. Whenever the current cost estimate increases to an amount greater than the face amount of a financial instrument currently in use, the owner or operator, within 60 days after the increase, must either cause the face amount to be increased to an amount at least equal to the current cost estimate and submit evidence of such increase to the Director, or obtain other financial responsibility instruments to cover the increase. Whenever the current cost estimate decreases, the face amount of the financial assurance instrument may be reduced to the amount of the current cost estimate only after the owner or operator has received written approval from the Director.

~~g.16~~ 14.7.7.p. The owner or operator must notify the Director by certified mail of adverse financial conditions such as bankruptcy that may affect the ability to carry out injection well plugging and post-injection site care and site closure.

~~g.16.A~~ 14.7.7.p.1. In the event that the owner or operator or the third party provider of a financial responsibility instrument is going through a bankruptcy, the owner or operator must notify the Director by certified mail of the commencement of a voluntary or involuntary proceeding under Title 11 (Bankruptcy), U.S. Code, naming the owner or operator as debtor, within 10 days after commencement of the proceeding.

~~g.16.B~~ 14.7.7.p.2. A guarantor of a corporate guarantee must make such a notification to the Director if he/she is named as debtor, as required under the terms of the corporate guarantee.

~~g.16.C~~ 14.7.7.p.3. An owner or operator who fulfills the requirements of 14.7.7~~g~~. of this section by obtaining a trust fund, surety bond, letter of credit, escrow account, or insurance policy will be deemed to be without the required financial assurance in the event of bankruptcy of the trustee or issuing institution, or a suspension or revocation of the authority of the trustee institution to act as trustee of the institution issuing the trust fund, surety bond, letter of credit, escrow account, or insurance policy. The owner or operator must establish other financial assurance within 60 days after such an event.

~~g.17~~ 14.7.7.q. The owner or operator must provide an adjustment of the cost estimate to the Director within 60 days of notification by the Director, if the Director determines during the annual evaluation of the qualifying financial responsibility instrument(s) that the most recent demonstration is no longer adequate to cover the cost of corrective action (as required by section 6.1), injection well plugging (as required by section 13.4), post-injection site care and site closure (as required by section 13.9), and emergency and remedial response (as required by section 13.7).

~~g.18~~ 14.7.7.r. The Director must approve the use and length of pay-in-periods for trust funds or escrow accounts.

~~h~~14.7.8. Mechanical integrity. The permittee of a Class 1, 2, 3, or 6 well shall establish and maintain mechanical integrity. A permit for any Class 1, 2, 3, or 6 well or injection project which lacks mechanical integrity shall include, and for any Class 5 well may include, a condition prohibiting injection operations until the permittee shows to the satisfaction of the Director under subsection 6.2 that the well has mechanical integrity.

~~i~~14.7.9. Additional conditions. The Director shall impose on a case-by-case basis such additional conditions as are necessary to prevent the migration of fluids into underground sources of drinking water.

14.8. Waiver of Requirements by the Director.

~~a~~14.8.1. When injection does not occur into, through, or above an underground source of drinking water, the Director may authorize a well or project with less stringent requirements for area of review, construction, mechanical integrity, operation, monitoring, and reporting than required in section 8, 9, 10, and subsection 14.7 to the extent that the reduction in requirements will not result in an increased risk of movement of fluids into an underground source of drinking water.

~~b~~14.8.2. For wells other than Class 6, when injection occurs through or above an underground source of drinking water, but the radius of endangering influence when computed under subdivision 5.3.~~a~~1 is smaller or equal to the radius of the well, the Director may authorize a well or project with less stringent requirements for operation, monitoring, and reporting in sections 8, 10, and subsection 14.7 to the extent

that the reduction in requirements will not result in an increased risk of movement of fluids into an underground source of drinking water.

~~e~~14.8.3. When reducing requirements under subdivision 14.8.1~~a~~ or 14.8.2~~b~~ of this section, the Director shall explain the reason for the action by preparing a fact sheet under subsection 14.31.

~~d~~14.8.4. When an owner or operator submits a waiver of the Class 6 injection depth requirements, the Director must consult with all affected Public Water System Directors and the Regional Administrator after considering the following:

~~d.1~~ 14.8.4.a. Owner/Operator Requirements. In seeking a waiver of the requirement to inject below the lowermost USDW, the owner or operator must submit a supplemental report concurrent with permit application. The supplemental report must include the following,

~~d.1.A~~ 14.8.4.a.1. A demonstration that the injection zone(s) is/are laterally continuous, is not a USDW, and is not hydraulically connected to USDWs; does not outcrop; has adequate injectivity, volume, and sufficient porosity to safely contain the injected carbon dioxide and formation fluids; and has appropriate geochemistry.

~~d.1.B~~ 14.8.4.a.2. A demonstration that the injection zone(s) is/are bounded by laterally continuous, impermeable confining units above and below the injection zone(s) adequate to prevent fluid movement and pressure buildup outside of the injection zone(s); and that the confining unit(s) is/are free of transmissive faults and fractures. The report shall further characterize the regional fracture properties and contain a demonstration that such fractures will not interfere with injection, serve as conduits, or endanger USDWs.

~~d.1.C~~ 14.8.4.a.3. A demonstration, using computational modeling, that USDWs above and below the injection zone will not be endangered as a result of fluid movement. This modeling should be conducted in conjunction with the area of review determination, as described in 5.4 and 14.9, and is subject to requirements, as described in 14.9.3~~e~~., and periodic reevaluation, as described in 14.9.5~~e~~.

~~d.1.D~~ 14.8.4.a.4. A demonstration that well design and construction, in conjunction with the waiver, will ensure isolation of the injectate in lieu of requirements at 13.3.1.a~~a.1~~. and will meet well construction requirements in 14.8.4.~~d.6~~. of this section.

~~d.1.E~~ 14.8.4.a.5. A description of how the monitoring and testing and any additional plans will be tailored to the geologic sequestration project to ensure protection of USDWs above and below the injection zone(s), if a waiver is granted.

~~d.1.F~~ 14.8.4.a.6. Information on the location of all the public water supplies affected, reasonably likely to be affected, or served by USDWs in the area of review.

~~d.1.G~~ 14.8.4.a.7. Any other information requested by the Director to inform the Regional Administrator's decision to issue a waiver.

~~d.2~~ 14.8.4.b. Consultation. The Director must inform the Regional Administrator of a pending decision on whether to grant a waiver of the injection depth requirements at section 4.6, 14.8.4~~d.6~~, and 13.3.~~a.1~~1.a. the Director must submit, to the Regional Administrator, documentation of the following:

~~d.2.A~~ 14.8.4.b.1. An evaluation of the following information as it relates to siting, construction, and operation of a geologic sequestration project with a waiver:

~~d.2.A.i~~ 14.8.4.b.1.A. The integrity of the upper and lower confining units;

~~d.2.A.ii~~ 14.8.4.b.1.B. The suitability of the injection zone(s) (e.g., lateral continuity; lack of transmissive faults and fractures; knowledge of current or planned artificial penetrations into the injection zone(s) or formations below the injection zone);

~~d.2.A.iii~~ 14.8.4.b.1.C. The potential capacity of the geologic formation(s) to sequester carbon dioxide, accounting for the availability of alternative injection sites;

~~d.2.A.iv~~ 14.8.4.b.1.D. All other site characterization data, the proposed emergency and remedial response plan, and a demonstration of financial responsibility;

~~d.2.A.v~~ 14.8.4.b.1.E. Community needs, demands, and supply from drinking water resources;

~~d.2.A.vi~~ 14.8.4.b.1.F. Planned needs, potential and/or future use of USDWs and non-USDWs in the area;

~~d.2.A.vii~~ 14.8.4.b.1.G. Planned or permitted water, hydrocarbon, or mineral resource exploitation potential of the proposed injection formation(s) and other formations both above and below the injection zone to determine if there are any plans to drill through the formation to access resources in or beneath the proposed injection zone(s)/formation(s);

~~d.2.A.viii~~ 14.8.4.b.1.H. The proposed plan for securing alternative resources or treating USDW formation waters in the event of contamination related to the Class 6 injection activity; and,

~~d.2.A.ix~~ 14.8.4.b.1.I. Any other applicable considerations or information requested by the Director.

~~d.2.B~~ 14.8.4.b.2. Consultation with the Public Water System Supervision Directors of all States and Tribes having jurisdiction over lands within the area of review of a well for which a waiver is sought.

~~d.2.B.i~~ 14.8.4.b.2.A. Any written waiver-related information submitted by the Public Water System Supervision Director(s) to the (UIC) Director.

~~d.3~~ 14.8.4.c. Procedures.

~~d.3.A~~ 14.8.4.c.1. Pursuant to requirements at 47 CSR 10-12 and concurrent with the Class 6 permit application notice process, the Director shall give public notice that a waiver application has been submitted. The notice shall clearly state:

~~d.3.A.i~~ 14.8.4.c.1.A. The depth of the proposed injection zone(s);

~~d.3.A.ii~~ 14.8.4.c.1.B. The location of the injection well(s);

~~d.3.A.iii~~ 14.8.4.c.1.C. The name and depth of all USDWs within the area of review;

~~d.3.A.iv~~ 14.8.4.c.1.D. A map of the area of review;

~~d.3.A.v~~ 14.8.4.c.1.E. The names of any public water supplies affected, reasonably likely to be affected, or served by USDWs in the area of review; and,

~~d.3.A.vi~~ 14.8.4.c.1.F. The results of UIC-Public Water System Supervision consultation required under 14.8.~~d.2.B~~4.b.2.

~~d.3.B~~ 14.8.4.c.2. Following public notice, the Director shall provide all information received through the waiver application process to the Regional Administrator. Based on the information provided, the Regional Administrator shall provide written concurrence or non-concurrence regarding waiver issuance.

~~d.3.B.i~~ 14.8.4.c.2.A. If the Regional Administrator determines that additional information is required to support a decision, the Director shall provide the information. At his or her discretion, the Regional Administrator may require that public notice of the new information be initiated.

~~d.3.C~~ 14.8.4.c.3. In no case shall a Director of a State-approved program issue a waiver without receipt of written concurrence from the Regional Administrator.

~~d.3.D~~ 14.8.4.c.4. If a waiver is issued, within 30 days of waiver issuance, the Director shall post the following information on the Department's Division of Water and Waste Management's web site:

~~d.3.D.i~~ 14.8.4.c.4.A. The depth of the proposed injection zone(s);

~~d.3.D.ii~~ 14.8.4.c.4.B. The location of the injection well(s);

~~d.3.D.iii~~ 14.8.4.c.4.C. The name and depth of all USDWs within the area of review;

~~d.3.D.iv~~ 14.8.4.c.4.D. A map of the area of review;

~~d.3.D.v~~ 14.8.4.c.4.E. The names of any public water supplies affected, reasonably likely to be affected, or served by USDWs in the area of review; and

~~d.3.D.vi~~ 14.8.4.c.4.F. The date of waiver issuance.

~~d.4~~ 14.8.4.d. Additional requirements. Upon receipt of a waiver of the requirement to inject below the lowermost USDW for geologic sequestration, the owner or operator of the Class 6 well must comply with:

~~d.4.A~~ 14.8.4.d.1. All requirements at 6.2., 13.4., 13.5., 13.6., 13.6.3.a.~~c.1.~~, 13.7., 14.7.7.~~g.~~, and 14.9.~~b.5~~2.e., of this rule;

~~d.4.B~~ 14.8.4.d.2. All requirements at section 13.3. with the following modified requirements:

~~d.4.B.i~~ 14.8.4.d.2.A. The owner or operator must ensure that Class 6 wells with a waiver are constructed and completed to prevent movement of fluids into any unauthorized zones including USDWs, in lieu of requirements at 13.3.~~a.1~~1.a.

~~d.4.B.ii~~ 14.8.4.d.2.B. The casing and cementing program must be designed to prevent the movement of fluids into any unauthorized zones including USDWs in lieu of requirements at 13.3.~~b.1.A~~2.a.1.

~~d.4.B.iii~~ 14.8.4.d.2.C. The surface casing must extend through the base of the nearest USDW directly above the injection zone and be cemented to the surface; or, at the Director's

discretion, another formation above the injection zone and below the nearest USDW above the injection zone.

~~d.4.C~~ 14.8.4.d.3. All requirements at 13.6.2~~b~~. with the following modified requirements:

~~d.4.C.i~~ 14.8.4.d.3.A. The owner or operator shall monitor the groundwater quality, geochemical changes, and pressure in the first USDWs immediately above and below the injection zone(s); and in any other formations at the discretion of the Director.

~~d.4.C.ii~~ 14.8.4.d.3.B. Testing and monitoring to track the extent of the carbon dioxide plume and the presence or absence of elevated pressure (e.g., the pressure front) by using direct methods to monitor for pressure changes in the injection zone(s); and, indirect methods (e.g., seismic, electrical, gravity, or electromagnetic surveys and/or down-hole carbon dioxide detection tools), unless the Director determines, based on site-specific geology, that such methods are not appropriate.

~~d.4.D~~ 14.8.4.d.4. All requirements at 13.9. with the following, modified post-injection site care monitoring requirements:

~~d.4.D.i~~ 14.8.4.d.4.A. The owner or operator shall monitor the groundwater quality, geochemical changes and pressure in the first USDWs immediately above and below the injection zone; and in any other formations at the discretion of the Director.

~~d.4.D.ii~~ 14.8.4.d.4.B. Testing and monitoring to track the extent of the carbon dioxide plume and the presence or absence of elevated pressure (e.g., the pressure front) by using direct methods in the injection zone(s); and indirect methods (e.g., seismic, electrical, gravity, or electromagnetic surveys and/or down-hole carbon dioxide detection tools), unless the Director determines based on site-specific geology, that such methods are not appropriate;

~~d.4.E~~ 14.8.4.d.5. Any additional requirements requested by the Director designed to ensure protection of USDWs above and below the injection zone(s).

14.9. Corrective Action

~~a~~14.9.1. Applicants for Class 1, 2 (other than existing wells) or 3 injection well permits shall identify the location of all known wells within the injection well's area of review which penetrate the injection zone (or for Class 2, all wells penetrating formations affected by an increase in pressure) and/or confining zone. For such wells which are improperly sealed, completed, or abandoned, the applicant shall also submit a plan consisting of such steps or modifications as are necessary to prevent movement of fluid into underground sources of drinking water ("corrective action") under subsection 6.1. Where the plan is adequate, the Director shall incorporate it into the permit as a condition. Where the Director's review of an application indicates that the permittee's plan is inadequate, he or she shall require the applicant to revise the plan, prescribe a plan for corrective action as a condition of the permit under subdivision 14.9.~~b~~2 of this section, or deny the application.

~~b~~14.9.2. Requirements.

~~b.1~~ 14.9.2.a. Existing injection wells. Any permit issued for an existing injection well (other than Class 2) requiring corrective action shall include a compliance schedule requiring any corrective action accepted or prescribed under subdivision 14.9.~~a~~1 of this section to be completed as soon as possible.

~~b.2~~ 14.9.2.b. New injection wells. No permit for a new injection well may authorize injection until all required corrective action has been taken.

~~b.3~~ 14.9.2.c. Injection pressure limitation. The Director may require as a permit condition that pressure be so limited that pressure in the injection zone does not exceed hydrostatic pressure at the site of any improperly completed or abandoned well within the area of review. This pressure limitation shall satisfy the corrective action requirement. Alternatively, such injection pressure limitation can be part of a compliance schedule and last until all other required corrective action has been taken.

~~b.4~~ 14.9.2.d. Class 3 wells only. When setting corrective action requirements, the Director shall consider the overall effect of the project on the hydraulic gradient in potentially affected USDW's, and the corresponding changes in potentiometric surface(s) and flow direction(s) rather than the discrete effect of each well. If a decision is made that corrective action is not necessary based on the determinations above, the monitoring program required in subdivision 10.4.~~b~~2 shall be designed to verify the validity of such determinations.

~~b.5~~ 14.9.2.e. Class 6 wells only. When setting corrective action requirements, the Director shall require the owner or operator of the well to prepare, maintain, and comply with a plan to delineate the area of review for a proposed geologic sequestration project, periodically reevaluate the delineation, and perform corrective action that meets the requirements of this section and is acceptable to the Director. The requirement to maintain and implement an approved plan is directly enforceable regardless of whether the requirement is a condition of the permit. As a part of the permit application for approval by the Director, the owner or operator must submit an area of review and corrective action plan that includes the following information:

~~b.5.A~~ 14.9.2.e.1. The method for delineating the area of review that meets the requirements of 14.9.c. of this section, including the model to be used, assumptions that will be made, and the site characterization data on which the model will be based;

~~b.5.B~~ 14.9.2.e.2. A description of:

~~b.5.B.i~~ 14.9.2.e.2.A. The minimum fixed frequency, not to exceed five years, at which the owner or operator proposes to reevaluate the area of review;

~~b.5.B.ii~~ 14.9 2.e.2.B. The monitoring and operational conditions that would warrant a reevaluation of the area of review prior to the next scheduled reevaluation as determined by the minimum fixed frequency established in 14.9.~~b.5.B.i~~2.e.2.A. of this section.

~~b.5.B.iii~~ 14.9.2.e.2.C. How monitoring and operational data (e.g., injection rate and pressure) will be used to inform an area of review reevaluation; and

~~b.5.B.iv~~ 14.9.2.e.2.D. How corrective action will be conducted to meet the requirements of 14.9.4~~d~~. of this section, including what corrective action will be performed prior to injection and what, if any, portions of the area of review will have corrective action addressed on a phased basis and how the phasing will be determined; how corrective action will be adjusted if there are changes in the area of review; and how site access will be guaranteed for future corrective action.

~~c~~14.9.3. Owners or operators of Class 6 wells must perform the following actions to delineate the area of review and identify all wells that require corrective action:

~~c.1~~ 14.9.3.a. Predict, using existing site characterization, monitoring and operational data, and computational modeling, the projected lateral and vertical migration of the carbon dioxide plume and formation fluids in the subsurface from the commencement of injection activities until the plume movement ceases, until pressure differentials sufficient to cause the movement of injected fluids or formation fluids into a USDW are no longer present, or until the end of a fixed time period as determined by the Director. The model must:

~~c.1.A~~ 14.9.3.a.1. Be based on detailed geologic data collected to characterize the injection zone(s), confining zone(s) and any additional zones; and anticipated operating data, including injection pressures, rates, and total volumes over the proposed life of the geologic sequestration project;

~~c.1.B~~ 14.9.3.a.2. Take into account any geologic heterogeneities, other discontinuities, data quality, and their possible impact on model predictions; and

~~c.1.C~~ 14.9.3.a.3. Consider potential migration through faults, fractures, and artificial penetrations.

~~c.2~~ 14.9.3.b. Using methods approved by the Director, identify all penetrations, including active and abandoned wells and underground mines, in the area of review that may penetrate the confining zone(s). Provide a description of each well's type, construction, date drilled, location, depth, record of plugging and/or completion, and any additional information the Director may require; and

~~c.3~~ 14.9.3.c. Determine which abandoned wells in the area of review have been plugged in a manner that prevents the movement of carbon dioxide or other fluids that may endanger USDWs, including use of materials compatible with the carbon dioxide stream.

~~d~~14.9.4. Owners or operators of Class 6 wells must perform corrective action on all wells in the area of review that are determined to need corrective action, using methods designed to prevent the movement of fluid into or between USDWs, including use of materials compatible with the carbon dioxide stream, where appropriate.

~~e~~14.9.5. At the minimum fixed frequency, not to exceed five years, as specified in the area of review and corrective action plan, or when monitoring and operational conditions warrant, owners or operators must:

~~c.1~~ 14.9.5.a. Reevaluate the area of review in the same manner specified in 14.9.~~c.1~~3.a. of this section;

~~c.1~~ 14.9.5.b. Identify all wells in the reevaluated area of review that require corrective action in the same manner specified in 14.9.~~c~~3. of this section;

~~c.1~~ 14.9.5.c. Perform corrective action on wells requiring corrective action in the reevaluated area of review in the same manner specified in 14.9.~~d~~4. of this section; and

~~c.1~~ 14.9.5.d. Submit an amended area of review and corrective action plan or demonstrate to the Director through monitoring data and modeling results that no amendment to the area of review and corrective action plan is needed. Any amendments to the area of review and corrective action plan must be approved by the Director, must be incorporated into the permit, and are subject to the permit modification requirements at sections 14.18 or 14.20, as appropriate.

~~f~~14.9.6. The emergency and remedial response plan (as required by section 13.7.) and the demonstration of financial responsibility (as described by 14.7.~~g~~7.) must account for the area of review delineated as specified in 14.9.~~e.1~~3.a. of this section or the most recently evaluated area of review delineated under 14.9.~~e~~5. of this section, regardless of whether or not corrective action in the area of review is phased.

~~g~~14.9.7. All modeling inputs and data used to support area of review reevaluations under 14.9.~~e~~5. of this section shall be retained for 10 years.

14.10. Application for a Permit. This section shall apply in addition to the requirements of subsections 8.5, 9.5, 10.5, and 14.3.

~~a~~14.10.1. Permit application. Any person who is required to have a permit (including new applicants and permittees with expiring permits) shall complete, sign, and submit an application to the Director as described in this section. Persons currently authorized with UIC authorization by rule shall apply for permits when required by the Director.

~~b~~14.10.2. Who applies. When a facility or activity is owned by one person but is operated by another person, it is the operator's duty to obtain a permit.

~~c~~14.10.3. Completeness. The Director shall not issue a permit under a program before receiving a complete application, except for an emergency permit. An application for a permit under a program is complete when the Director receives an application form and any supplemental information which are completed to his or her satisfaction.

~~d~~14.10.4. Information requirements. All applicants for UIC permits shall provide the following information to the Director, using the application form provided by the Director. Class 6 applicants shall follow the requirements of 13.8.:

~~d.1~~ 14.10.4.a. The activities conducted by the applicant which require it to obtain permits under UIC.

~~d.2~~ 14.10.4.b. Name, mailing address, and location of the facility for which the application is submitted.

~~d.3~~ 14.10.4.c. Up to four (4) SIC codes which best reflect the principal products or services provided by the facility.

~~d.4~~ 14.10.4.d. The operator's name, address, telephone number, ownership status, and status as Federal, State, private, public, or other entity.

~~d.5~~ 14.10.4.e. A listing of all permits or construction approvals received or applied for under any of the following programs:

~~d.5.A~~ 14.10.4.e.1. Hazardous Waste Management Program under RCRA and W. Va. Code §22-18-1 et seq.

~~d.5.B~~ 14.10.4.e.2. NPDES program under CWA and State Act.

~~d.5.C~~ 14.10.4.e.3. Prevention of Significant Deterioration (PSD) program under the Clean Air Act.

~~d.5.D~~ 14.10.4.e.4. Nonattainment program under the Clean Air Act.

~~d.5.E~~ 14.10.4.e.5. National Emission Standards for Hazardous Pollutants (NESHAPS) pre-construction approval under the Clean Air Act.

~~d.5.F~~ 14.10.4.e.6. Dredge or fill permits under section 404 of CWA.

~~d.5.G~~ 14.10.4.e.7. Other relevant environmental permits, including State permits.

~~d.6~~ 14.10.4.f. A topographic map extending one (1) mile beyond the property boundaries of the source, depicting the facility and each of its intake and discharge structures, each of its hazardous waste treatment, storage, or disposal facilities, each well where fluids from the facility are injected underground and those wells, springs, other surface water bodies, and drinking water wells listed in public records or otherwise known to the applicant in the map area.

~~d.6.A~~ 14.10.4.f.1. Map requirements for Class 6 permits shall include the injection well for which a permit is sought and the applicable area of review consistent with 5.4 and 14.9.~~b.5~~2.e. Within the area of review, the map must show the number or name, and location of all injection wells, producing wells, abandoned wells, plugged wells or dry holes, deep stratigraphic boreholes, State- or EPA-approved subsurface cleanup sites, surface bodies of water, springs, mines (surface and subsurface), quarries, water wells, other pertinent surface features including structures intended for human occupancy, State, Tribal, and Territory boundaries, and roads. The map should also show faults, if known or suspected. Only information of public record is required to be included on this map.

~~d.7~~ 14.10.4.g. A brief description of the nature of the business.

~~e~~14.10.5. Record keeping. Applicants shall keep records of all data used to complete permit applications and any supplemental information submitted under subsection 14.3 for a period of at least three (3) years from the date the application is signed.

14.11. Signatories to Permit Applications and Reports.

~~A~~14.11.1. Applications. All permit applications, except those submitted for Class 2 wells under the UIC program, shall be signed as follows:

~~a.1~~ 14.11.1.a. For a corporation: by a principal officer of at least the level of vice-president;

~~a.2~~ 14.11.1.b. For a partnership or sole proprietorship: by a general partner or the proprietor, respectively; or

~~a.3~~ 14.11.1.c. For a municipality, State, Federal, or other public agency: by either a principal executive officer or ranking elected official.

~~b~~14.11.2. Reports. All reports required by permits, other information requested by the Director, and all permit applications submitted for Class 2 wells shall be signed by a person described in subdivision 14.11.1~~a~~ above in this section, or by a duly authorized representative of that person. A person is a duly authorized representative if:

~~b.1~~ 14.11.2.a. The authorization is made in writing by a person described in subdivision 14.11.~~a~~1. of this section;

~~b.2~~ 14.11.2.b. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of plant manager, operator of a well or a well field, superintendent, or position of equivalent responsibility. (A duly authorized representative may thus be either a named individual or any individual occupying a named position); and

~~b.3~~ 14.11.2.c. The written authorization is submitted to the Director.

~~c~~14.11.3. Changes to Authorization. If an authorization under subdivision 14.11.~~b~~2 of this section is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of subdivision 14.11.~~b~~ of this section must be submitted to the Director prior to or together with any reports, information, or applications to be signed by an authorized representative.

~~d~~14.11.4. Certification. Any person signing a document under subdivision 14.11.~~a~~1 or 14.11.~~b~~2 of this section shall make the following certification:

"I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment."

14.12. Conditions Applicable to All permits. The following conditions are applicable to all permits, and shall be incorporated into the permits either expressly or by reference. If incorporated by reference, a specific citation to this rule must be given in the permit.

~~a~~14.12.1. Duty to comply. The permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the SDWA and the State Act and is grounds for enforcement action; for permit suspension or revocation, revocation and reissuance, or modification; or for denial of a permit renewal application.

~~b~~14.12.2. Duty to Reapply. If the permittee wishes to continue activity regulated by this permit after the expiration date of this permit, the permittee must apply for and obtain a new permit.

~~c~~14.12.3. Duty to reduce or halt activity. It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

~~d~~14.12.4. Duty to mitigate. The permittee shall take all reasonable steps to minimize or correct any adverse impact on the environment resulting from noncompliance with this permit.

~~e~~14.12.5. Proper operation and maintenance. The permittee shall at all times, properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance includes effective performance, adequate funding, adequate operator staffing and training, and quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems only when necessary to achieve compliance with the conditions of the permit.

~~f~~14.12.6. Permit actions. This permit may be modified, revoked and reissued, suspended, or revoked for cause. The filing of a request by the permittee for a permit modification, revocation and reissuance, suspension or revocation, or notification of planned changes or anticipated noncompliance, does not stay any permit condition. All requests shall be in writing and shall contain facts or reasons supporting the request.

~~g~~14.12.7. Property rights. This permit does not convey any property rights of any sort, or any exclusive privilege.

~~h~~14.12.8. Duty to provide information. The permittee shall furnish to the Director within a reasonable time, any information which the Director may request to determine whether cause exists for modifying, revoking and reissuing, or revoking this permit, or to determine compliance with this permit. The permittee shall also furnish to the Director, upon request, copies of records required to be kept by this permit.

~~i~~14.12.9. Inspection and entry. The permittee shall allow the Director, or an authorized representative, upon the presentation of credentials and other documents as maybe required by law, to:

~~i.1~~ 14.12.9.a. Enter upon the permittees premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit;

~~i.2~~ 14.12.9.b. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;

~~i.3~~ 14.12.9.c. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; and

~~i.4~~ 14.12.9.d. Sample or monitor at reasonable times, for the purposes of assuring permit compliance or as otherwise authorized by the SDWA and State Act, any substances or parameters at any location.

~~j~~14.12.10. Monitoring and records.

~~j.1~~ 14.12.10.a. Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity.

~~j.2~~ 14.12.10.b. The permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a period of at least three (3) years from the date of the sample, measurement, report or application. This period may be extended by request of the Director at any time.

~~j.3~~ 14.12.10.c. Records of monitoring information shall include:

~~j.3.A~~ 14.12.10.c.1. The date, exact place, and time of sampling or measurements;

~~j.3.B~~ 14.12.10.c.2. The individual(s) who performed the sampling or measurements;

~~j.3.C~~ 14.12.10.c.3. The date(s) analysis(es) were performed;

~~j.3.D~~ 14.12.10.c.4. The individual(s) who performed the analyses;

~~j.3.E~~ 14.12.10.c.5. The analytical techniques or methods used; and

~~j.3.F~~ 14.12.10.c.6. The results of such analyses.

~~k~~14.12.11. Signatory requirement. All applications, reports, or information submitted to the Director shall be signed and certified, as required under subsection 14.11.

~~l~~14.12.12. Reporting requirements.

~~l.1~~ 14.12.12.a. Planned changes. The permittee shall give notice to the Director as soon as possible of any planned significant physical alterations or additions to the permitted facility, or any planned significant changes in the operation of the facility.

~~l.2~~ 14.12.12.b. Anticipated noncompliance. The permittee shall give advance notice to the Director of any planned changes in the permitted facility or activity which may result in noncompliance with the permit requirements.

~~l.3~~ 14.12.12.c. Transfers. This permit is not transferable to any person except after notice to the Director. The Director may require modification or revocation and reissuance of the permit to change the name of the permittee and incorporate such other requirements as may be necessary under the SDWA and the State Act and rules. In some cases, modification or revocation and reissuance is mandatory (see subsection 14.17).

~~l.4~~ 14.12.12.d. Monitoring reports. Monitoring results shall be reported at the intervals specified elsewhere in this permit.

~~l.5~~ 14.12.12.e. Compliance schedules. Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule of this permit shall be submitted no later than thirty (30) days following each schedule date.

~~l.6~~ 14.12.12.f. Immediate reporting. The permittee shall report any noncompliance which may endanger health or the environment immediately after becoming aware of the circumstances by using the Water Resources Emergency Notification Number, 1-800-642-3074. Written submission shall also be provided within five (5) days of the time the permittee becomes aware of the circumstances. The written submission shall contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and the steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.

~~l.7~~ 14.12.12.g. Other noncompliance. The permittee shall report all instances of noncompliance not reported under paragraphs 14.12.~~l.1~~12.a., 14.12.~~l.4~~12.d., 14.12.~~l.5~~12.e, and 14.12.~~l.6~~12.f of this section, at the time monitoring reports are submitted. The report shall contain the information listed in paragraph 14.12.12.f~~l.6~~ of this section.

~~l.8~~ 14.12.12.h. Other information. Where a permittee becomes aware that he/she failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the Director, he/she shall promptly submit such facts or information.

~~l.9~~ 14.12.12.i. Owners or operators of Class 6 wells shall retain records as specified in 47 CSR 13, including subparts 14.4.~~d~~4., ~~14.6.e.1.F~~3.a.6., 14.9.~~f~~6., 14.9.~~g~~7., and ~~14.9.h~~8 14.10.5.

14.13. Duration of Permits. UIC permits for Class 1, ~~2, 3,~~ 5 and 6 wells shall be effective for a fixed term not to exceed five (5) years. Reevaluation is required to determine whether it should be modified, revoked and reissued, terminated or a minor modification made.

~~a~~14.13.1. The term of a permit shall not be extended by modification beyond the maximum duration specified in this section.

~~b~~14.13.2. The Director may issue any permit for a duration that is less than the full allowable term under this section.

14.14. Schedules of Compliance.

~~a~~14.14.1. The permit may, when appropriate, specify a schedule of compliance leading to compliance with the SDWA, the State Act and rules.

~~a.1~~ 14.14.1.a. Time for compliance. Any schedules for compliance under this section shall require compliance as soon as possible.

~~a.2~~ 14.14.1.b. In addition, a schedule of compliance shall require compliance no later than three (3) years after the effective date of the permit.

~~a.3~~ 14.14.1.c. Interim dates. Except as provided in subparagraph 14.14.~~b.1.B~~2.a.2. of this section, if a permit establishes a schedule of compliance which exceeds one (1) year from the date of permit issuance, the schedule shall set forth interim requirements and the dates for their achievement.

~~a.3.A~~ 14.14.1.c.1. The time between interim dates shall not exceed one (1) year.

~~a.3.B~~ 14.14.1.c.2. If the time necessary for completion of any interim requirement (such as the construction of a control facility) is more than one (1) year and is not readily divisible into stages for completion, the permit shall specify interim dates for the submission of reports of progress toward completion of the interim requirements and indicate a projected completion date.

~~a.4~~ 14.14.1.d. Reporting. The permit shall be written to require that no later than thirty (30) days following each interim date and the final date of compliance, the permittee shall notify the Director in writing of its compliance or noncompliance with the interim or final requirements.

~~b~~14.14.2. Alternative schedules of compliance. A UIC permit applicant or permittee may cease conducting regulated activities (by plugging and abandonment) rather than continue to operate and meet permit requirements as follows:

~~b.1~~ 14.14.2.a. If the permittee decides to cease conducting regulated activities at a given time within the term of a permit which has already been issued:

~~b.1.A~~ 14.14.2.a.1. The permit may be modified to contain a new or additional schedule leading to timely cessation of activities; or

14.14.2.a.2. The permittee shall cease conducting permitted activities before noncompliance with any interim or final compliance schedule requirement already specified in the permit.

~~b.2~~ 14.14.2.b. If the decision to cease conducting regulated activities is made before issuance of a permit whose term will include the termination date, the permit shall contain a schedule leading to termination which will ensure timely compliance with applicable requirements.

~~b.3~~ 14.14.2.c. If the permittee is undecided whether to cease conducting regulated activities, the Director may issue or modify a permit to contain two schedules as follows:

~~b.3.A~~ 14.14.2.c.1. Both schedules shall contain an identical interim deadline requiring a final decision on whether to cease conducting regulated activities no later than a date which ensures sufficient time to comply with applicable requirements in a timely manner if the decision is to continue conducting regulated activities.

~~b.3.B~~ 14.14.2.c.2. One schedule shall lead to timely compliance with applicable requirements;

~~b.3.C~~ 14.14.2.c.3. The second schedule shall lead to cessation of regulated activities by a date which will ensure timely compliance with applicable requirements; and

~~b.3.D~~ 14.14.2.c.4. Each permit containing two (2) schedules shall include a requirement that after the permittee has made a final decision under subparagraph 14.14.~~b.1.A~~2.a.1. of this section it shall follow the schedule leading to compliance if the decision is to continue conducting regulated activities, and follow the schedule leading to termination if the decision is to cease conducting regulated activities.

~~b.4~~ 14.14.2.d. The applicant's or permittee's decision to cease conducting regulated activities shall be evidenced by a firm public commitment satisfactory to the Director, such as a resolution of the board of directors of a corporation.

14.15. Requirements for Recording and Reporting of Monitoring Results. All permits shall specify:

~~a~~14.15.1. Requirements concerning the proper use, maintenance, and installation, when appropriate, of monitoring equipment or methods (including biological monitoring methods when appropriate);

~~b~~14.15.2. Required monitoring including type, intervals, and frequency sufficient to yield data which are representative of the monitored activity including, when appropriate, continuous monitoring; and

~~c~~14.15.3. Applicable reporting requirements based upon the impact of the regulated activity and as specified elsewhere by this rule.

14.16. Effect of a Permit.

~~a~~14.16.1. The issuance of a permit does not convey any property rights of any sort, or any exclusive privilege.

~~b~~14.16.2. The issuance of a permit does not authorize any injury to persons or property or invasion of other private rights, or any infringement of State or local law or rules.

~~c~~14.16.3. Except for Class 2 and 3 wells, compliance with a permit during its term constitutes compliance, for purposes of enforcement, with Part C of SDWA. However, a permit may be modified, revoked, and reissued, suspended or revoked during its term for cause as set forth in subsections 14.18 and 14.19.

14.17. Transfer of Permits.

~~a~~14.17.1. Transfers by modification. Except as provided in subdivision 14.17.~~b~~2 of this section, a permit may be transferred by the permittee to a new owner or operator only if the permit has been modified or revoked and reissued, or a minor modification made to identify the new permittee and incorporate such other requirements as may be necessary under the SDWA and the State Act and rules.

~~b~~14.17.2. Automatic transfers. As an alternative to transfers under subdivision 14.17.~~a~~1 of this section, any UIC permit for a well not injecting hazardous waste or injecting carbon dioxide may be automatically transferred to a new permittee if:

~~b.1~~ 14.17.2.a. The current permittee notifies the Director at least thirty (30) days in advance of the proposed transfer date in paragraph 14.17.~~b.2~~2.b of this section;

~~b.2~~ 14.17.2.b. The notice includes a written agreement between the existing and new permittees containing a specific date for transfer of permit responsibility coverage, and liability between them and, in the case of UIC permits, the notice demonstrates that the financial responsibility requirements of subdivision 14.7.~~g~~7 will be met by new permittee; and

~~b.3~~ 14.17.2.c. The Director does not notify the existing permittee and the proposed new permittee of his or her intent to modify or revoke and reissue the permit. A modification under this section may also be a minor modification under subsection 14.20. If this notice is not received, the transfer is effective on the date specified in the agreement mentioned in paragraph 14.17.~~b.2~~2.b of this section.

14.18. Modification or Revocation and Reissuance of Permits. When the Director receives any information (for example, inspects the facility, receives information submitted by the permittee as required in the permit, receives a request for modification or revocation and reissuance, or conducts a review of the permit file) he or she may determine whether or not one or more of the causes listed in subdivisions 14.18.1~~a~~ and 14.18.2~~b~~ of this section for modification or revocation and reissuance or both exists. If cause exists, the Director may modify or revoke and reissue the permit accordingly, subject to the limitations of subdivision 14.18.3~~c~~ of this section and request an updated application. When a permit is modified, only the conditions subject to modification are reopened. If a permit is revoked and reissued, the entire permit is reopened and subject to revision and the permit is reissued for a new term. If cause does not exist under this section or subsection 14.20, the Director shall not modify or revoke and reissue the permit. If a permit modification satisfies the criteria in subsection 14.20 for "minor modifications" the permit may be modified without a draft permit or public review. Otherwise, a draft permit must be prepared. Notice of intent to revoke a permit will require a draft permit.

~~a~~14.18.1. Cause for modification. The following are causes for modification but not revocation and reissuance of permits, except for Class 1, 2 and 3 wells in which case the following may be causes for revocation and reissuance as well as modification.

~~a.1~~ 14.18.1.a. Alterations. There are material and substantial alterations or additions to the permitted facility or activity which occurred after permit issuance which justify the application of permit conditions that are different or absent in the existing permit.

~~a.2~~ 14.18.1.b. Information. The Director has received information. Permits other than for Class 2 and 3 wells may be modified during their terms for this cause only if the information was not available at the time of permit issuance (other than revised rules, guidance, or test methods) and would have

justified the application of different permit conditions at the time of issuance. For UIC area permits, this cause shall include any information indicating that cumulative effects on the environment are unacceptable.

~~a.3~~ 14.18.1.c. New rules. The standards or rules on which the permit was based have been changed by promulgation of amended standards or rules or by judicial decision after the permit was issued. Permits other than for Class 2 or 3 wells may be modified during their terms for this cause only as follows:

~~a.3.A~~ 14.18.1.c.1. For promulgation of amended standards or rules, when:

~~a.3.A.1~~ 14.18.1.c.1.A. The permit condition to be modified was based on a State regulation requiring compliance with forty (40) CFR Part 146; and

~~a.3.A.2~~ 14.18.1.c.1.B. The State has revised, withdrawn, or modified that portion of the regulation on which the permit condition was based.

~~a.3.B~~ 14.18.1.c.2. For judicial decisions, a court of competent jurisdiction has remanded and stayed State promulgated rules if the remand and stay concern that portion of the rules on which the permit condition was based.

~~a.4~~ 14.18.1.d. Compliance schedules. The Director determines good cause exists for modification of a compliance schedule, such as an act of God, strike, flood, or materials shortage or other events over which the permittee has little or no control and for which there is no reasonably available remedy.

~~a.5~~ 14.18.1.e. For Class 6 wells. Whenever the Director determines that permit changes are necessary based on area of review reevaluations or any amendments to the testing and monitoring plan, injection well plugging plan, post injection site care and site closure plan, or emergency and remedial response plan; or a review of monitoring and/or testing results conducted in accordance with permit requirements.

~~b~~14.18.2. Cause for modification or revocation and reissuance. The following are causes to modify or, alternatively, revoke and reissue a permit:

~~b.1~~ 14.18.2.a. Cause exists for revocation under subsection 14.19 and the Director determines that modification or revocation and reissuance is appropriate.

~~b.2~~ 14.18.2.b. The Director has received notification of a proposed transfer of the permit. A permit may also be modified to reflect a transfer after the effective date of an automatic transfer under subdivision 14.17.2~~b~~ but will not be revoked and reissued after the effective date of the transfer except upon the request of the new permittee unless the permit is up for reissuance or meets a qualification for revocation under 14.19.

~~c~~14.18.3. Facility siting. Suitability of the facility location will not be considered at the time of permit modification or revocation and reissuance unless new information or standards indicate that a threat to human health or the environment exists which was unknown at the time of permit issuance.

14.19. Revocation and Suspension of Permits.

~~a~~14.19.1. The Director may revoke or suspend a permit during its term or deny a permit renewal application for the following causes:

~~a.1~~ 14.19.1.a. Noncompliance by the permittee with any condition of the permit;

~~a.2~~ 14.19.1.b. The permittee's failure in the application or during the permit issuance process to disclose fully all relevant facts, or the permittee's misrepresentation of any relevant facts at any time; or

~~a.3~~ 14.19.1.c. A determination that the permitted activity endangers human health or the environment and can only be regulated to acceptable levels by permit modification or revocation. Such as the waste being injected ~~in~~ is now a hazardous waste.

14.20. Minor Modifications of Permits. Upon the consent of the permittee, the Director may modify a permit to make the corrections or allowances for changes in the permitted activity listed in this section. Any permit modification not processed as a minor modification under this section must be made for cause and with a draft permit and public notice as required in subsection 14.18. Minor modifications may only:

~~a~~14.20.1. Correct typographical errors;

~~b~~14.20.2. Require more frequent monitoring or reporting by the permittee;

~~c~~14.20.3. Change an interim compliance date in a schedule of compliance, provided the new date is not more than one hundred-twenty (120) days after the date specified in the existing permit and does not interfere with attainment of the final compliance date requirement;

~~d~~14.20.4. Allow for a change in ownership or operational control of a facility where the Director determines that no other change in the permit is necessary, provided that a written agreement containing a specific date for transfer of permit responsibility, coverage, and liability between the current and new permittees has been submitted to the Director; or

~~e~~14.20.5. Allow the following:

~~e.1~~ 14.20.5.a. Change quantities or types of fluids injected which are within the capacity of the facility as permitted, and in the judgement of the Director would not interfere with the operation of the facility or its ability to meet conditions prescribed in the permit, and would not change its classification;

~~e.2~~ 14.20.5.b. Change construction requirements approved by the Director pursuant to subdivision 14.7.1~~a~~, provided that any such alteration shall comply with the requirements of this rule; and

~~e.3~~ 14.20.5.c. Amend a plugging and abandonment plan which has been updated under subdivision 14.6.~~e~~5.

~~e.4~~ 14.20.5.d. Amend a Class 6 injection well testing and monitoring plan, plugging plan, post-injection site care and site closure plan, or emergency and remedial response plan where the modifications merely clarify or correct the plan.

14.21. Confidentiality of Information.

~~a~~14.21.1. Any information submitted to the State pursuant to this rule may be claimed as confidential by the submitter. Any such claim must be asserted at the time of submission in the manner prescribed on the application form or instructions or, in the case of other submissions, by stamping the words "CONFIDENTIAL BUSINESS INFORMATION" on each page containing such information. If no

claim is made at the time of submission, the State may make the information available to the public without further notice.

~~b~~14.21.2. Claims of confidentiality for the following information will be denied:

~~b.1~~ 14.21.2.a. The name and address of any permit applicant or permittee.

~~b.2~~ 14.21.2.b. Information which deals with the existence, absence, or level of contaminants in drinking water.

14.22. Identification of Underground Sources of Drinking Water and Exempted Aquifers.

~~a~~14.22.1. The Director may identify (by narrative description, illustrations, maps, or other means) and shall protect, except where exempted under subdivision 14.22.~~b~~2 of this section, as an underground source of drinking water, all aquifers or parts of aquifer which meet the definition of an "underground source of drinking water" in section 2. Even if an aquifer has not been specifically identified by the Director, it is an underground source of drinking water if it meets the definition in section 2 or an expansion to the areal extent of an existing Class II EOR/EGR aquifer exemption for the exclusive purpose of Class 6 injection for geologic sequestration. Other than EPA approved aquifer exemption expansions or exemptions following 40 CFR_144.7(a)., new aquifer exemptions shall not be issued for Class 6 injection wells.

~~b~~14.22.2. The Director may identify (by narrative description, illustrations, maps, or other means) and describe in geographic and/or geometric terms, such as vertical and lateral limits and gradient, which are clear and definite, all aquifers or parts thereof which the Director proposes to designate as exempted aquifers using the criteria in section 3.

~~c~~14.22.3. No designation of an exempted aquifer submitted as a part of a UIC Program shall be final until approved by the Director of the U.S. EPA as part of the State program.

~~c.1~~ 14.22.3.a. No designation of an expansion to the areal extent of a Class II EOR/EGR aquifer exemption for the exclusive purpose of Class 6 injection for geologic sequestration shall be final until approved by the Director of the U.S. EPA as part of the State Program.

~~c.2~~ 14.22.3.b. In order to make a request to the Director to approve an expansion to the areal extent of existing Class II aquifer exemptions for Class 6 wells, the owner or operator of a Class II EOR/EGR must define and describe all aquifers that are requested to be designated as exempted in 40 CFR 146.4. Requests must be treated as a substantial program revision under the approved State UIC program and will not be final until approved by EPA. The Director must determine that the request meets the criteria in 40 CFR 146.4 and consider: 1 - Current and potential future use of the USDWs to be exempted as drinking water resources; 2 - The predicted extent of the injected CO2 plume and any mobilized fluids that may degrade of water quality, over the GS project lifetime, as informed by computational modeling in 14.9.~~c.1~~3.a.; 3 - Whether the areal extent of the expanded aquifer exemption is of sufficient size to account for any possible revisions to the computational model during reevaluation of the area of review, pursuant to 14.9.~~c.4~~5.d.; and 4 -Any information submitted to support a waiver request made by the owner or operator under 14.8.4~~d~~., if appropriate.

~~d~~14.22.4. For Class 3 wells, the Director shall require an applicant for a permit which necessitates an aquifer exemption under paragraph 3.1.~~b.1~~2.a to furnish the data necessary to demonstrate that the aquifer is expected to be mineral or hydrocarbon producing. Information contained in the mining plan for the proposed project, such as a map and general description of the mining zone, general information on the

mineralogy and geochemistry of the mining zone, analysis of the amenability of the mining zone to the proposed mining method, and a time-table of planned development of the mining zone shall be considered by the Director in addition to the information required by subsection 14.3.

~~e~~14.22.5. For Class 2 wells, a demonstration of commercial producibility shall be made as follows:

~~e.1~~ 14.22.5.a. For a Class 2 well to be used for enhanced oil recovery processes in a field or project containing aquifers from which hydrocarbons were previously produced, commercial productibility shall be presumed by the Director upon a demonstration by the applicant of historical production having occurred in the project area or field.

~~e.2~~ 14.22.5.b. For Class 2 wells not located in a field or project containing aquifers from which hydrocarbons were previously produced, information such as logs, core data, formation description, formation depth, formation thickness and formation parameters such as permeability and porosity shall be considered by the Director, to the extent such information is available.

14.23. Public Access to Information.

~~a~~14.23.1. Any records, reports, or information contained under this rule and any permits, permit applications, and related documentation shall be available to the public for inspection and copying in accordance with Series 8, West Virginia Legislative Rules (Freedom of Information Act); provided, however, that upon a satisfactory showing to the Director that such records, reports, permit documentation, or information (other than that listed in subdivision 14.21.~~b~~2), would, if made public, divulge methods or processes entitled to protection as trade secrets, the Director shall consider, treat and protect such records as confidential.

~~b~~14.23.2. It shall be the responsibility of the person claiming information as confidential under the provisions of subdivision 14.23.~~a~~1 above to clearly mark each page containing such information with the word "CONFIDENTIAL" and to submit an affidavit setting forth the reasons that said person believes that such information is entitled to protection.

~~c~~14.23.3. Any document submitted to the Director which contains information for which claim of confidential information is made shall be submitted in a sealed envelope marked "CONFIDENTIAL" and addressed to the Director. The document shall be submitted in two (2) separate parts. The first part shall contain all information which is not deemed by the person preparing the report as confidential and shall include appropriate cross-references to the second part which contains data, words, phrases, paragraphs, or pages and appropriate affidavits containing or relating to information which is claimed to be confidential.

~~d~~14.23.4. No information shall be protected as confidential information by the Director unless it is submitted in accordance with the provisions of subdivision 14.23.~~c~~3 above and no information which is submitted in accordance with the provisions of subdivision 14.23.~~c~~3 above shall be afforded protection as confidential information unless the Director finds that such protection is necessary to protect trade secrets and that such protection will not hide from public view the characteristics of waste materials and probable effects of the introduction of such wastes or by-products into the environment. The person who submits information claimed as confidential shall receive written notice from the Director as to whether the information has been accepted as confidential or not.

~~e~~14.23.5. All information which meets the tests of subdivision 14.23.~~d~~4 above shall be marked with the term "ACCEPTED" and shall be protected as confidential information. If said person fails to satisfactorily demonstrate to the Director that such information in the form presented him meets the criteria of subdivision 14.23.~~d~~4 above, the Director shall mark the information "REJECTED" and promptly return such information to the person submitting such information.

~~f~~14.23.6. Nothing contained herein shall be construed so as to restrict the release of relevant confidential information during situations declared to be emergencies by the Director or his designee.

~~g~~14.23.7. Nothing in this section may be construed as limiting the disclosure of information by the Water Resources section to any officer, employee or authorized representative of the State or Federal government concerned with the State UIC program.

14.24. Public Participation in Permit Process.

~~a~~14.24.1. Scope. Public notice shall be given that the following actions have occurred:

~~a.1~~ 14.24.1.a. A draft permit has been prepared; or

~~a.2~~ 14.24.1.b. A hearing time has been scheduled.

~~b~~14.24.2. Timing.

~~b.1~~ 14.24.2.a. Public notice of the preparation of the draft permit required under this section shall allow at least thirty (30) days for public comment.

~~b.1~~ 14.24.2.b. Public notice of a hearing shall be given at least thirty (30) days before the hearing.

~~c~~14.24.3. Methods. Public notice of activities described in this section shall be given by the following methods:

~~c.1~~ 14.24.3.a. By mailing a copy of a notice to the following persons (any person otherwise entitled to receive notice under this paragraph may waive the right to receive notice for any classes and categories of permits):

~~c.1.A~~ 14.24.3.a.1. The applicant;

~~c.1.B~~ 14.24.3.a.2. Any other agency including EPA which the Director knows has issued or is required to issue a RCRA, PSD, NPDES permit for the same facility or activity;

~~c.1.C~~14.24.3.a.3. Federal and State and interstate agencies with jurisdiction over fish and wildlife resources, public health, the State Historic Preservation Unit of the Department of Culture and History, and other appropriate government authorities, including any affected states;

~~c.1.D~~ 14.24.3.a.4. Persons on a mailing list developed by:

~~c.1.D.1~~ 14.24.3.a.4.A. Including those who request in writing to be on the list;

~~c.1.D.2~~ 14.24.3.a.4.B. Soliciting persons for "area lists" from participants in past permit proceedings in that area; and

~~c.1.D.3~~ 14.24. 3.a.4.C. Notifying the public of the opportunity to be put on the mailing list through periodic publication in the public press and in appropriate publications of the State.

~~c.1.E~~ 14.24.3.a.5. By mailing a copy to each agency having authority under State law with respect to the construction or operation of such facility~~;~~ and to any unit of local government having jurisdiction over the area where the facility is proposed to be located;

~~c.1.E~~ 14.24.3.a.6. State and local oil and gas agencies for Class 6 UIC Permits.

~~c.2~~ 14.24.3.b. For any permit, and all major permits, the Director shall send the public notice to the applicant who shall be responsible for publication of a Class 1 legal advertisement by a date, and in a paper specified by the Director. Upon publication, the applicant shall send the Director a copy of the certificate of publication. The costs of publication shall be borne by the applicant; and

~~c.3~~ 14.24.3.c. Any other method reasonably calculated to give actual notice of the action in question to the persons potentially affected by it, including press releases or any other forum or medium to elicit public participation.

14.25. Contents of a Public Notice.

~~a~~14.25.1. All public notices issued under this section shall contain the following minimum information:

~~a.1~~ 14.25.1.a. Name and address of the office processing the permit action for which notice is being given.

~~a.~~2 14.25.1.b. Name and address of the permittee or permit applicant and, if different, of the facility or activity regulated by the permit.

~~a.3~~ 14.25.1.c. A brief description of the business conducted at the facility described in the permit application or the draft permit.

~~a.4~~ 14.25.1.d. The name, address, and telephone number of a person from whom interested persons may obtain further information, including copies of the draft permit or fact sheet, and the application.

~~a.5~~ 14.25.1.e. A brief description of the comment procedures required by subsections 14.26 and 14.27 and the time and place of any hearing that will be held, including a statement of procedures to request a hearing unless already scheduled, and other procedures by which the public may participate in the final permit decision.

~~b~~14.25.2. In addition to the general public notice described in subdivision 14.25.~~a~~1., the public notice of a hearing shall contain the following information:

~~b.1~~ 14.25.2.a. Reference to the date of previous public notices relating to the permit;

~~b.2~~ 14.25.2.b. Date, time and place of the hearing; and

~~b.3~~ 14.25.2.c. A brief description of the nature and purposes of the hearing, including the applicable rules and procedures.

~~c~~14.25.3. In addition to the general public notice, all persons identified in subparagraphs 14.24.~~c.1.A~~3.a.1, 14.24.~~c.1.B~~3.a.2, and 14.24.~~c.1.C~~3.a.3 shall be mailed a copy of the fact sheet, the permit application and the draft permit.

14.26. Public Comment and Requests for Public Hearings. During the public comment period provided, any interested person may submit written comments on the draft permit and may request a public hearing if no hearing has already been scheduled. A request for a public hearing shall be in writing and shall state the nature of the issues proposed to be raised in the hearing. All comments shall be considered in making the final decision and shall be answered as provided in subsection 14.30.

14.27. Public Hearings.

~~a~~14.27.1. The Director shall hold a public hearing whenever he or she finds, on the basis of requests, a significant degree of public interest of issues relevant to the draft permit(s). The Director also may hold a public hearing at his or her discretion, whenever, for instance, such a hearing might clarify one or more issues involved in the permit decision.

~~b~~14.27.2. Any person may submit oral or written statements and data concerning the draft permit. Reasonable limits may be set upon the time allowed for oral statements, and the submission of statements in writing may be required. The public comment period under paragraph 14.24.~~b.1~~2.a shall automatically be extended to ten (10) days after the close of any public hearing under this section.

~~c~~14.27.3. A tape recording or written transcript of the hearing shall be made available to the public, upon request.

14.28. Obligation to Raise Issues and Provide Information During the Public Comment Period. All persons, including applicants, who believe any condition of a draft permit is inappropriate or that the Director tentative decision to prepare a draft permit is inappropriate, shall raise all reasonably ascertainable issues and submit all reasonably available arguments and factual grounds supporting their position, including all supporting material, by the close of the public comment period. All supporting materials shall be included in full and not be incorporated by reference, unless they are already part of the administrative record in the same proceeding, or consist of State or Federal statutes and rules, documents of general applicability, or other generally available reference materials. Submitters of comments shall make supporting material not already included in the administrative record available to the State as directed by the Director.

14.29. Reopening of the Public Comment Period.

~~a~~14.29.1. If any data, information or arguments submitted during the public comment period appear to raise substantial new questions concerning a permit, the Director may take one or more of the following actions:

~~a.1~~ 14.29.1.a. Prepare a new draft permit, appropriately modified;

~~a.1~~ 14.29.1.b. Prepare a revised fact sheet and reopen the comment period under this section; or

~~a.1~~ 14.29.1.c. Reopen or extend the comment period to give interested persons an opportunity to comment on the information or arguments submitted.

~~b~~14.29.2. Comments filed during the reopened comment period shall be limited to the substantial new questions that caused its reopening. The public notice shall define the scope of the reopening.

14.30. Response to Comments.

~~a~~14.30.1. Any time that any final permit is issued, the Director shall prepare a response to comments. This response shall:

~~a.1~~ 14.30.1.a. Specify which provisions, if any, of the draft permit have been changed in the final permit decision, and the reasons for the change; and

~~a.2~~ 14.30.1.b. Briefly describe and respond to all significant comments on the draft permit raised during the public comment period, or during any hearing.

~~b~~14.30.2. The response to comments shall be available to the public.

14.31. Fact Sheet.

~~a~~14.31.1. A fact sheet shall be prepared for every draft permit for a major facility or activity and for every draft permit which the Director finds is the subject of widespread public interest or raises major issues. The fact sheet shall briefly set forth the principal facts and the significant factual, legal, methodological and policy questions considered in preparing the draft permit. The Director shall send this fact sheet to the applicant and, on request, to any other person and to the persons required under subparagraphs 14.24.~~e.1.A~~3.a.1, 14.24.~~e.1.B~~3.a.2, and 14.24.~~e.1.C~~3.a.3. A major facility is classified as such by the Regional Administrator in conjunction with the State Director.

~~b~~14.31.2. The fact sheet shall include, when applicable:

~~b.1~~ 14.31.2.a. A brief description of the type of facility or activity which is the subject of the draft permit;

~~b.2~~ 14.31.2.b. The type and quantity of fluids, which are proposed to be or are being injected;

~~b.3~~ 14.31.2.c. A brief summary of the basis for the draft permit conditions including references to applicable statutory or regulatory provisions;

~~b.3.A~~ 14.31.2.c.1. Justified or unjustified variances;

~~b.4~~ 14.31.2.d. A description of the procedures for reaching a final decision on the draft permit including:

~~b.4.A~~ 14.31.2.d.1. The beginning and ending dates of the public comment period and the address where comments will be received;

~~b.4.B~~ 14.31.2.d.2. Procedures for requesting a hearing and the nature of that hearing;

~~b.4.C~~ 14.31.2.d.3. Any other procedures by which the public may participate in the final decision; and

~~b.4.D~~ 14.31.2.d.4. Name and telephone number of a person to contact for additional information.

14.32. Draft Permits.

~~a~~14.32.1. Once an application is complete, the Director shall tentatively decide whether to prepare a draft permit or to deny the application.

~~b~~14.32.2. If the Director decides to prepare a draft permit, it shall contain the following information:

~~b.1~~ 14.32.2.a. All conditions under subsections 14.6, 14.7, and 14.12;

~~b.2~~ 14.32.2.b. All compliance schedules; and

~~b.3~~ 14.32.2.c. All monitoring requirements.

Figure 47-13-5

Zone of Endangering Influence

$$r = \sqrt{\frac{2.25KHt}{S10^{x}}}$$

where:

$$x = \frac{4\pi KH(h_w - h_{bo})S_p G_b}{2.3Q}$$