WEST VIRGINIA
SECRETARY OF STATE
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ADMINISTRATIVE LAW DIVISION

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OFFICE OF WEST VIRGINIA
SECRETARY OF STATE

NOTICE OF AGENCY APPROVAL OF A PROPOSED RULE

AND

FILING WITH THE LEGISLATIVE RULE-MAKING REVIEW COMMITTEE

Water Resources / Waste Management

AGENCY: Division of Environmental Protection TITLE NUMBER: 47

CITE AUTHORITY § 22-12-5(d)

AMENDMENT TO AN EXISTING RULE: YES _____ NO X

IF YES, SERIES NUMBER OF RULE BEING AMENDED: _____

TITLE OF RULE BEING AMENDED: _____

IF NO, SERIES NUMBER OF RULE BEING PROPOSED: 60

TITLE OF RULE BEING PROPOSED: Monitoring Well Design Standards

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THE ABOVE PROPOSED LEGISLATIVE RULE HAVING GONE TO A PUBLIC HEARING OR A PUBLIC COMMENT PERIOD IS HEREBY APPROVED BY THE PROMULGATING AGENCY FOR FILING WITH THE SECRETARY OF STATE AND THE LEGISLATIVE RULE-MAKING REVIEW COMMITTEE FOR THEIR REVIEW.

Roger McDonald

Laidly Eli McCoy, Director
Division of Environmental Protection

16-10

BUREAU OF ENVIRONMENT
10 McJUNKIN ROAD
NITRO, WV 25143-2506

GASTON CAPERTON
GOVERNOR

DAVID C. CALLAGHAN
COMMISSIONER

May 31, 1995

Ms. Judy Cooper
Director, Administrative Law Division
Secretary of State's Office
Building 1, Suite 157K
Charleston, West Virginia 25305

RE: 47 CSR 60 - "Monitoring Well Design Standards"

Dear Ms. Cooper:

This is to advise you that I am giving approval for the filing of the above-captioned rule as a proposed legislative rule.

Your cooperation in this regard is very much appreciated. If you have any questions or require additional information, please feel free to contact Roger T. Hall at 759-0515.

Sincerely yours,

David C. Callaghan
Commissioner
Bureau of Environment

DCC;RTH:cc

Attachment

STATEMENT OF CIRCUMSTANCES
CONCERNING
MONITORING WELL DESIGN STANDARDS

AGENCY: Bureau of Environment - Division of Environmental Protection

REGULATION: 47 CSR 60 - "Monitoring Well Design Standards"

SUMMARY: The circumstances surrounding the filing of this proposed rule is twofold. One reason is administrative in nature. A companion rule, 47 CSR 59, passed by the Legislature entitled "Monitoring Well Regulations" establishes a certification program for monitoring well drillers and monitoring well installations and alterations. The rule also specifies that compliance with this rule will not be required until this rule (47 CSR 60) becomes effective. The other reason is to develop a minimum set of guidelines for the construction, installation, maintenance, and abandonment of monitoring wells, which if not installed properly can be a major source of ground water contaminations.

For further information, contact David P. Watkins, Ground Water Program at (304) 558-2108

FISCAL NOTE FOR PROPOSED RULE

Rule Title: Monitoring Well Design Standards 47 C.S.R. 60

Type of Rule: __X__ Legislative _____ Interpretive _____ Procedural

Agency: WV Division of Environmental Protection, Office of Water Resources

Address: 1201 Greenbrier Street, Charleston, WV 25311

1. Effect of Proposed Rule		ANNUAL Increase	ANNUAL Decrease	FISCAL YEAR Current	FISCAL YEAR Next	FISCAL YEAR Thereafter
Estimated Total Cost	$	N.A.	N.A.	N.A.	N.A.	N.A.
Personal Services	$					
Current Expenses	$					
Repairs & Alterations	$					
Equipment	$					
Other	$					

2. Explanation of above estimates: This rule is not expected to increase or decrease state revenues or costs, other than as described in the Fiscal Note accompanying the Groundwater Protection Act Fee Schedule rule, 47CSR55.

3. Objectives of this rule: To serve only as a minimum statewide guideline towards ensuring that monitoring wells and boreholes do not constitute a significant pathway for the movement of poor quality water, pollutants or contaminants.

4. Explanation of Overall Economic Impact of Proposed Rule.

A. Economic Impact on State Government. This rule will regulate private industry and as such should not directly impact state government.

B. Economic Impact on Political Subdivisions; Specific Industries; Specific groups of citizens. This rule will not impact costs on specific industries, other than what is currently being imposed through the drilling industry.

C. Economic Impact on Citizens/ Public at Large. The Division of Environmental Protection has no way to accurately predict the economic impact on citizens or the public at large, other than those costs associated with the certification of monitoring well drillers as specified in 47CSR55.

Date: May 25,1995

Signature of Agency Head or Authorized Representative

Director, Division of Environmental Protection

DATE: July 26, 1995

TO: Legislative Rule-Making Review Committee

FROM: Division of Environmental Protection, Office of Water Resources

LEGISLATIVE RULE TITLE: Monitoring Well Design Standards

1. Authorizing statute(s) citation: §22-12-5(d)

2.a. Date filed in State Register with Notice of Hearing: June 2, 1995

2.b. What other notice, including advertizing, did you give of the hearing? Notice of public hearing and comment period was advertised in 9 daily newspapers.

2.c. Date of hearing(s): July 6, 1995

2.d. Attach list of persons who appeared at hearing, comments received, amendments, reasons for amendments;
Attached partially attached No comments received ____

2.e. Date agency approved proposed Legislative Rule filed in State Register following public hearing: July 28, 1995

2.f. Name and telephone of agency contact: Dave Watkins, 558-2108

3. If the statute under which the rule was promulgated and submitted requires certain findings and determinations to be made as a condition precedent to their promulgation:

3.a. Date on which a notice of the time and place of hearing for the taking of evidence and a general description of the issues to be decided was filed in the State Register:

3.b. Date of hearing: _____

3.c. Date the required findings and determinations together with reasons therefor were filed in the State Register: _____

3.d. Findings and determinations, and reasons (attached).

PREAMBLE TO A PROPOSED RULE
CONCERNING
MONITORING WELL DESIGN STANDARDS

AGENCY: Bureau of Environment; Division of Environmental Protection

REGULATION: 47 CSR 60, "Monitoring Well Design Standards."

ACTION: Filing of a Proposed Rule, Notice of Public Hearing, and Notice of a Public Comment Period.

SUMMARY: The proposed rule to the Groundwater Protection Act provides a set of minimum standards for the construction, alteration, maintenance and abandonment of groundwater monitoring wells. These standards serve only as minimum statewide guidelines towards ensuring that monitoring wells do not constitute a significant pathway for the movement of poor quality water pollutants or contaminants. These standards alone provide no assurance that a monitoring well will perform a desired function. In most cases groundwater monitoring practices and monitoring well performance, or functional requirements, fall under the purview of the appropriate groundwater regulatory agency. Ultimate responsibility for the construction, alteration, maintenance and abandonment of a monitoring well rests with the well owner and/or the certified monitoring well driller.

A Public Hearing will be held as follows:

July 6, 1995, 7:00 p.m.

Division of Environmental Protection
Nitro Office - Training Room
10 McJunkin Road
Nitro, West Virginia 25143

Written comments should arrive at the Office of

Water Resources on or before 4:00 pm, July 7, 1995 to receive consideration during the comment review process. Written comments should be sent to:

Mark A. Scott, Chief
Division of Environmental Protection
Office of Water Resources
1201 Greenbrier Street
Charleston, West Virginia 35311
Attn: David P. Watkins

TITLE 47
LEGISLATIVE RULES
BUREAU OF THE ENVIRONMENT
DIVISION OF ENVIRONMENTAL PROTECTION
OFFICE OF WATER RESOURCES

SERIES 60
MONITORING WELL DESIGN STANDARDS

§47-60-1. General.

1.1. Scope and Purpose. - This rule establishes minimum acceptable documentation and standards for the design, installation, construction, and abandonment of monitoring wells.

1.2. Authority - West Virginia Code §22-12-5(d).

1.3. Filing Date -

1.4. Effective Date -

§47-60-2. Applicability.

This rule applies to any person who either owns, operates, constructs, installs, or abandons monitoring wells and boreholes. All monitoring wells and boreholes shall be abandoned according to section 19 of this rule.

§47-60-3. Definitions.

3.1. "Abandonment" means the sealing of a monitoring well or borehole in accordance with section 19 of this rule in order to restore original hydrogeologic conditions and/or to prevent contamination.

3.2. "Air rotary drilling" means a drilling method whereby the borehole is advanced using a circular rotating action applied to a string of drilling rods which have a diffused discharge bit attached to the bottom of the rods. Pressurized air is forced through the drilling rods and cools the drilling tools and removes the cuttings from the borehole.

3.3. "Annular space" (Annulus) means the space between two well casings or between the casing and the borehole sidewall.

3.4. "Annular space seal" means the following:

3.4.1. For wells constructed with filter packs, it is the material placed above the top of the filter pack or the filter pack seal up to the surface seal and between the well casing and the adjacent formation; or

3.4.2. For wells constructed into bedrock formations and without well screens, it is the material placed from the bottom of the enlarged borehole up to the surface seal, between the well casing and the adjacent formation.

3.5. "Appropriate groundwater regulatory agency" means the groundwater regulatory agency which has primary regulatory oversight of a particular facility or activity. Where primary regulatory oversight is unassigned or shared, the Director shall determine which groundwater regulatory agency is to be the appropriate groundwater regulatory agency.

3.6. "Aquifer test well" means a well installed to provide information on the hydraulic conductivity, transmissivity, storage coefficient, capture zone, specific capacity, radius of influence or other physical parameters of an aquifer, defined geologic unit, or water bearing formation.

3.7. "ASTM" means American Society for Testing and Materials.

3.8. "Bedrock" means the continuous solid rock underlying any loose surficial material such as soil, alluvium or boulders. Bedrock includes, but is not limited to, limestone, dolomite, sandstone, shale, coal, igneous and metamorphic rock.

3.9. "Bentonite" means a clay consisting of at least 85% montmorillonite. Bentonite is available in the following forms:

3.9.1. "Bentonite powder" means 200 mesh pure bentonite, without additives.

3.9.2. "Bentonite granules" means 8 mesh pure bentonite, without additives.

3.9.3. "Bentonite pellets" means commercially manufactured tablets made by compressing pure bentonite, without additives, into forms greater than 1/4" in size.

3.9.4. "Bentonite chips" means commercially processed angular fragments of pure bentonite, without additives.

3.10. "Bentonite - cement grout" means a mixture with the ratio not to exceed 5 pounds of bentonite with 94 pounds of Portland cement and approximately 8.6 gallons of water from an uncontaminated source.

3.11. "Bentonite - fine sand slurry" means a mixture with the minimum ratio of 50 pounds of bentonite with 100 gallons of water from an uncontaminated source and 10-25% sand by volume for a mud weight of 11 pounds per gallon.

3.12. "Bentonite granular slurry" means a thoroughly blended mixture of up to 30 pounds of untreated bentonite powder added to 100 gallons of water from an uncontaminated source with a minimum of 100 pounds of untreated bentonite granules mixed together by a Venturi hopper mud mixer or other equivalent high shear mixer.

3.13. "Bentonite high-solids grout" means a thoroughly blended mixture of water from an uncontaminated source with untreated bentonite, without additives. The mixture by weight shall contain a minimum of twenty percent (20%) bentonite solids.

3.14. "Borehole" means a circular hole deeper than it is wide, constructed in earth material for the purpose of obtaining geologic or groundwater related data. Boreholes are also referred to as drillholes.

3.15. "Clay" means a fine grained inorganic soil with a grain size less than 75 um and having a plasticity index equal to or greater than 4.

3.16. "Clustered Monitoring Wells" means individual monitoring wells situated close together, but not in the same borehole. Clustered wells are most often used for monitoring ground water conditions at various depths in roughly the same area.

3.17. "Coarse sand" means a well sorted sand with a predominant grain size between 4.76mm and 2.0mm as established by the unified soil classification system.

3.18. "Concrete" means a slurry mixture with a ratio of 94 pounds of cement, equal volumes of dry sand and gravel and 5 to 6 gallons of water from an uncontaminated source. The ratio of sand and gravel to cement may not exceed 3 parts to one.

3.19. "Contaminant" means any material in a solid, liquid or gaseous state that has the potential to cause contamination.

3.20. "Contamination" means any man made or man induced alteration of the chemical, physical, or biological, integrity of the groundwater, resulting from activities regulated under the West Virginia Groundwater Protection Act, in excess of existing groundwater quality, unless that site has been granted a deviation or variance from existing quality as provided for in the West Virginia Groundwater Protection Act, or is subject to an order, permit, or other regulatory action that requires restoration or maintenance of groundwater quality at a different concentration or level.

3.21. "Director" means the director of the Division of Environmental Protection of the Bureau of Environment or his/her authorized designee.

3.22. "Driven point well" means a well constructed by joining a drive point with lengths of pipe and driving the assembly into the ground with percussion equipment or by hand, without first removing material below the 10 foot depth.

3.23. "Excavated Well" means any monitoring well which is constructed by backfilling appropriately sized unconsolidated material around the well screen. Excavated wells will be installed in accordance with sections 6, 7, and 8, paragraph 11.4.3, and subsection 11.5 of this rule. Excavated wells include, but are not limited to any tank pit observation well.

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

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

3.26. "Fine sand" means a well sorted sand with a predominant grain size between 0.42mm and 0.074mm, as established by the unified soil classification system.

3.27. "Gravel" means an unconsolidated material with the predominant grain size being between 76.2mm and 4.76mm, as established by the unified soil classification system.

3.28. "Groundwater" means the water occurring in the zone of saturation beneath the seasonal high water table, or any perched water zones.

3.29. "Groundwater Observation Well" means any excavated well in which the screened interval intersects the water table in the backfill or unconsolidated material.

3.30. "Groundwater Regulatory Agency" means the Division of Environmental Protection, the Bureau for Public Health, the Department of Agriculture, or any other political subdivision which has received approval from the director to regulate facilities or activities for groundwater protection.

3.31. "Hollow stem auger drilling" means a drilling method where continuous flighting is welded to a hollow stem pipe. The flighting carries drill cuttings to the surface as the flighting is rotated and pushed down into the earth.

3.32. "Inside diameter" means the horizontal distance between the inner walls of a well casing, hollow stem auger or tremie pipe.

3.33. "Medium sand" means a well sorted sand with a predominant grain size between 2.0 mm and 0.42 mm, as established by the unified soil classification system.

3.34. "Monitoring well" means any cased excavation or opening into the ground made by digging, boring, drilling, driving, jetting, or other methods for the purpose of determining the physical, chemical, biological, or radiological properties of surrounding media, including groundwater. The term "monitoring well" includes piezometers, water table observation wells, excavated wells and aquifer test wells which are installed for purposes other than those listed

above, but does not include water wells whose sole purpose is to: provide a supply of water, for exploration of water, for dewatering, or to function as heat pump wells.

3.35. "Montmorillonite" means a group of expanding lattice clay minerals of the general formula:

$$R_{0.33}Al_2Si_4O_{10}(OH)_2 \cdot H_2O,$$

where R means one or more cations of sodium, potassium, magnesium or calcium and where Al means aluminum, Si means silicon, O means oxygen and H means hydrogen.

3.36. "Mud rotary drilling" means a drilling method whereby a borehole is advanced by using a circular rotating action applied to a string of drilling rods which have a diffused discharge bit attached to the bottom of the string. A bentonite and water mud slurry is used to provide borehole stability, to cool the bit and to carry cuttings to the ground surface.

3.37. "Neat cement grout" means a slurry mixture with a ratio of 94 pounds of Portland cement mixed with 5 to 6 gallons of water from an uncontaminated source.

3.38. "Nested monitoring wells" means two or more casing strings within the same borehole. The screened interval of each casing string is designed to monitor water from different zones.

3.39. "Percussion drilling" means a drilling method using a cable tool drilling machine or a drilling method whereby the permanent or temporary well casing is driven, or is set into a borehole and then driven.

3.40. "Permanent monitoring well" means any monitoring well in place for 60 days or longer.

3.41. "Person" means any industrial user, public or private corporation, institution, association, firm or company organized or existing under the laws of this or any other state or country; state of West Virginia; governmental agency, including federal facilities; political subdivision; county commission; municipal corporation; industry; sanitary district; public service district; soil conservation district; watershed improvement district; partnership; trust; estate; person or individual; group of persons or individuals acting individually or as a group; or any legal entity whatever.

3.42. "Piezometer" means a monitoring well sealed below the water table and which is installed for the specific purpose of determining the potentiometric surface or the physical, chemical, biological, or radiological properties of groundwater, or both.

3.43. "Potentiometric surface" or "piezometric surface" means an imaginary surface representing the total head of groundwater and is the level to which water will rise in a well.

3.44. "Psi" means pounds per square inch.

3.45. "Purge" means an action that removes water from the well, commonly accomplished by using a pump or bailer.

3.46. "Recovery well" means a well intended and designed to capture and remove contaminants from the subsurface.

3.47. "Rotary wash drilling" means a drilling method whereby metal temporary casing is advanced into the borehole by driving. At selected intervals, the temporary casing is cleaned out using rotary drilling tools by pumping clean water through the rod to flush out accumulated cuttings. This drilling method is also known as wash bore or wash down drilling.

3.48. "Sand-cement grout" means a mixture of cement, sand and water in the proportion of 94 pounds of Portland cement, one cubic foot of dry sand and 5 to 6 gallons of water from an uncontaminated source.

3.49. "Sediment" means any unconsolidated material including, but not limited to clay, silt, sand, gravel, and rock particles.

3.50. "Solid stem auger drilling" means a drilling method where continuous flighting is welded onto a solid stem pipe. The flighting carries drill cuttings to the surface as the flighting is rotated and pushed down into the earth. The borehole is created by a cutting bit located at the tip of the lead auger.

3.51. "Specific gravity" means the weight of a particular volume of substance compared to the weight of an equal volume of water at a reference temperature.

3.52. "Surge" means an action causing water to move rapidly in and out of the well screen, thereby removing fine material from the surrounding aquifer.

3.53. "Tank Pit Observation Well" means any vapor observation well or groundwater observation well or both installed in an underground storage tank excavation for release detection purposes.

3.54. "Temporary monitoring well" means any monitoring well in place for less than 60 days.

3.55. "Top of bedrock" or "top of firm rock" means at least 70% of the drill cuttings being either:

3.55.1. Angular rock fragments, as in the case of crystalline rock; or

3.55.2. Rock fragments composed of individual grains or rock particles that are cemented together to form an aggregate as opposed to a single sediment particle.

3.56. "Tremie pipe" means a pipe or hose used to install well construction materials in an annular space or a borehole.

3.57. "Unconsolidated material" means that material found above bedrock, composed of single sediment particles, individual grains or rock fragments. Unconsolidated material includes but is not limited to clay, silt, sand, gravel, loess, peat and organic soil.

3.58. "Unified soil classification system" means the soil designation system based on the physical properties of the soil developed from the airfield classification system in 1952 and adopted by the American Society for Testing and Materials in standard test method D2487-83.

Note: A copy of this publication is available for inspection at the offices of the division of environmental protection and the secretary of state's office. A copy for personal use may be obtained from the American Society for Testing and Materials, 1916 Race Street, Philadelphia, Pennsylvania 19103.

3.59. "Vapor Observation Well" means any excavated well in which the screened interval intersects the backfill or unconsolidated material which is sufficiently porous to readily allow diffusion of vapors into the well.

3.60. "Water table" means the surface of unconfined groundwater where the water pressure is equal to atmospheric pressure.

3.61. "Water table observation well" means any monitoring well, in which the screen or open borehole intersects a water table, which is installed for the specific purpose of determining either the elevation of the water table or the physical, chemical, biological, or radiological properties of groundwater, or both.

3.62. "Well" means any borehole, or other excavation or opening in the ground deeper than it is wide constructed for the purpose of obtaining or monitoring the surrounding media, including groundwater. This definition does not include water wells whose sole purpose is to: provide a supply of water, for exploration of water, for dewatering, or to function as heat pump wells.

3.63. "Well depth" means the distance from the ground surface to the bottom of the well screen or to the bottom of the open hole when a well screen is not used.

3.64. "Well volume" means the volume of water contained in the well casing and the filter pack.

§47-60-4. Conflicting Provisions.

Where in certain instances existing regulations impose requirements that are more or less restrictive than the requirements of this rule, and in the event that this rule conflicts with another applicable rule, the director shall determine which rule, or section(s) thereof, best complies with the intent of the Groundwater Protection Act, West Virginia Code §22-12-1 et seq. and require adherence to said rule or section(s) thereof. The director may, at his/her discretion, begin the formal regulatory process to remove the conflict between the regulations.

§47-60-5. Borehole Protection.

Protective measures shall be taken to prevent a borehole from acting as a conduit for contamination or becoming a safety hazard until abandonment in accordance with section 19 of this rule.

§47-60-6. Well Location And Reporting Requirements.

6.1. Where prior groundwater regulatory agency approval is required monitoring wells shall be installed at the locations indicated on the approved plans and specifications.

6.2. Following installation of the wells, each certified monitoring well driller shall report to the director, on forms provided by the director, the following information by the 15th (fifteenth) of the month following the month in which the wells were installed:

6.2.1. The name and address of the person the wells were installed for.

6.2.2. The date the wells were installed.

6.2.3. The latitude and longitude coordinates in degrees, minutes and seconds to the nearest second; and method used to determine such coordinates for each well installed.

6.3. The certified monitoring well driller shall assign each monitoring well a registration number using the following system:

6.3.1. The first group of numbers will be the certified monitoring well drillers certification number followed by a dash (-).

6.3.2. The second group of numbers will represent the number of the monitoring well(s) installed by the driller followed by a dash (-).

6.3.3. The third group of numbers will represent the calendar year in which the well was installed.

Example: The first well drilled by a certified monitoring well driller with certification number 0123 in calendar year 1996 would be: 0123-0001-96.

6.4. The certified monitoring well driller shall permanently affix the registration number onto each well installed.

6.5. Failure to comply with any part of section 6 of this rule may result in enforcement action taken pursuant to section 7 of the "Monitoring Well Regulations", 47CSR59.

§47-60-7. Well Riser.

7.1. The well risers for wells constructed in a floodplain or floodway shall terminate a minimum of 2 feet above ground level and be provided with a water tight, vented cap, unless it can be demonstrated that inundation will not occur, except as provided for under subsection 11.6 of this rule.

7.2. Specifications - The riser must consist of materials that will not alter the quality of water samples for the constituents of concern and that are appropriate for the monitoring environment. The riser should have adequate wall thickness and coupling strength to withstand installation and development stresses. Each section of riser should be decontaminated appropriate to the constituents being monitored for and the protection of public health. The minimum nominal internal diameter of the riser should be chosen based on the particular application. However, in most instances, a minimum of 2 inches (50.8 mm) is needed to accommodate sampling devices.

Note: Risers are generally constructed of PVC, stainless steel, fiberglass, or fluoropolymer materials.

7.3. Assembly and Installation - Where the well is to be used for organic water quality monitoring, all riser couplings shall use a coupling method which is water tight and which does not introduce organic compounds to the well. Wells which will not be monitored for organic compounds may use any industry accepted water tight coupling method.

7.4. Inspection - Prior to use, the casings, couplings and other components shall be inspected for cuts, deformities, gouges, deep scratches, damaged ends and other imperfections which could compromise the integrity of the well. Any casing, coupling or component having such a defect may not be used.

7.5. Risers shall be centered in the borehole except that multiple well installations in one borehole do not have to be centered.

§47-60-8. Well Screen.

8.1. Specifications - The well screen must consist of materials that will not alter the

quality of water samples for the constituents of concern and that are appropriate for the monitoring environment. The well screen should have adequate wall thickness and coupling strength to withstand installation and development stresses. Each section of well screen should be decontaminated appropriate to the constituents being monitored for and the protection of public health. The minimum nominal internal diameter of the well screen should be chosen based on the particular application.

8.2. All monitoring well screens shall be constructed of material which is nonreactive with the constituents in soils and groundwater at the monitoring location. The well screen slot size shall be sized to retain at least 90% of the grain size of the collapsed formation where such is used as filter pack material or at least 90% of the grain size of the filter pack, if material other than collapsed formation is used; except that other slot sizes may be used when 90% of the formation cannot be retained on a number 10 slot, or where other well design considerations require a different slot size. Well screens on water table observation wells may not exceed 20 feet in length. Well screens on piezometers installed for the purpose of determining the elevation of the potentiometric surface may not exceed 5 feet in length, except where potentiometric surfaces may fluctuate over greater intervals.

Note: Well screens for wells other than the water table observation wells and piezometers identified above may vary in length.

8.3. Assembly and Installation. All well screens shall be joined to the well riser by methods described in subsection 7.3 of this rule. All joints shall be watertight. Monitoring wells installed in bedrock using an open borehole may be constructed without a well screen.

8.4. Well screens shall be centered in the borehole except that multiple well installations in one borehole do not have to be centered.

8.5. The bottom portion of each well screen or well must be plugged or capped to prevent oversized material from entering the well.

§47-60-9. Tremie Pipes and Sealing Procedures.

9.1. Materials - The tremie pipe used for the placement of sealant materials shall be one of the following materials.

9.1.1. Metal pipe,

9.1.2. Rubber-covered hose reinforced with braided fiber or steel,

9.1.3. Thermoplastic pipe including but not limited to:

9.1.3.a. Polyvinyl chloride (PVC)

9.1.3.b. Chlorinated polyvinyl chloride (CPVC),

9.1.3.c. Polyethylene (PE),

9.1.3.d. Polybutylene (PB), or

9.1.3.e. Acrylonitrite butadiene styrene (ABS).

The material shall exhibit pressure ratings adequate for the pumping pressures to be used.

9.2. Procedures - This subsection describes ground water regulatory agency approved sealant placement methods when a tremie pipe is used.

Note: These procedures apply to the use of grout or slurry sealant.

9.2.1. The sealant material shall be placed in such a manner as to not disturb the integrity of the filter pack and seal, and to not threaten the integrity of the riser.

9.2.2. When a tremie pipe is used for placement of fluid sealants, the bottom end shall be kept submerged in the sealant material throughout the sealing process.

9.2.3. The sealant material shall be brought up to the ground surface seal. Any settling of the sealant material shall be topped off.

9.2.4. Tremie pipe - gravity - Sealing material may flow by gravity through a funnel or hopper connected to a tremie pipe. The tremie pipe shall be lowered to the bottom of the annular space or borehole to be sealed and the sealing material placed from the bottom up.

9.2.5. Tremie pipe-pumped - Sealing material shall be placed by a pump through a tremie pipe into the annular space or borehole. Tremie pipes used for the placing of pumped slurry or grout shall be fitted with a J-hook end or a closed end with side discharge.

Note: The J-hook end or closed end with side discharge of the tremie pipe will direct the flow of the materials to the side or upward.

§47-60-10. Filter Packs.

10.1. All permanent monitoring wells installed in unconsolidated material and used for the collection of water quality samples shall be constructed with filter packs except as provided in subsection 10.4 of this rule. Permanent monitoring wells installed in bedrock may be constructed with filter packs. When used, the filter pack shall be the only material in contact with the well screen. All commercially prepared filter packs installed in permanent monitoring wells shall meet the requirements in subsection 10.2 of this rule. All other filter packs shall meet

the requirements in subsection 10.4 of this rule.

10.2. Specifications - The filter pack shall be a silica based sand or gravel. The sand or gravel used for filter packs shall be hard and durable and shall have an average specific gravity of not less than 2.50. The sand and gravel shall be visibly free of clay, dust and micaceous and organic matter. Not more than 5% of the sand or gravel shall be soluble in a 10% hydrochloric acid solution. Thin, flat or elongated pieces of gravel, the maximum dimension of which exceeds 3 times the minimum dimension, may not constitute more than 2% of the material by weight. The filter pack for wells installed in unconsolidated material shall be sized to retain at least 50% of the surrounding formation. In formations which are predominantly silt and clay, the filter pack shall be a fine sand. In bedrock, the filter pack shall be a medium or coarse sand or gravel. Crushed limestone, dolomite or any material containing clay or any other material that will adversely impact on the performance of the monitoring well may not be used as filter pack.

10.3. Installation - The filter pack shall generally extend from 6 inches beneath the bottom of the well to between two and five feet above the top of the well screen. For water table observation wells constructed in areas where the depth to water table is less than 7 feet or where discrete monitoring is desired, the required filter pack height above the top of the well screen may be reduced to 6 inches to allow for the required amount of annular space sealant to be placed. To ensure that the filter pack is installed evenly surrounding the well screen and casing over the proper depth interval, a tape measure, measuring rod or similar device shall be used to measure the height of the filter pack. The tape measure, measuring rod or similar device shall be carefully raised and lowered while the filter pack is being installed to identify bridging. If bridging occurs, the filter pack material shall be tamped into place surrounding the well screen and riser, using a measuring rod or similar device.

10.4. Collapsed Formation - Collapsed formation may be used as filter pack material if the collapsed formation will limit the passage of formation fines into the well screen and either an artificial filter pack cannot be installed or the formation grain size is greater than or equal to fine sand sized grains. The grain size distribution of the collapsed formation shall be such that at least 90% of the formation will be retained by the well screen.

§47-60-11. Sealing Requirements.

11.1. All materials and procedures used in the installation of seals for permanent monitoring wells shall meet the requirements of this section.

11.2. Installation of the Filter Pack Seal - A bentonite chip, pellet or a slurry seal shall be placed in the annulus between the borehole and the riser pipe on top of the secondary or primary filter pack. This seal will retard the movement of cement-based grout backfill into the primary or secondary filter packs. To be effective, the filter pack seal should extend above the filter packs approximately 3 feet or more, but may be less depending on site-specific conditions where discrete sampling is desired or where physical conditions prohibit a longer seal depending on local conditions. The filter pack seal should be installed using a tremie pipe lowered to the

top of the filter pack and slowly raised as the bentonite pellets or the slurry fill the annular space. Bentonite pellets may bridge and block the tremie pipe in deep wells. In these cases, pellets may be allowed to free fall into the borehole. As a bentonite pellet seal is poured into the tremie pipe or allowed to free fall into the borehole, a tamper or weighted line may be necessary to tamp pellets into place. If the seal is installed above the water level, water from an uncontaminated source shall be added to allow proper hydration of the annular seal. The tremie pipe or a weighted line inserted through the tremie pipe shall be used to measure the top of the filter pack seal as the work progresses. Sufficient time should be allowed for the bentonite pellet seal to hydrate or the slurry annular seal to expand prior to grouting the remaining annulus. The volume and elevation of the filter pack seal material should be measured and recorded on the well construction diagram.

11.3. Annular Space Seal Specifications - All permanent monitoring wells shall be installed with an annular space seal designed to achieve a permeability of 10^{-5} centimeters per second or less. For permanent monitoring wells constructed with filter packs, the annular space seal shall extend from the filter pack seal to the ground surface seal. For monitoring wells constructed into bedrock formations and without well screens, the annular space seal shall extend from the bottom of the outer casing to the ground surface seal.

11.4. Annular Space Seal Installation - Bentonite chips, pellets or granules with a diameter of 3/8 inches or less shall either be poured freely down the borehole or added through a tremie pipe to seal the annular space. When a tremie pipe is used to place the annular space sealant the procedures in paragraphs 9.2.1 and 9.2.2 of this rule shall be followed.

11.4.1. When grouts or slurries are used to seal the annular space, the material shall be poured freely down a tremie pipe or pumped down a borehole with the use of a tremie pipe. When a tremie pipe is used to place the annular space sealant the procedures of subsection 9.2 of this rule shall be followed.

11.4.2. When any slurry or grout is used, there shall be a 12-hour period between the time the annular space seal is installed and the time the protective ground surface seal is installed. Any settling in the annular space seal shall be topped off before the ground surface seal is installed.

11.4.3. The top of the well casing shall be covered with a protective cap.

11.5. Excavated Wells - For excavated wells, the seal between the protective cover and the riser pipe acts as both the filter pack seal and the annular space seal.

11.6. Ground Surface Seal and Protective Cover Pipe.

11.6.1. Ground surface seal - All permanent monitoring wells shall be constructed with a bentonite-cement grout, neat cement grout, or concrete ground surface seal.

The ground surface seal shall extend to a minimum of 30 inches below the land surface, and the top shall be sloped away from the well casing. If the monitoring well depth is such that both a minimum 2 foot annular space seal and a minimum 2.5 foot ground surface seal cannot both be placed, the ground surface seal may be shortened.

11.6.2. Protective cover pipe - The protective cover pipe shall consist of a casing at least 2 inches larger in diameter than the well riser and have a locking cap. The protective cover pipe shall extend from the bottom of the ground surface seal to a minimum of 24 inches above the ground surface except as provided in subsection 11.5 of this rule. The protective cover pipe shall always extend above the top of the well riser. For water table observation wells constructed in areas where the depth to water table is less than 7 feet, the required length (depth) of protective cover shall be reduced and may not extend through the annular space seal or into the filter pack.

11.7. Ground Surface Seal and Flush Mounted Protective Cover.

11.7.1. Ground surface seal - All permanent monitoring wells with a flush mounted protective cover shall be constructed with a concrete ground surface seal. The ground surface seal shall extend to, but not beyond, the total depth of the flush mounted protective cover. The ground surface seal shall be installed around the flush mounted protective cover and may not be placed between the flush mounted protective cover and the well casing.

11.7.2. Flush mounted protective cover - The flush mounted protective cover should not be installed in areas subject to ponding or flooding. The flush mounted protective cover lid(s) shall indicate on its outer surface that it is a type of monitoring well as defined in section 3.34 of this rule. A black equilateral triangle inset in a white background is also an acceptable label. If an impervious surface does not exist, an apron shall be created which will support the weight of the traffic in the area. The flush mounted protective cover shall consist of a watertight metal casing with an inside diameter at least 2 inches greater than the inside diameter of the monitoring well riser. The flush mounted protective cover shall be one continuous metal piece or 2 metal pieces which are joined with a continuous weld. The flush mount protective cover shall be a minimum of 12 inches in length. There may be no more than 8 inches between the top of the monitoring well riser and the top of the flush mounted protective cover after installation. The flush mounted protective cover shall have an exterior flange or lugs. The flush mounted protective cover or the monitoring well shall have a locking mechanism. The monitoring well installed within any flush mounted protective cover shall have a watertight cap.

Note: After removing the watertight cap and prior to taking a head level measurement, a waiting period is recommended to enable the water level to stabilize.

§47-60-12. Drilling Methods and Fluids.

Drilling shall be conducted in a manner such as to minimize the introduction of foreign material into the borehole, produce the least possible disturbance to the formation and permit the

proper construction and development of the required diameter well. Only air; water free of bacterial and chemical contamination; or bentonite drilling muds, mixed with water from an uncontaminated source, may be used as drilling fluids. The water used for drilling shall be stored in such a manner as to prevent contamination of the clean water. If air is used as a drilling fluid, the air shall be filtered by a coalescing air filter. If water is used, the source of the water shall be reported.

§47-60-13. Cross Contamination.

In areas where contamination is suspected to exist, precautions shall be taken to prevent cross contamination of groundwater bearing zones or uncontaminated zones.

§47-60-14. Disposal and Decontamination.

14.1. In areas where contamination is known to occur, all drill cuttings and fluids and surge and wash waters from borehole and monitoring well construction and development shall be disposed of in a manner which is protective of the waters of the State.

14.2. All borehole and monitoring well construction and development equipment shall be decontaminated as needed to prevent cross-contamination of boreholes or monitoring wells.

§47-60-15. Borehole Diameter.

15.1. Boreholes in unconsolidated geologic formations - For all permanent monitoring wells in unconsolidated geologic formations, the borehole diameter shall meet the following requirements:

15.1.1. If hollow stem augers are used, their inside working diameter shall be at least 2 inches greater than the inside diameter of the permanent well casing.

15.1.2. If solid stem augers are used, their outside diameter shall be at least 4 inches greater than the inside diameter of the permanent well casing.

15.1.3. If an air or mud rotary method is used, the borehole diameter shall be at least 4 inches greater than the inside diameter of the permanent well casing. If a temporary outer casing is used, the inside diameter of the temporary outer well casing shall be at least 4 inches greater than the inside diameter of the permanent well casing. The temporary outer casing shall be pulled as the annular space is being sealed.

Note: The dual-tube or triple-tube reverse rotary systems are rotary methods.

15.1.4. If percussion methods, including the rotary wash, wash down and wash bore methods, with a temporary outer casing are used in unconsolidated geologic formations, the inside diameter of the temporary outer casing shall be at least 4 inches greater

than the inside diameter of the permanent well casing. The temporary outer casing shall be removed during the sealing of the annular space.

15.2. Boreholes in bedrock geologic formations - For all permanent monitoring wells installed deeper than 2 feet past the top of the bedrock, the borehole diameter shall meet the following requirements:

15.2.1. If an air or mud rotary method is used to construct the monitoring well, the requirements of paragraph 15.1.3. of this rule shall be followed.

15.2.2. If percussion methods are used to construct the monitoring well, the requirements of paragraph 15.1.4. of this rule shall be followed.

§47-60-16. Recovery Wells.

Recovery wells may be used for pressure head monitoring or water quality monitoring only with the approval of the appropriate groundwater regulatory agency. Recovery wells shall be subject to the reporting requirements in section 6 of this rule, documentation requirements in section 18 of this rule, and the abandonment requirements in section 19 of this rule.

§47-60-17. Well Development, Redevelopment and Reconditioning.

All permanent monitoring wells shall be developed according to the requirements of this section, except for excavated wells and wells which are installed for the sole purpose of determining the level of groundwater or the potentiometric surface. Wells sealed with grout or slurry shall be developed after a minimum waiting period of 12 hours after installation is completed. The goal of well development is to produce water free of sediment and all drill cuttings and drilling fluids. Appropriate methods of well development vary with the type and use of a monitoring well. Development methods that may be acceptable under certain circumstances include:

Note: Development, redevelopment and/or reconditioning operations shall be performed with care so as to prevent damage to the well and any strata surrounding the well. Care is necessary to prevent the spread of contaminants particularly when the well is situated in known or suspected areas of contamination.

17.1. Methods for wells that cannot be purged dry - All permanent monitoring wells that cannot be purged dry shall be developed until 10 well volumes of water are removed or until the well produces sediment free water. Well volumes shall be calculated in the following manner:

$V_1 + V_2$ = well volume

Where:

V_1 = volume of water in well casing = $3.1416 \times (D_1/2)^2 H_1$
V_2 = volume of water in filter pack = $N \times 3.1416 \times H_2 [(D_3/2)^2 - (D_2/2)^2]$
N = porosity of filter pack
D_1 = inside diameter of well casing
D_2 = outside diameter of well casing
D_3 = diameter of borehole
H_1 = height of water column
-- (Use appropriate H_2) --
H_2 = length of sand used in filter pack and fine sand filter pack seal or the height of the water column in water table observation wells.
-- or --
H_2 = length of filter pack or the height of the water column in water table observation wells.

Note: There are 7.48 gallons per cubic foot.

Use one or more of the following methods to develop a well under this subsection:

17.1.1. Surge and Purge Method - Alternately surge and purge the well for a minimum of 30 minutes. The surge and purge cycle shall consist of several minutes of surging followed by several minutes of purging to remove the material collecting in the bottom of the well. The surging shall move formation water in and out of the well screen. The surging shall be accomplished by using a bailer, surge block or by pumping the well sufficiently to cause a drawdown and then allowing the well to recover and repeating the process. Plungers, bailers, surge blocks, and other surging devices must incorporate safety valves or vents to prevent excessive pressure differentials that could damage casing, screen, or the formation. The positive and negative pressures exerted shall not force contaminants from or into the well bore; cause mechanical damage to the well components; draw annular space or filter pack sealant into the filter pack; or bridge the filter pack with excessive sediments or collapse the formation.

17.1.2. Over Pumping (Pump Surging Method) - The monitoring well shall be pumped at a rate considerably higher than it would be during normal operation to dislodge fine-grain materials from the filter pack and surrounding strata. This method also requires mechanical surging in order to delete the negative influences associate with one directional movement of water. This method may not be suitable for wells producing large amounts of sediment which could jam or clog a pump. Overpumping can also create a cone of depression in the water table which can draw contaminants to the well.

17.1.3. Air Lift Pumping Method - An air lift pump shall be operated by cycling the air pressure on and off for short periods of time to provide a surging action that will dislodge fine-grained materials from the filter pack and surrounding strata. A steady, low pressure shall be applied to remove the fines that have been drawn into the well by the surging action. Efforts should be made (through the use of a foot valve) to avoid pumping air into the filter pack and adjacent hydrologic unit because the air may lodge there and inhibit future sampling efforts

and may also alter ambient water chemistry. Furthermore, application of high air pressures should be avoided to prevent damage to PVC risers, screens, and filter packs. The use of an eductor pipe is recommended. Operational air must be free of oil or other contaminants through use of a coalescing filter.

17.1.4. Well Jetting Method - The well screen area shall be jetted with water using sufficient pressure to achieve the desired effect but limiting force to prevent damage to the well components and surrounding formation. Water added during this development procedure will alter the natural, ambient water quality and may be difficult to remove. Therefore, the water added should be obtained from a source of known chemistry. Water from the monitoring well being developed may also be used if the suspended sediments are first removed.

17.2. Methods for Wells that Can Be Purged Dry. All permanent monitoring wells that can be purged dry shall be developed in a manner which limits agitation by slowing purging the well dry. Any water added for development shall be deionized, Type II reagent-grade water, and an equal volume of water shall be purged upon completion of development.

§47-60-18. Well And Borehole Construction Documentation.

18.1. All permanent monitoring well construction details shall be reported to the person for whom the wells were installed using forms and instructions provided by the director within 60 days after the well has been installed. These forms are to be retained by the person for whom the well was installed for five years beyond the abandonment of the well. These forms are not transferable without notification to the proper groundwater regulatory agency. The completed report shall include the following information:

18.1.1. Well location, as determined by paragraph 6.2.3 of this rule,

18.1.2. Well casing material and installation procedures,

18.1.3. Well screen materials and installation procedures,

18.1.4. Filter pack materials, installation procedures and depth to bottom and top of filter pack,

18.1.5. Sealing materials, installation procedures, and depth to bottom and top of seal (i.e. filter pack, annular space, etc,),

18.1.6. Drilling methods and fluids used for installation,

18.1.7. Borehole diameter,

18.1.8. Well development procedures,

18.1.9. Sieve analysis,

18.1.10. Length of screen,

18.1.11. Screen slot size,

18.1.12. Elevation of bottom of screen,

18.1.13. Well depth,

18.1.14. Total drilled depth of the borehole,

18.1.15. Well registration number,

18.1.16. Certified Driller and Company Name(s), address(es), and telephone number(s),

18.1.17. Driller's certification number, and

18.1.18. Any other information deemed necessary by a groundwater regulatory agency.

18.2. The certified monitoring well driller shall report to the person for whom the wells were installed any and all decontamination procedures for each borehole.

§47-60-19. Abandonment Requirements.

The following requirements apply to the abandonment of all monitoring wells and all boreholes. The appropriate groundwater regulatory agency may require, by order or other appropriate means, that any borehole or monitoring well be abandoned. The appropriate groundwater regulatory agency shall consider the following factors in determining whether a borehole or monitoring well should be abandoned: purpose, location, groundwater quality, age and condition of the well or borehole, potential for groundwater contamination, and well or borehole construction.

19.1. Timelines for Abandonment.

19.1.1. A borehole shall be abandoned within 3 working days after its use has been discontinued.

19.1.2. Any permanent monitoring well no longer being used to gather information on geologic or groundwater properties shall be abandoned within 60 days after its use has been discontinued.

19.1.3. Any monitoring well found by the appropriate groundwater regulatory agency to be acting as a conduit for groundwater contamination shall be abandoned within 15 working days after written notification by the appropriate groundwater regulatory agency.

19.1.4. Any monitoring well constructed after the effective date of this rule not meeting the requirements of this rule unless approved by the appropriate groundwater regulatory agency in accordance with section 22 of this rule shall be abated, abandoned or replaced with a monitoring well meeting the requirements of this rule, within 60 days after written notification by the appropriate groundwater regulatory agency that the well is noncomplying.

19.2. Abandonment Procedures.

19.2.1. Boreholes - Any borehole whose use has been discontinued shall be abandoned according to the requirements of subsection 19.3 of this rule.

19.2.2. Monitoring wells, impermeable annular space seals - A permanent monitoring well known to be constructed with an impermeable annular space seal shall be abandoned according to the requirements of subsection 19.3 of this rule after the protective cover pipe and ground surface seal have been removed and the well riser cut off at least 30 inches below the ground surface. If the well riser is to be removed, the well shall be sealed as the riser is removed, pursuant subsection 19.3 of this rule.

19.2.3. Monitoring wells - permeable annular space seals and wells in waste areas - A monitoring well not known to be constructed with an impermeable annular space seal or located in an existing or planned future waste disposal or treatment area shall be abandoned by removing the protective cover pipe and the ground surface seal and then completely removing the well riser. The well riser shall be pulled out of the ground as the well is filled according to the requirements of subsection 19.3 of this rule.

19.3. Sealing requirements - Boreholes and monitoring wells shall be abandoned by complete filling with neat cement grout, bentonite-cement grout, bentonite high-solids grout, concrete, bentonite-sand slurry or sand-cement grout. When a tremie pipe is used to place the sealing material, the procedures of subsection 9.2 of this rule shall be followed. A tremie pipe shall be used to abandon monitoring wells and boreholes greater than 30 feet in depth or with standing water. Monitoring wells and boreholes greater than 100 feet in depth shall be sealed with a tremie pipe-pumped method. Bentonite may be used as a sealing material without the use of a tremie pipe under the following conditions:

19.3.1. Bentonite or bentonite mixed sand consisting of 80% sand and 20% bentonite by volume may be used for abandonment of boreholes and monitoring wells less than

30 feet deep where there is no standing water.

19.3.2. Bentonite chips or bentonite pellets may be used for abandonment of boreholes and monitoring wells less than 50 feet deep and where the depth of standing water is less than 30 feet, provided that the pellets or chips are smaller than 1/5 the diameter of the hole or the annular space.

19.3.3. Bentonite chips or bentonite pellets may be used for abandonment of boreholes and monitoring wells which are greater than 4 inches in diameter and less than 250 feet deep and where the depth of standing water is less than 150 feet, provided that the pellets or chips are smaller than 1/5 the diameter of the hole or the annular space.

19.4. Sealant Settlement - Any settling of the sealant material shall be topped off. Sealing material may be terminated 30 inches below the ground surface in agricultural areas to avoid interference with agricultural activities. A native soil plug shall be placed on top of the settled sealing material in such cases.

19.5. Abandonment Documentation - All borehole and permanent monitoring well abandonments shall be reported to the appropriate groundwater regulatory agency within 60 days of the abandonment on forms supplied by the appropriate groundwater regulatory agency. In addition to the information required on the form, the person performing the abandonment shall report any decontamination procedures used between borehole and well abandonments.

§47-60-20. Driven Point Wells.

Driven point wells with contaminant compatible drive pipes and well screens may be used as permanent monitoring wells if prior groundwater regulatory agency approval is obtained. Prior approval is not necessary for driven point wells installed in the backfill surrounding underground storage tanks used solely to determine the water table elevation in the tank pit for tank tightness testing purposes. Written documentation shall be supplied to the appropriate groundwater regulatory agency prior to installation indicating:

20.1. That the well is to be used only for water table elevation measurements or to monitor for parameters for which the well casing and screen material will not interfere with the analytical results;

20.2. That the well will not provide a conduit for contaminants to enter the groundwater; and

20.3. That information on subsurface stratigraphy is not needed. In situations where subsurface geologic information is needed, a separate borehole shall be constructed to collect the required data.

§47-60-21. Temporary Monitoring Wells.

Temporary monitoring wells may be installed according to less stringent standards than specified for permanent monitoring wells. Any temporary monitoring well construction shall be approved by the appropriate groundwater regulatory agency prior to its installation. All temporary monitoring wells shall be abandoned in accordance with section 19 of this rule within 120 days after their installation.

§47-60-22. Special Circumstances and Exceptions.

22.1. The appropriate groundwater regulatory agency may require or approve more restrictive or alternative well material, assembly, installation, development or abandonment procedures if the contaminant concentrations or geologic setting require alternative construction. Prior written approval is required before any alternative materials are used in monitoring well installation.

22.2. Exceptions to the requirements of this rule may be approved by the appropriate groundwater regulatory agency prior to installation or abandonment. An exception request shall state the reasons why compliance with the rule requirements is infeasible. The appropriate groundwater regulatory agency may conditionally approve an exception by requiring materials or procedures which safeguard against contamination and result in monitoring well construction which is substantially equivalent to the requirements of this rule. Failure to comply with the conditions of an exception voids the appropriate groundwater regulatory agency's approval of the exception.

§47-60-23. Enforcement.

23.1. Any person who violates these regulations shall be subject to civil administrative penalties, civil or criminal penalties, enforcement orders, and procedures as set forth in section 10 of the Groundwater Protection Act, WV Code §22-12-10.

23.2. The appeal and review procedures set forth in section 11 of the Groundwater Protection Act, WV Code §22-12-11, shall be applicable to actions arising under this regulation.

Public Hearing Transcript
Division of Environmental Resources
Proposed Regulation

Hearing Date: July 6, 1995

Code of State Regulations Title 47 Series 60
MONITORING WELL STANDARDS

Jim Waycaster: We're here to discuss Code of State Regulations Title 47, Series 60, Monitoring Well Design Standards for the proposed regulation and we're here to fulfill public participation requirements for these proposed rules. First I'd like to introduce our contingent this evening. To my right is Wayne Wilson, geologist, West Virginia Division of Environmental Protection (WVDEP), next is Gary Viola, engineer with the Health Department, Mark Priddy, geologist WVDEP and the lady at the sign-in desk there is Anne Howell, Office of Water Resources.

The Monitoring Well Design Standard rules establish minimum acceptable documentation and standards for the design, installation, construction and abandonment of monitoring wells. This rule applies to any person who either owns, operates, constructs, installs or abandons monitoring wells or bore holes. All monitoring wells and bore holes shall be abandoned according to Section 19 of this rule. Now these proposed regulations were established under the authority of West Virginia Code of Regulations, Chapter 22, Article 12, Section 5, subsection D. The following date this particular regulation was filed was May 31, 1995. It appeared in the State Register, June 2, 1995 and it

had statewide publication for this rule. Now in order to prepare these proposed regulations, a Monitoring Well Advisory Board was formed and Mr. Gary Viola has graciously agreed to talk a little bit about that component of these proposed regulations. Mr Viola...

GARY VIOLA: Thank you, Jim. According to the Monitoring Well Regulations, it was set forth that an advisory board, through the Director of the WVDEP, be established and on that board it laid out requirements of a minimum number of three industry representatives, a representative of the Health Department, representative of the West Virginia Geologic and Economic Survey and a minimum number of three individuals from the regulatory side that would be handling the enforcement of these standards.

We have...(do you have that list of names Jim, ... thank you). There are a total of 11 board members, with three industry representatives, one from the coal industry and one, two three; three from DEP, one of the members changed his position I guess, went to work for another employer - four members from industry then, were on the board so these rules and regulations or design standards were not done in a vacuum of regulatory personnel

developing standards and then imposing them on industry. Primarily, we used our time rather efficiently. We started in April of 1994, working very diligently to come up with these design standards because without these design standards, the regulations for monitoring wells, of course, is just not effective. We met at least once a month and toward the final completion of the design standards we met rather frequently, as much as, two times per month. We got input from all the interested parties and we have come together and put together this standard for comment tonight. Having said that, I would like to introduce two other Board members that are here tonight. One is Mr. Ron Mullennex, who is with Marshall Miller and Associates and Mr. John Sedlock, H.C. Nutting Company. These fellows were valuable in the information that they presented and kept all the others on their toes. Here Jim, I'll turn it over, back to you...

Jim Waycaster: This evening's proceedings will be divided into two sections. The first section is going to be a statement section where I will identify the people who have indicated their desire to speak while signing up on our forms this evening. This statement portion for this evening is an opportunity to get your

statement on the record, on tape, regarding these proposed regulations. Only rhetorical questions are permitted at this particular time. Once everybody has been given an opportunity to speak and their comments have been recorded for the record we will close that particular portion of these proceedings and then open it up to Questions and Answers. Now, if you do have written statements that are prepared this evening and you want to go ahead and turn them in to us tonight, Anne Howell will take these for you. Now you have until tomorrow afternoon, July 7, 1995 at 4:00pm to turn in your written statements regarding these regulations. And that's 4:00pm. You can turn those in at the Office of Water Resources, either to Wayne Wilson and Mark Priddy's office, or to my office, Jim Waycaster, Public Information there at OWR. Our address is 1201 Greenbrier Street. We're down by the airport, next to the Federal Express office. As I call your name, I'd like you to come up to the microphone and provide your statement. Mr. Ron Mullenax ...

Ron Mullennex: The comments that I have, in reviewing what we have put together is one on page 9, section 7.1 which refers to well risers and it says that for wells constructed in a flood plain or flood way shall extend at least two feet above the

ground, be provided with a water tight, vented cap. I suggest that we drop vented from that. It should be a water tight cap. And then on the comments that I made, refer on page 19, Section 18.1, (9) and (12). Let's see here, the reporting requirements on one of those is reporting requirements for a sieve analysis which would apply only, of course, in a soil horizon and maybe it should be specified there that it is not applicable for a bedrock well. And in 18.1(12) requires the elevation of a bottom of a screen be reported elsewhere we have reporting requirements that do not specify the elevation of the well and I was wondering if that should be **depth** of the bottom of the stream as opposed to the elevation. Those were my comments...

Jim Waycaster: Thank you. Mr. Kenneth Heirendt...

Kenneth Heirendt: I don't have my formal statement but I would like to clarify getting a statement in by tomorrow with a fax acceptable?

Jim Waycaster: Yes, it is. Just as long as you follow your fax with a hard copy later on. That will meet the requirements of getting the fax in. Mr. Sherman, Mr. Glen R. Sherman...

Glen R. Sherman: I represent the Materials Control Division of the West Virginia Division of Highways and we just yesterday became aware of these regulations. I just realizing the importance of the environment, really don't have any comments concerning the regulations per say, but we would like to make a statement concerning your fiscal note for proposed rule. You note the economical impact upon state government. This rule will regulate private industry as such, and should not directly impact state government. However, your definition of **person** in these regulations includes state government. That's noted. On an average, we drill 1200 borings a year - 30,000 feet average, 24 feet in depth and approximately 120 of those holes are water well observations. Just wanted to point out that, that statement is not exactly correct.

Jim Waycaster: Thank you. Karen Price...

Karen Price: Thank you. I'm Karen Price, President of the West Virginia Manufacturers Association (WVMA). As you are aware the WVMA is comprised of approximately 250 member companies, both large and small, which are significant contributors to West

Virginia's economy. In the tradition of cooperation and positive discourse with state government on environmental regulatory issues, we'd like to offer the following statement. We will be submitting written comments, so without reiterating all the points raised in our written comments, there are a few key points that need to be highlighted. First, the broad language of the rules will capture activities beyond the intended purpose of construction and installation of ground water monitoring wells. For example, the rules would regulate bore holes dug for mineral exploration. We do not believe it was the agency's intent to regulate this type of activity. The WVMA suggests limiting the scope and purpose of the rule specifically to ground water monitoring wells required to be installed by an existing regulatory program. As a second point, we are concerned that theses regulations do not provide adequate flexibility to make adjustments in installing monitoring wells. We propose that the agency incorporate, by reference, the American Society of Testing and Material Standards (ASTMS) which had been developed over many years for the installation of ground water monitoring wells. In addition, the rules should allow for deference to the expertise of the engineers who design and install wells and allow for deviations from the regulations for site specific conditions

instead of creating blanket requirements to cover every installation. Third, we believe the regulation should only apply to ground water monitoring wells that are required to be installed after the effective date of the regulation by the regulatory program. The rule should not apply to existing wells or bore holes created for purposes other than the installation of ground water monitoring wells. In conclusion, we really appreciate the opportunity to comment on the proposed monitoring well rule. The WVMA through its member companies, associates and consultants stands ready to assist the agency in revising and developing reasonable rules that will not have an adverse effect on business in West Virginia. Thank you...

Jim Waycaster: Thank you. Is there anyone else who would like to make a statement for the record concerning the proposed regulation. If not, I will take this opportunity to go ahead and close the formal, recorded portion of these proceedings.

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TO: EN#9605 NR02 Frank Pelurie

FROM: EN#4302 NR02 Anne Howell

DATE: JULY 27, 1995
SUBJECT: Monitoring Well Design Standards

Here is a list of attendees at the Nitro meeting on July 6, 1995 per Jim Waycaster.

Dave Junker/Robert Jalacic - Terradon
K. O. Damron - WV Mining & Reclamation
John R. Sedlock - H. C. Nutting Co.
Ron Mullennex - Marshall Miller & Associates
Gary T. Viola - Office of Environmental Health
Kenneth M. Heirendt - Michael Baker
Glenn R. Sherman - 312 Michigan Ave., Charleston
Karen Price - WV Manufacturing Association

MARSHALL MILLER & ASSOCIATES
Geology, Engineering, Geophysics

June 2, 1995

Mr. Dave Watkins
Division of Environmental Protection
1201 Greenbrier Street
Charleston, WV 25311-1088

RE: Response to Public Notice Regarding Monitoring Well Design Standards

Dear Dave:

I would like to make comment on two items in one section of the final draft version of the Monitoring Well Design Standards. Under "Well and Borehole Construction Documentation", § 47-60-18 (pages 18 and 19), the requirement for reporting of sieve analysis results should reflect that sieve analysis is not applicable or required for bedrock well installations. Secondly, the requirement for reporting of the elevation of the bottom of the screen should read "depth of bottom of screen", as the elevation determination requirement is not included in the well location specifications of § 47-60-6.

It has taken a while, but I believe we have an end product that will work, and that will fulfill the goals of preventing cross-contamination and affording reliable monitoring data. I appreciate the opportunity to have participated.

With highest regards,

MARSHALL MILLER & ASSOCIATES

Ronald H. Mullennex, C.P.G., C.G.W.P.
Senior Vice President

RHM/drm

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MARSHALL MILLER & ASSOCIATES
Geology, Engineering, Geophysics

July 7, 1995

Mr. Jim Waycaster
Public Information Specialist
West Virginia Department of Environmental Protection
1201 Greenbrier Street
Charleston, WV 25311-1088

Dear Mr. Waycaster:

I would like to comment on the proposed rule concerning Monitoring Well Design Standards, as regards the requirement for sieve analysis (§ 47-60-18.1.9). I would suggest that the regulation be worded to clearly reflect that sieve analysis not be mandated so long as certain size guidelines for screen slots and filter pack material are followed, as set forth in other sections of the proposed rule. For instance, § 47-60-8.2 provides for use of a number 10 slot (0.010 inch) screen as the minimum size required. If a number 10 slot screen is used, this should alleviate the requirement for sieve analysis.

§ 47-60-10.2 indicates that a fine sand filter pack should be used in predominantly silt and clay formations, and that a medium or coarse sand or gravel be used in bedrock. This requirement is adequate for the purposes of the rule, and again should alleviate the need for sieve analysis. (However, allowance for use of a fine sand filter pack should be made in bedrock formations that are heavily fractured or karstic).

While the use of a sieve analysis for screen slot and filter pack selection is prudent, it is very often impractical to apply in field situations. Waiting for a sieve analysis to be completed before setting a well will result in excessive delays and significantly increased

costs to the project, as well as increase the chances for cross-contamination or borehole collapse during the waiting period.

Thank you for the opportunity to comment.

Sincerely,

MARSHALL MILLER & ASSOCIATES

Ronald H. Mullennex

Ronald H. Mullennex, C.P.G., C.G.W.P.
Senior Vice President

RHM/wpm

Allegheny Power System

LARRY D. MYERS
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July 6, 1995

Mark A. Scott, Chief
West Virginia Department of Environmental Protection
Office of Water Resources
1201 Greenbrier Street
Charleston, WV 25311

ATTN: David P. Watkins

Monongahela Power Company
Comments on 47CSR60
Monitoring Well Design Standards

Monongahela Power Company (Mon Power) offers the following comments on the WVDEP's Monitoring Well Design Standards rule (47CSR60). Overall, the rule is well written, comprehensive, and practical. Mon Power commends the WVDEP for proposing such a thorough and technically sound rule. Mon Power's comments are listed below by applicable provision number and page.

§ 47-60-3.29./page 4

The definition for observation well is too specific. Several references, such as ASTM 5092, use the term observation well as a well used to measure changes in hydraulic head. It is unclear as to why the current definition only identifies backfill and unconsolidated material because we believe it is applicable in all types of material and bedrock. Therefore, Mon Power suggests deleting the phrase "in the backfill or unconsolidated material" from the definition.

§ 47-60-6.2./page 8

This condition states that certified well drillers are required to submit a report to the WVDEP, by the fifteenth of the month following the month of well installation, detailing the latitude and longitude coordinates of the well. In some cases, submission of such a report within this time frame may not be achievable. The availability and mobilization of a surveying crew may not coincide with the due date of well driller's reports. Since the data requested on this report is biographical in nature (i.e. well installation date, driller's name, driller's address, and well coordinates) it is not critical that the information be supplied so rapidly. Therefore, Mon Power recommends that the provision be reworded to require the information within 60 days of the well installation date.

§ 47-60-8.2./page 10

This condition establishes, among other things, maximum (i.e. "not to exceed") well screen lengths. Mon Power does not understand the rationale for defining a 20-foot limit on well screen length for water table observation wells and a 5-foot screen limit on piezometers. In thick saturated formations, a screen length greater than 20-feet may be necessary and appropriate to provide a representative interval of the aquifer. Likewise, although most aquifers fluctuate within 1 to 2 feet, some shallow aquifers may fluctuate greater than 5 feet between high and low water table elevations. In addition, most screens are manufactured in 10-foot

sections, therefore, a 5-foot section may be difficult or costly to obtain. Mon Power believes that these screen length limits should be eliminated from this condition, and replaced with: "Well screen intervals should be of appropriate length to adequately monitor the water bearing strata of interest."

§ 47-60-11.6.1./page 13

This condition requires the ground surface seal to extend to a minimum of 30 inches below the land surface. Mon Power believes that the minimum depth can be reduced to 6 inches below the frost line. Since the frost line in this part of the country extends to a depth of 18-20 inches, a well seal of at least 24 inch depth would be required. However, if some area of the state has a shallower or deeper frost line, the regulations will automatically allow for the ground seal depth to be appropriately adjusted.

§ 47-60-12./page 14

This condition requires the use of a "coalescing air filter" if air is used as a drilling fluid (rotary drilling). Mon Power is unfamiliar with the term "coalescing air filter" and requests clarification. If this term describes a filter designed to remove oil and/or water vapor and droplets from the air stream, than Mon Power concurs with the provision. Otherwise, we believe that an oil/air filter or oil trap on the air compressor is adequate for "cleaning" rotary drilling air.

§ 47-60-17.1./page 16

This condition describes a well development purging method that, in part, states that the purging of 10 well volumes constitutes development of the well. This appears to Mon Power to be too arbitrary. The purging of 10 well volumes does not ensure proper or adequate development of a well. Most references on the subject of well development speak to purging until a constant, measurable parameter (e.g. pH, temperature, specific gravity) is achieved. Therefore, Mon Power recommends that this provision be reworded to state: "Removal of well bore volumes should continue until representative water is obtained. Representative water is assumed to be obtained when pH, temperature, and specific gravity measurements are repetitively constant and stabilized, and the water is visually clear of suspended solids.

§ 47-60-18.1.18./page 19

Section 18.1. of the proposed rule requires that a construction record for each well be maintained. The contents of such a record are identified by items 18.1.1. through 18.1.18. This last item, simply states "any other information deemed necessary by a groundwater regulatory agency." This is too broad and capricious a statement and needs to be reworded to either include the phrase "reasonable and related" between the words "other" and "information"; or the "other information" needs to be defined and delineated (i.e. "Any other information such as 1), 2), 3), etc. . . . . ").

§ 47-60-19.1.1./page 19

This condition states "A borehole shall be abandoned within 3 working days after its use has been discontinued." Although Mon Power understands the WVDEP's desire to abandon a borehole as soon as possible, 3 working days can be unreasonable with regard to mobilizing equipment for the abandonment process (i.e. grouting). The decision to abandon a borehole could be made after the drilling rig has left the site and 3 working days does not provide enough time for all the logistics and mobilization required for drillers to perform this type of work. Therefore, Mon Power suggests that this condition be reworded to state "A borehole shall be abandoned within 60 days after its use has been discontinued."

§ 47-60-19.1.3./page 20

As stated above, the time frame proposed may prove impossible to meet just because of the logistics and mobilization constraints associated with getting a driller to a specific site to properly abandon a well. Therefore, Mon Power believes that this provision should incorporate a 30 day time frame rather than a 15 day

time frame. A 30 day time frame should provide ample time to mobilize a driller on an emergency basis given the urgency of eliminating a well that is an obvious conduit for contaminants to migrate to groundwater.

§ 47-60-21./page 22

This provision allows for the installation of temporary monitoring wells, under separate approval by the WVDEP, but places a 120 day limitation on their use. Mon Power believes that if a situation is unique enough to require temporary wells, construction of which needs to be approved by the WVDEP, then the estimated time frame for which a temporary well is being installed may also prove to be unique. Therefore, Mon Power recommends that no time limitation on temporary wells be given in this regulation, but rather be determined on a case by case basis along with the request for approval on construction. For example, a temporary well may need to be installed for one year (as opposed to 120 days maximum) to determine seasonal trends in groundwater quality or water table elevation.

Mon Power appreciates the opportunity to comment on these regulations and hopes the Department favorably considers Mon Power's recommended changes to the proposed Monitoring Well Design Standards rule.

Sincerely,

L. D. Myers

COMMENTS OF THE

WEST VIRGINIA MANUFACTURERS ASSOCIATION

ON

PROPOSED MONITORING WELL DESIGN STANDARDS

47 CSR 60

July 7, 1995

COMMENTS OF THE
WEST VIRGINIA MANUFACTURERS ASSOCIATION
ON PROPOSED MONITORING WELL DESIGN STANDARDS
47 CSR 60

July 7, 1995

I. INTRODUCTION

On May 31, 1995, the West Virginia Division of Environmental Protection, Office of Water Resources and Waste Management ("DEP", "OWR" or "OWM") filed with the Secretary of State a notice of public hearing on proposed legislative rule, "Monitoring Well Design Standards," Title 47, Series 60 of the West Virginia Code of State Rules. In accordance with the Administrative Procedures Act, W.Va. Code §§ 29A-3-1 et seq., both written and oral comments may be filed with the DEP on the day of the public hearing to be held on July 7, 1995. Pursuant to this notice, the West Virginia Manufacturers Association ("WVMA") files these comments.

The WVMA represents a broad cross-section of large and small industrial concerns throughout West Virginia. Because WVMA members are subject to, and significantly affected by, the groundwater program and, in particular, the requirements concerning the installation and operation of groundwater monitoring wells at or near their facilities, WVMA has prepared these comments which raises a number of concerns with the proposed rule.

Of particular concern to WVMA members are the additional costs

associated with installing groundwater monitoring wells by certified monitoring well drillers that will be passed through to its member companies. The WVMA is also acutely interested in the affects of the rule on existing wells and other activities not related to groundwater monitoring wells. The WVMA offers these comments as constructive recommendations to develop a workable rule that will accomplish its intended purpose without creating undesirable conditions. In this regard, the WVMA requests the DEP give these comments due consideration when evaluating this rule proposal for filing with the Legislative Rule-Making Review Committee.

II. GENERAL COMMENTS

A. Scope

The proposed rules are intended to address groundwater monitoring wells, groundwater monitoring well practices and monitoring well performance, and particularly, standards for the design, installation, construction and abandonment of groundwater monitoring wells. However, the scope of the rules incorporates more than groundwater monitoring wells by inclusion of the term "boreholes," without limitation, throughout the text of the rule. While the concept of regulating boreholes drilled for the purpose of installing groundwater monitoring wells under the proposed rules is not objectionable, the practical effect of using the term "borehole" in different contexts by implication includes boreholes drilled for other purposes, such as foundations investigations, construction of footers, and geologic exploration for coal and oil and gas purposes. The scope of the rules is limited to groundwater monitoring

wells and should not be extended to include boreholes drilled for other purposes.

The scope of the rules should further be clarified to ensure that the provisions of the rules are prospective only and do not encompass existing monitoring wells already installed. The WVMA does not believe that it was the intent of the DEP to require replacement or retrofitting of the hundreds upon hundreds of groundwater monitoring wells currently in place. Furthermore, the Groundwater Protection Act, W.Va. Code §§ 22-12-1 et seq., does not require any action with respect to existing wells unless there is evidence that the wells are contributing to groundwater contamination. The cost of imposing additional requirements on existing wells would be enormous without any appreciable environmental benefit. In fact, the WVMA submits that to disturb existing wells could cause environmental harm where none before existed because of the disturbance to established monitoring wells. Thus, the WVMA urges that clarifying language be inserted to the effect that the provisions of the rule only apply to monitoring wells installed after the effective date of the rule.

B. **Definitions**

A second point of general comment is that the term "contamination" is used in different contexts throughout the rule. While the term is defined in Section 3.20 with a specific legal meaning, its use within the rule is more generic; that is, contamination is used in the ordinary sense of the word. For example, the requirement that equipment used in the drilling of the borehole must be "decontaminated" results in an inconsistency in relation to the definition which

encompasses a change in existing groundwater quality. Also, use of the term begs the question of what extent the "contamination" must be removed so that the equipment is considered "decontaminated." The WVMA suggests the definition of "contamination" be revised to reflect its usage within the rule to cure any inconsistency or misunderstanding that may result from the proposed definition.

Similarly, the term "borehole" also captures drilled holes that are unrelated to groundwater monitoring wells and the definition should be amended to limit the scope activities included within the terminology. The term is used in different contexts throughout the rule, both in the definition section and as a synonym for drill holes associated with the construction of a groundwater monitoring well. However, boreholes are drilled for a variety of purposes that are unrelated to groundwater monitoring wells. Thus, the WVMA suggests consistency throughout the rule by limiting the definition of borehole to boreholes drilled for the purpose of installing a groundwater monitoring well as discussed below.

As proposed, the rule provides for definitions of particular types of groundwater monitoring wells, however, there are internal inconsistencies between definitions that need to be resolved. The definitions are circularly defined so that a monitoring well is an excavated well and an excavated well is a monitoring well, even though the terms are defined differently. Under the proposed rule, these various types of wells expand the scope of the activities covered by the rule.

The WVMA therefore suggests that the terms "driven point well,"

"excavated well," "groundwater observation well" "tank pit observation well," and "vapor observation well" all be revised to resolve this internal circular definitions. In addition, the term "well" should be deleted in its entirety for it is unnecessary and broadens the scope of the rule in every instance where the rule uses the term "well" instead of "monitoring well." The essential elements of a "well" are already incorporated within the definition of "monitoring well." Therefore, to avoid confusion and unintended interpretation of the rule, the definition of "well" should be stricken in its entirety.

The WVMA also requests the DEP to clarify usage of the terms "well" and "borehole" throughout the rule. The term "well" is internally inconsistent with the phrase "monitoring well" because the definition of "well" necessarily captures activities not associated with groundwater monitoring wells. Thus, the WVMA suggests the DEP revise the rule to use the phrase "groundwater monitoring well" in lieu of the term "well" throughout the rule unless the context clearly requires a different meaning.

C. **Jurisdiction and Authority**

Another general comment relates to the authority of the Director of the Division of Environmental Protection relative to the authority of other agencies with statutory authority to regulate activities that have the potential to impact groundwater. While the DEP has been designated the lead agency, the Bureau of Public Health and the Department of Agriculture also share a coordinated role in the

groundwater program. The WVMA urges consistency and cooperation among and between agencies with authority over the groundwater program. While the Director of the DEP has specific statutory authority for the oversight and direction of the divisions within the DEP, this authority does not give the director the authority to restrict the authority specifically granted to other agencies to regulate groundwater under the Groundwater Protection Act. W.Va. Code §§ 22-12-1 et seq.

D. ASTM Standards

Another comment that applies to the rule in its entirety is the failure to incorporate by reference the industry standards established by the American Society for Testing and Materials. These standards provide the basis for engineers to design groundwater monitoring wells and are set forth in Standard Practice for Design and Installation of Ground Water Monitoring Wells in Aquifers; ASTM D 5092-90.

The DEP would have saved significant resources by requiring all groundwater monitoring wells to be designed and installed in accordance with ASTM standards. The WVMA urges the DEP to reconsider its proposed rule and to simplify the monitoring well design standards by specifically referencing ASTM standards in lieu of the adoption of a separate set of standards. There are no other surrounding states that to our knowledge require additional standards beyond using ASTM standards as a guideline. Thus, by this rule, West Virginia has more stringent, more convoluted and confusing requirements for installing groundwater monitoring wells.

Although it appears from the WVMA review that the rule is generally

consistent, at least in principle, with the industry standards set forth in the ASTM standards, differences that do exist will result in dual standards and cross-referencing that create additional, unnecessary complication with regard to compliance, and do not contribute to the protection of groundwater that the rule is seeking to achieve. This dual standard functions as a compliance trap for those not cognizant of the subtle differences between the industry standards and the regulations, notwithstanding the compliance of the certified monitoring well driller with the industry ASTM standards. The WVMA therefore encourages the DEP to consider reducing the text of the rule and adopting the ASTM standards by reference.

E. Other Regulatory Program Standards

The federal Resource Conservation Recovery Act and the regulations promulgated pursuant thereto have specific requirements governing groundwater monitoring wells. These requirements must be met in accordance with the hazardous waste management regulations which incorporate the federal regulations by reference. See 47 C.S.R. 35, 40 C.F.R. 264.90 et seq and 40 C.F.R. 265.90 et seq. While the WVMA has not compared the two programs in detail to identify specific conflicts, if any, with the competing regulations, requiring additional standards under the monitoring well rule presents the opportunity for duplication and conflict. In addition, there are guidance documents designed to assist in groundwater monitoring activities. See, i.e. Procedures Manual for Ground-water monitoring at Solid Waste Disposal Facilities, EPA-530/sw-611; RCRA Ground-water Monitoring, EPA-530-R-93-

001 and Subsurface Characterization and Monitoring Techniques Vol. 1 and 2 - EPA/625/R-93/0036. Because many of the drilling techniques, installation procedures and construction materials are too divers to be incorporated into one set of standards, the rule should recognize the various guidance documents. Thus, the WVMA believes that the rule should have flexibility and adaptability included within the rule to accommodate the different guidance documents and regulatory requirements of other state and federal programs.

F. Timing

The final general comment is the timing of the effective date relative to that of the timing of the driller certification program. The certification program, embodied in 47 CSR 59, must be implemented prior to the provisions of this rule to ensure that certified monitoring well drillers are available to perform groundwater monitoring well installation services. Because the monitoring well design standards rule requires certified well drillers, the ability of an entity to contract with a certified monitoring well driller must not be interrupted by implementation of this rule. The WVMA urges due consideration of the coordination between the implementation of these two rules to ensure ample time to allow for certification. Similarly, the release and use of the forms required by the proposed rules should precede the implementation of this rule so as not to cause unnecessary delay in installing groundwater monitoring wells.

III. SPECIFIC COMMENTS

A. Section 1 - General

Section 1.1 - Scope and Purpose

The scope and purpose section of the rule should be refined to ensure that only groundwater monitoring wells installed and put in service after the effective date of the rule are covered by the rule. Existing groundwater monitoring wells that have not been identified as contributing to the degradation of groundwater should not be disturbed. At the very least, the scope of the rule should be clarified so that the provisions relating to groundwater monitoring well construction apply only to groundwater monitoring wells that are installed after the effective date of the rule. The rule should not be construed to require existing groundwater monitoring wells that do not meet the design standards to be closed or upgraded unless there is evidence that a particular groundwater monitoring well is contributing to groundwater contamination.

In addition, the scope of the rule should be clarified to exclude boreholes drilled for purposes other than groundwater monitoring wells. Principally, the Groundwater Protection Act specifically excludes wells drilled for oil and gas and coal extraction purposes. W.Va. Code § 22-15-5(h) & (i). Geologic exploration not related to the installation of groundwater monitoring wells is not and should not be encompassed within the rule because the rule is intended to specifically address the design standards for groundwater monitoring wells.

The WVMA suggests adding the following language to Section 1.1 to address this concern:

> This rule does not apply to groundwater monitoring wells constructed and installed prior to the effective date of this rule unless there is reliable evidence that the groundwater monitoring well is contributing to the contamination of groundwater. Further, the scope of this rule is limited to groundwater monitoring well design standards; the drilling of boreholes for other purposes, including exploration and development of coal, oil, gas and other minerals, is not covered by the standards set forth herein.

Similar language should also be incorporated into Section 2, relating to the applicability of the rule.

B. Section 2 Applicability.

To ensure internal consistency in the rule, Section 2 should be revised to clarify that the rule only applies to groundwater monitoring wells installed after the effective date of the rule or groundwater monitoring wells for which contribution to groundwater contamination has been evidenced. Accordingly, the WVMA urges that Section 2 be revised as follows:

> This rule applies to any person who either ~~owns, operates,~~ constructs, installs, or abandons groundwater monitoring wells after the effective date of this rule. ~~and~~ This rule also applies to boreholes associated with the construction and installation of groundwater monitoring wells installed after the effective date of this rule. All groundwater monitoring wells and boreholes associated with the installation of a groundwater monitoring well which have been constructed or installed after the effective date of this rule shall be abandoned according to Section 19 of this rule. Existing groundwater monitoring wells that do not meet the design standards as set forth in this rule are not required to be abandoned, closed or upgraded in accordance with this rule unless there is reliable evidence that the groundwater monitoring well is contributing

to groundwater contamination. This rule does not apply to constructed, installed or abandoned boreholes that were constructed or installed for purposes other than groundwater monitoring. Such other purposes include geologic exploration or extraction of coal, oil and gas or other minerals.

The WVMA urges the adoption of this proposed language to ensure that the rule is implemented prospectively, but at the same time addresses poorly constructed wells that contribute to groundwater contamination. Likewise, the new language clarifies that the groundwater monitoring well design standards do not apply to geologic exploration or extraction of minerals not associated with the installation of a groundwater monitoring well.

C. Section 3 Definitions

1. Section 3.6 Aquifer Test Well

The definition of aquifer test well should be revised to mean "a monitoring well installed. . ." to clarify that this type of well is a monitoring well that first must meet the requisites of the monitoring well definition.

2. Section 3.9 Bentonite

This section defines "bentonite" and includes three subdivisions which further define specific types of bentonite. While bentonite is recognized by the ASTM standards as an appropriate material for groundwater monitoring well construction, the proposed definition maybe too restrictive and could result in technical non-compliance with the specific provision because of the manufacturer's specifications relative to the material. Normally, there is a certain percentage of the material which

passes a mesh size in order to be marketable for its intended purposes. This principle is not specified in the rule and may lead to confusion. For example, some manufacturers consider 200 mesh bentonite to mean bentonite where 80 percent of the material passes the 200 mesh sieve. As written, it is unclear whether the definition requires 100 percent of the material to pass the sieve or if 80 percent would be acceptable. The WVMA has several suggestions to improve this definition.

First, the definition of powdered bentonite could be expanded to provide that a range of percentages of material that passes 200 mesh criteria is deemed acceptable, or in the case of bentonite granules, to follow the definition in the ASTM Standard Practice for Design and Installation of Ground Water Monitoring Wells in Aquifers; ASTM D 5092-90 which states in section 6.8.1 that granules consist of coarse particles of unaltered bentonite, typically smaller than 0.2 inch (50 cm). The rule could be revised to delete the specific definitions and instead insert examples referencing the ASTM standards as the recommended standards coupled with a qualification that the requirements set forth in the definition are approximations. The WVMA suggests a less restrictive definition to this technical requirement for bentonite.

3. Section 3.14 Boreholes

The definition of "borehole" in Section 3.14 is overly broad and captures activities that do not relate to the construction and installation of groundwater monitoring wells. It is critical that this definition be revised. The WVMA suggests

deleting the proposed language and inserting in lieu thereof the following language which is derived, in part, from the ASTM groundwater monitoring well design standards:

> "Borehole" means a circular open or uncased subsurface hole created by drilling for the purpose of constructing or installing a groundwater monitoring well. For purposes of this rule, boreholes and drillholes are synonymous.

It needs to be recognized that unlike the engineering standards set forth in the ASTM guidance document, the definitions contained in this rule have legal implications which define the activities which are regulated pursuant to the rule and form the basis for compliance and enforcement. In conformance with the changes to the scope and applicability sections above, the definition of borehole should comport to the activity for which the rule has been proposed -- installation and construction of groundwater monitoring wells.

4. Section 3.20 Contamination

The WVMA submits that the definition of "contamination" as contained in this section is a term of art and forms a legal conclusion whereas the use of the term in the rule is that of a its ordinary and plain meaning. Therefore, the WVMA urges revision of the definition to read as follows:

> "Contamination," <u>for purposes of this rule,</u> means any man made or man induced alteration of the chemical, physical, or biological integrity of the groundwater ~~resulting from activities regulated under the West Virginia Groundwater Protection Act, in excess of existing groundwater quality, unless that site has been granted a deviation or variance from existing quality as provided for in the West Virginia Groundwater Protection Act,~~

~~or is subject to an order, permit, or other regulatory action that requires restoration or maintenance of groundwater quality at a different concentration level.~~

In this instance, the deleted language does not add anything to the term contamination as used in the text of the rule, and instead confuses the meaning in the context in which it is used in the rule; that is, its ordinary and plain meaning.

5. Section 3.34 Monitoring Well

The definition of monitoring well should be revised to include only those wells which are installed for the purpose of monitoring groundwater. The definition should be amended further to specifically exclude those activities not dealing with monitoring groundwater that are specifically excluded by statute to ensure that the definition breadth does not capture activities that are not intended to be covered by the rules. The WVMA recommends modifying the definition of "monitoring well" as follows:

> "Monitoring well" means any cased ~~excavation or~~ opening into the ground made by digging, boring, drilling, driving, jetting, or other methods for the purpose of determining the physical, chemical, biological, or radiological properties of ~~surrounding media, including~~ groundwater. The term "monitoring well" includes piezometers, water table observation wells, ~~excavated wells~~ and aquifer test wells which are installed for ~~purposes other than those listed above~~ the purpose of monitoring groundwater as stated above, but does not include water wells whose sole purpose is to provide a supply of water, for exploration of water, for dewatering or to function as heat pump wells, or for the exploration of geologic formations, coal analysis, coalbed methane extraction, oil or gas recovery, mineral analysis or similar activities unrelated to groundwater monitoring.

Again, the definition of "monitoring well" as proposed by the DEP expands the

universe of wells beyond those installed and constructed for monitoring groundwater. Moreover, the definition set forth in these proposed rules differs from that authorized in the groundwater certification rules.

6. **Section 3.22 Driven Point Well**

A "driven point well" for purposes of the rule must first meet the definition of "monitoring well." Thus, the definition should state that a "driven point well means a monitoring well . . . "

7. **Section 3.23 Excavated Well**

The definition of "excavated well" should be stricken from the rule because it is not a groundwater monitoring well authorized by the Groundwater Protection Act. Rather, an excavated well as set forth in the rule is a release detection device and includes "tank pit observation wells," "groundwater observation wells" and "vapor observation wells." None of these devises are groundwater monitoring wells as that term should be defined, i.e. a cased opening in the ground for the purpose of determining the properties of the groundwater. The WVMA recommends that the term excavated well be stricken; however, if the agency justifies the necessity to include the term within the rule, then the definition should be revised to mean "any ~~monitoring~~ well which is constructed . . ." Deleting the word monitoring from the definition will provide a distinction between groundwater monitoring wells and excavation wells.

8. **Section 3.4 Piezometer**

The definition of piezometer is overly broad. By definition, a piezometer is designed and installed for measuring water levels only and not for determining groundwater properties. Thus, the words "or physical, chemical, biological, or radiological properties of groundwater, or both" should be stricken.

9. Section 3.61 Water Table Observation Well

The only other well with independent significance other than a monitoring that should be defined in the rule is that of the "water table observation well" which definition in its current form is overly broad as to make it coextensive with the definition for monitoring wells. It is therefore appropriate and desirable to limit this definition to a well which is installed for the specific purpose of determining the elevation of the water table. The WVMA suggests:

> "Water table observation well" means any monitoring well~~; in which the screen or open borehole intersects a water table;~~ which is installed for the specific purpose of determining ~~either~~ the elevation of the water table ~~or the physical, chemical, biological, or radiological properties of groundwater, or both~~.

Revision of this definition will result in two distinct wells under the regulation; groundwater monitoring wells and water table observation wells. All other wells identified and defined in the proposed regulation are simply subsets or types of groundwater monitoring wells which inclusion creates more confusion than is necessary considering the complexity of the rule in the first instance.

The resultant definition of water table observation well, however, becomes synonymous with a peizometer. In that case, the term peizometer should

be used and the definition of water table observation well should be deleted. If the intent of the water table observation well is as a monitoring well, then it must meet the criteria set forth in the definition of monitoring well, i.e. it must be cased. However, the requirements applicable to monitoring wells set forth elsewhere in the rule, such as well screen design, screen length and filter pack requirements, will not necessarily be attainable for water table observation wells because of the unique placement at the intersection of the water table. Under either interpretation, the rule should be revised accordingly.

10. Section 3.62 Well

As an alternative to deleting the term well in its entirety as suggested in the general comments, the term "well" should be revised as follows:

> "Well" means any borehole or ~~other excavation or~~ opening in the ground deeper than it is wide constructed for the purpose of obtaining or monitoring ~~the surrounding media, including~~ groundwater. This definition does not include water wells whose sole purpose is to provide a supply of water, for exploration of water, for dewatering, or to function as heat pump wells.

It should be made clear that the wells covered by the rule are monitoring wells as that term is defined. Therefore, retention of the definition of "well" will necessitate the insertion of "monitoring" before well throughout the rule where the intent is to regulate "monitoring wells" and not "wells."

11. Section 3.64 Well Volume

The definition of well volume should not include the water in the filter

pack. The filter pack is similar to the actual soil formation and should contain water that is representative, i.e. stagnant water will not be found in the filter pack.

D. Section 4 Conflicting Provisions.

This section ascribes broad authority to the Director to make a determination on the applicable rule in the event there is a conflict between the proposed rule and an existing rule. This authority is beyond that granted to the Director by statute, especially where there is a conflict with a rule promulgated by the Bureau of Public Health or the Department of Agriculture. The WVMA suggests that the language in this section needs to be tempered to comport with the authority of the Director as contemplated by statute; that is, the Director does not have the authority to pick and chose whatever standard he or she determines because there exists a regulatory conflict. Instead, the rules of statutory construction are applicable to conflicts in regulations just as those rules are applicable to conflicts in statutes. In determining conflict resolution, the rules of statutory construction should be consulted.

E. Section 6 Monitoring Well Location and Reporting Requirements.

1. Section 6.1 Agency Approval

As noted, the term "monitoring" should be added to the section heading to clarify its contents. The provisions of Section 6.1 are awkward and confusing as written. Therefore, the WVMA suggests deletion of Section 6.1 in its entirety and inserting in lieu thereof the following language which accomplishes the purpose of the

proposed language:

> Where the installation of monitoring wells was required by a groundwater regulatory agency, approval for the location of such wells must be obtained before the wells are constructed. Approval of plans or specifications setting forth the proposed locations for groundwater monitoring wells shall deemed to be approval of such locations.

This revised language simply clarifies the intent of the provision in a more coherent manner.

2. Section 6.2 Reports

This section addresses the filing of reports by certified monitoring well driller and the contents of those reports. This provision requires the well driller to report the name and address of the "person the wells were installed for." This language is unnecessarily loose and, presumably, is not intended to have the well driller identify the name of the specific employee, but rather the name of the company for which the work is being performed, where work is for someone other than an individual. Some clarification should be provided on this point. The WVMA recommends replacing "person" with "entity." In addition, in the first clause preceding the term "wells" the words "groundwater monitoring" should be inserted. Also, the provision should clarify the reports are due on the 15th of the month following the "calendar" month in which the wells were installed.

Section 6.2.3, requiring the location of monitoring wells to be identified by latitude and longitude coordinates in degrees to the nearest second, is too precise, not necessary and not a common industry practice. Locating wells to this degree of

accuracy is not needed. In addition, most wells are located in accordance with local, i.e. facility, coordination systems, not latitude and longitude. Instead, the locations of the monitoring wells should be identified on a U.S. Geological Survey topographical map or a sketch map.

3. Sections 6.3, 6.4 and 6.5 Numbering and Location of Monitoring Wells

These sections provide for the numbering system for registration of groundwater monitoring wells. It is not clear whether the scheme proposed in this section can be implemented at locations with complicated monitoring well networks. Further investigation concerning alternatives should be pursued to ensure that the numbering system proposed may be altered to the extent necessary to address complicated monitoring well grids and clarification should be provided on this point. Also, reference should be made to the identification of monitoring wells on U.S. Geological Survey topographical maps or by preparing a sketch map of the groundwater monitoring well location. See ASTM standards and Section 18.1.

F. Section 7 Well Risers

1. Section 7.1 General

Section 7.1 of this section addresses the construction of well risers. Well risers are required to be both water tight and with a vented cap. These requirements are inconsistent. The section should read that the well risers are water tight at ground level, but with a vented cap. Before the term "wells" the words

"groundwater monitoring" should be inserted.

In addition, the terms "floodplain" and "floodway" should be defined as the area identified as the 100 year floodplain as determined by the federal government.

2. Section 7.3 Assembly and Installation

This section should be revised to clearly state that glues should not be used for coupling the riser joints even if the well is not to be used for organics because the glue has the potential of contaminating the water samples.

G. Section 8 Well Screens

1. Section 8.1 Specifications

This section requests that each section of well screens should be "decontaminated appropriate to the constituents being monitored for and the protection of public health." The regulation does not indicate where, when or how the decontamination should be undertaken. Instead, the WVMA believes that the proper term is "uncontaminated" so that "[e]ach section of well screen should be uncontaminated prior to installation" and strike the remainder of the sentence. However, decontamination would be the appropriate term if the definition of "contamination" is revised as suggested in Section B of the General Comments and Section 3.20 of the Specific Comments.

2. Section 8.2 Construction of Well Screens

The proposed length of 20 feet for well screens on the water table is

generally a good idea as long as the anticipated water level fluctuation is less than 20 feet. However, if the groundwater fluctuation is greater than 20 feet, such as often the case in carbonate rocks, there may be times when the water table is deeper than the well or the top of the water table is above the screened interval. Although as stated in Section 22.1 alternative installations can be accommodated, the WVMA suggests modifying this sentence in Section 8.2 to read "well screens on water table observation wells should not usually exceed 20 feet in length." Similarly, the screen lengths for piezometers should be determined by the specific application at the groundwater monitoring well site, and thus, the rule should set forth a guideline or recommendation and not a mandatory legal standard.

H. Section 9 Tremie Pipes and Sealing Procedures

1. Section 9.1 Materials

This section should be amended following the words "sealant materials shall be" by inserting the words "constructed of" and following the last word "materials" by inserting "or any other appropriate material:". As currently written, this section is unduly restrictive and does not make provision for the use of newly developed or substitute materials of equal effectiveness.

2. Section 9.2.5 Tremie Pipe Pumped

This section specifies the use of tremie pipes fitted with a J-hook end or closed end with side discharge. As a practical matter, the annular space between the borehole and riser is typically too small to accommodate the use of a J-hook or

side discharge device. In order to accommodate the use of these devices it may be necessary to increase the size of the borehole or reduce the diameter of the well. Increasing the size of the borehole will lead to increased costs in drilling and disposal of drilling cuttings. Decreasing the size of the riser diameter is dependent upon the anticipated use of the well and may not always be a possibility. Because reducing or regulating the injection pressure of the sealing material will not compromise the integrity of the filter pack, seal and riser, the WVMA suggests that the rule be revised to allow such reduction or regulation as an alternative.

I. **Section 10 Filter Packs**

This provisions specifies that "thin, flat or a long gaited pieces of gravel, the maximum dimension of which exceeds three times the minimum dimension, may not constitute more than 2% of the material by weight." This language is too restrictive. Instead, a general industry standard should be identified or an appropriately identified commercial material, and to use a range that is generally accepted throughout the industry. In any event, there should be some built in flexibility to design filter packs on a site specific basis.

J. **Section 11 Sealing Requirements**

While it may not be prudent to install flush mounted covers in areas subject to ponding or flooding as stated in Section 11.7.2, in traffic areas it is a necessity and should be specifically allowed under the rule. The rule should be revised to provide the flexibility to use flush mounted protective covers on a site

specific basis.

K. Section 14 Disposal and Decontamination

1. Section 14.1 Drill Cuttings

Section 14.1 should be revised to allow for authorization and approval to return drill cuttings to the borehole. Mandating alternative means of disposal is unnecessary, causes additional expense and creates no environmental benefit.

2. Section 14.2 Cross-Contamination

Section 14.2 should be revised after the words "as needed to prevent" by adding the words "contamination or" to require prevention of contamination in the first instance as well as cross-contamination.

L. Section 16 Recovery Wells

This section limits monitoring using recovery wells only with the approval of the regulatory agency. However, there is no environmental consequence from sampling recovery wells and, depending on the circumstance, the data from the recovery well can be quite useful. The WVMA questions why agency approval is a required and suggests revision to this section to allow for sampling from recovery wells.

M. Section 17 Well Development, Redevelopment and Reconditioning

This section specifies the use of deionized Type II reagent-grade water for those wells that require the addition of water for development. Given the large volumes of water often required it is impractical and unnecessary to use deionized

Type II reagent-grade water for this purpose. The use of potable water from a public water supply would be more than adequate. If there was any doubt as to the purity of the public water proposed for use, the party installing the well could always exercise the option of testing the public water supply.

Although this section appears to apply to well development, there is some concern that it is also intended for well purging prior to sampling. If it covers purging, then 10 well volumes is not correct. Rather, normal purge procedures use three well volumes, with slow recovery wells being pumped dry and allowed to recover once. Thus, the WVMA asserts that this section should be changed accordingly.

N. Section 18 Well and Borehole Construction Documentation

The heading of this section needs to be revised to state: Monitoring Well Construction Documentation. This change will remove the reference to boreholes which is a part of the groundwater monitoring well construction.

Section 18.1 should be amended to by deleting the sentence "[t]hese forms are not transferable without notification to the proper groundwater regulatory agency" and inserting in lieu thereof an affirmative statement to read "[t]hese forms are transferable with notification to the proper groundwater regulatory agency."

Moreover, the requirement in Section 18.1.18 obligating the well driller to report "any other information deemed necessary by a groundwater regulatory agency" is overly broad and should be deleted, or in the alternative, limited in its

scope.

Section 18 should be revised to allow for a location sketch to be included which shows the location of the well, a north arrow, and the direction and distance from some map reference point, i.e. state or county road or prominent landmark. This additions should be on forms developed by the DEP similar to those used in North Carolina. In addition, subsection 18.1.9 specifies that a sieve analysis be reported on a form provided by the Director, however, the depth and purpose of this sieve analysis is not provided. Consequently, this requirement should be deleted.

O. Section 19 Abandonment Requirements

1. Section 19 Introduction

With respect to the abandonment of monitoring wells in the first introductory paragraph of Section 19, the closure order language should read so that the "appropriate groundwater regulatory agency may require, by order or other appropriate means, that a groundwater monitoring well that is likely to contribute or is contributing to groundwater contamination be abandoned." The factors used to make a determination of closure set forth in the rule, such as purpose, location , age and condition of the well, etc., are acceptable and appropriate; however, the trigger on ordering closure should be limited to those wells that are contributing to groundwater contamination. The agency should not have untrammeled authority to require abandonment of a monitoring well.

Subsection 19.1.1 and 19.1.2 specify that boreholes (3 days) and

permanent monitoring wells (60 days) be abandoned after its use has been discontinued. The rule should be revised so that the determination as to when the borehole or monitoring wells use has been discontinued is be identified as well as the mechanism for notifying the regulatory agency when it is determined that this condition has been met. Moreover, abandonment should not be required of existing boreholes unless there is evidence of contamination or contribution of contamination to groundwater because of the presence of the well. The WVMA urges that this section be amended accordingly.

2. Section 19.1.4 Timelines for Abandonment

This section should be amended to be consistent with the scope, purpose and applicability of the rule, i.e. to reflect that wells installed prior to the effective date of this rule are not governed by these minimum standards and abandonment should not be ordered or required absent a finding that the groundwater monitoring well is likely to contribute to groundwater contamination. The rule should state that:

> [a]ny monitoring well constructed after the effective date of this rule not meeting the requirements of this rule ~~unless approved by the appropriate groundwater regulatory agency in accordance with section 22 of this rule shall be~~ is not required to be abated, abandoned or replaced with a monitoring well meeting the requirements of this rule, ~~within 60 days after written notification by the appropriate groundwater regulatory agency that the well is noncomplying~~ unless the monitoring well is significantly contributing to groundwater contamination.

Section 19.2.1. should be deleted and the remaining subdivisions renumbered

because there should not be an absolute requirement of abandonment of a borehole and instead a requirement to abandon existing boreholes associated with a groundwater monitoring well should be limited to those boreholes that are contributing to groundwater contamination.

Moreover, the WVMA believes that it would be appropriate to include a provision which allows the preclusion of abandonment and closure of monitoring wells where the well has a bona fide future use. The WVMA suggests that "[U]pon notice to the Director, a monitoring well is not required to be abandoned and closed if there is a bona fide future use for the monitoring well."

3. Section 19.3 Sealing Requirements

Subsection 19.3 specifies the use of a tremie pipe in accordance with the procedures of subsection 9.2 when abandoning boreholes or monitoring wells greater than 100 feet in depth. Subsection 9.2 specifies the use of a J-hook or side discharging device at the end of the tremie pipe. The purpose of using these devices is to insure than the integrity of the filter pack, seal and riser are not compromised. Since none of these features are present in a soil boring there is no need to require the use of a J-hook or side discharging device when abandoning a soil boring. The rule should reflect this inconsistency appropriately.

P. Section 21 Temporary Monitoring Wells

As long as a temporary well is not causing groundwater contamination, there should be no time requirement to abandon it. The temporary monitoring well

may be useful long after 120 days.

Q. Section 22 Special Circumstances and Exceptions

The Director is given overbroad authority to require more restrictive well drilling requirements. Consequently, the WVMA asserts that the first sentence in Section 22.1 should state that "[t]he appropriate groundwater regulatory agency may approve alternative well material, assembly installation, development or abandonment procedures if the contaminant concentrations or geologic setting require alternative construction."

Further, Section 22.2 states that exceptions to the rule "may be approved by the appropriate groundwater regulatory agency prior to installation or abandonment." This section should clarify that "[a]n exception request shall state the reasons why compliance with the rule requirements is infeasible or unnecessary."

IV. CONCLUSION

The WVMA and its member companies stand ready to assist the Division of Environmental Protection in any way to ensure that the rules promulgated are reasonable to comply with, protective of groundwater resources, consistent with the statutory authority and do not pose unnecessary restrictions or burdens on either the monitoring well drillers or the recipients of their services.

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Baker

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DATE: 7-7-95

☒ Hard copy will follow via U.S. Mail.

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TELECOPY

TO: WAYNE WILSON

FIRM: WV-DEP

TELEPHONE: (304)

FAX 558-5905

FROM: KEN HEIREIDT

This telecopy consists of 5 pages, including this cover sheet. If all pages of this fax are not received, please call (412) 495-4275.

Comments: _____

Baker

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A Unit of Michael Baker Corporation

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July 6, 1995

Mark A. Scott, Chief
Office of Water Resources
1201 Greenbrier Street
Charleston, WV 25311

Attn: David P. Watkins

Re: 47 CSR 60 - Monitoring Well Design Standards
Notice of Public Hearings on a Proposed Rule
Filed May 31, 1995
Public Hearing - July 7, 1995

Dear Sirs:

Attached are our comments regarding the above referenced proposed legislation.

Our comments are primarily related to the application of this proposed legislation to subsurface investigations for geotechnical purposes, as well as, the installation of monitoring wells. In general, the proposed regulation is loosely written and open to interpretation.

Sincerely,

Kenneth M. Heirendt

Kenneth M. Heirendt, P.G.
Senior Geologist

cc: R.Alvis, Baker - Charleston
J.Graff, Baker - Charleston
W.Richardson, Baker - Charleston

COMMENTS:

General

1. What are the appropriate Metric equivalents (hard or soft conversions)?

2. 47-60-12: boreholes where water samples not to be collected, the use of local surface waters (stream, river, etc.) should be permitted if no obvious contamination is present (visual/odor).

3. 47-60-17.14: "known chemistry" identify min. parameters to be tested to satisfy this. (Can this be applied to us of local waters in drilling non-sampled, temporary wells (Boreholes)

4. 47-60-6: this applies to temporary as well as permanent wells? (Include boreholes) - location/reporting.

5. 47-60-18: This applies only to permanent wells? (Not boreholes) - construction/reporting.

6. 47-60-18.1.18: "any other information" sounds excessive for "minimum statewide guidelines". It is understood that minimum is minimum and other information may be required for individual cases.

7. 47-60-6.2: does this (w/ question (4) mean all boreholes drilled during investigations for engineered civil works are to be performed by only certified non well drillers? What about soil samples (agronomic) by auger?

8. 47-60-3: Define "certified monitoring well driller" by ref. To 47CSR59 if nothing else.

9. 47-60-19: This applies clearly to all boreholes - Abandon/Report.

10. 47-60-19.5: Modify report any decontamination procedures . . . "to report any associated decontamination procedures - more comprehensive and less ambiguous - documents for each well stand alone.

11. 47-60-3.34: By the wording of the "monitoring well" definition, it includes geotechnical borings that use wireline, hollow stem or flush-joint casing in the drilling process. We suggest that the definition of "monitoring well" be modified to clearly exclude geotechnical borings.

12. 47-60-3.34: By the wording of the "monitoring well" definition, it includes geotechnical borings which contains a tremie pipe. Tremie pipes are often required (where caving is a concern) to maintain an open borehole until a 24 hour water reading can be obtained an the boring is properly abandoned. We suggest that the definition of "monitoring well" be modified to clearly exclude geotechnical borings utilizing a tremie pipe to maintain an open borehole until it is properly abandoned. If

tremie pipes are not placed prior to removing the drill casing (wireline, hollow stem or flush-joint) there is a strong possibility that the hole will cave and that proper abandonment procedures would not be followed.

13. 47-60-3.34: By the wording of the "monitoring well" definition, it includes vibrating-wire piezometers which are electrical sensing devices which are commonly buried beneath a proposed embankment to monitor pore-water pressures during consolidation settlement. The construction of these devices is very different from the "typical" piezometer. However, the proposed legislation requires them to adhere to the "monitoring well" and "permanent monitoring well" requirements. We suggest a review of these requirements and appropriate modifications to address the differences in construction.

14. 47-60-3.62: By the wording of the "well" definition, it includes the following:

    - all geotechnical borings,
    - testpits,
    - soil perk-test holes,
    - agronomic auger holes,
    - test holes drilled (typically excavated with a "jack-hammer") in the base of caissons to confirm integrity of bearing medium (rock)

    We suggest that the definition of "well" be modified to exclude these and other similar items.

15. 47 CSR 60, Fiscal Note, (Economic impact on State Government): This legislation will increase the Department of Highway's cost of conducting subsurface investigations.

16. 47-60-3.5: What is the avenue for the Director to assign primary regulatory oversight.

17. 47-60-3.10: Who makes the determination of an 'uncontaminated water source'?

18. 47-60-3.11: same question as 3.10

19. 47-60-3.12: same question as 3.10

20. 47-60-3.13: same question as 3.10

21. 47-60-3.18: same question as 3.10

22. 47-60-3.20: This definition does not address who is responsible for determination of contaminated water or 'excess of existing ground water quality.

23. 47-60-3.30: The Director should publish a list of those agencies or political

subdivisions that have received approval to regulate facilities/activities for groundwater protection.

24. 47-60-3.37: Uncontaminated source of water should be defined. This subsection, as well as others, implies that water may be drawn from virtually any source.

25. 47-60-4: At what point or within what time frame is the Director to take action to resolve specific regulatory conflicts.

26. 47-60-6.1: This subsection should be clarified. What defines 'prior groundwater regulatory agency approval? Also, define approved plans and specifications.

27. 47-60-6.3: In order to avoid conflict in number assignment the Director or his designee should assign well numbers . This would also facilitate accurate record keeping at the state level.

28. 47-60-6.4: The format and/or standard for numbering should determined/prescribed at the state level.

29. 47-60-7.4: Who will do the inspecting?

30. 47-60-7.5: Why? The rational for this directive should be defined/detailed.

31. 47-60-8.2: Regulatory justification for this requirement should be required.

32. 47-60-11.4.3: Define protective cap.

33. 47-60-21 The object of this regulatory effort is to protect groundwater (assumed). Why then should the installation of any well be administered in a less stringent manner.

Appalachian Power Company
PO Box 2021
Roanoke, VA 24022-2121
703 985 2300

AEP
APPALACHIAN POWER

OVERNIGHT

Mr. Mark A. Scott, Chief
West Virginia Division of Environmental Protection
Office of Water Resources
1201 Greenbrier Street
Charleston, West Virginia 25311
Attn: Mr. David P. Watkins

Re: Comments of American Electric Power and
Affiliated Power Companies
Proposed 47 CSR 60 - Monitoring Well Standards

July 6, 1995

Dear Mr. Scott:

On behalf of American Electric Power Service Corporation, Appalachian Power Company, Columbus Southern Power/Ohio Power Companies and Wheeling Power Company, I offer the attached comments on the West Virginia Division of Environmental Protection's Proposed Monitoring Well Design Standards. I would like to offer our appreciation for the opportunity to submit these comments and I look forward to a continued good relationship between our companies and the DEP.

If you have any questions concerning our comments, please contact Mr. Timothy P. Mallan of my staff at (703) 985-2367.

Sincerely,

Robert J. Robinson
Environmental Affairs Director

RJR:d
Attachments

Comments of American Electric Power on
the Proposed "Monitoring Well Design Standards"
47 CSR 60

Introduction

The American Electric Power family of companies (which include American Electric Power Service Corporation, Appalachian Power Company, Columbus Southern Power/Ohio Power Companies and Wheeling Power Company) present the following comments to the proposed Monitoring Well Design Standards (47 C.S.R. 60) of the West Virginia Division of Environmental Protection.

General Comments

The Company has reviewed the proposed regulations and agrees with the West Virginia Division of Environmental Protection (the Division) that the proper installation and maintenance of monitoring wells to ensure the protection of the quality of the state's ground water is an important goal. We support the registration of monitoring well installers as well as the testing and licensing of these individuals. It is apparent that the ground water quality of the state has benefited from the current well development and abandonment requirements that are applicable to potable water wells.

The Company, however, suggests to the Division that the installation and maintenance of ground water monitoring wells differs from the corresponding actions involved where potable water wells are concerned. Because of the nature and intended purpose of ground water monitoring wells, it is often necessary to individually develop or modify construction and abandonment criteria to ensure that the desired data gathering effort is achieved, and that the water resource is properly protected. This differs from the situation encountered with potable water wells which are intended for a limited range of purposes.

For the above reason, the Company submits, that establishing specific monitoring well criteria by force of regulation could severely limit the ability of those in need of ground water data from accurately and economically achieving this end. Such a restrictive regulation could also introduce needless administrative delays into an already complex process, further driving up costs.

Therefore, the Company suggests to the Division that the proposed regulation be limited to requiring that monitoring well installation be in accord with selected published criteria that are appropriate to the specific tasks at hand. The submittal of certain documentation to the Division, such as well location, installation methods, and construction details, would also be appropriate under this regulation. Monitoring well installers could be required to certify that each well installed was done so in accord with a specified published criteria. A list of appropriate criteria could be published by the Division as a policy document, thereby allowing updating and amendment without need for regulatory procedure.

As an aid to developing this list, the Company suggests the following documents be specified as the core of the approved criteria descriptions:

- RCRA Ground-water Monitoring - EPA/530-R-93-001
- Subsurface Characterization and Monitoring Techniques Volume 1, EPA/625/R-93/003a
- Subsurface Characterization and Monitoring Techniques Volume 2, EPA/625/R-93/003b

Specific Comments

In the event that the Division does not accept the Company's suggestion that the basic intent of the proposed regulation be significantly changed, we offer the alternative suggestions enumerated below. It is hoped that should the Division determine specific criteria need to be established in a regulatory context, the following comments will aid in that effort. The Company submits, however, that the numerous comments included below, point out the difficulties encountered in attempting to issue specific, regulatory rules in this matter.

§47-60-2. Applicability

This section should clearly state that these standards apply to new wells only, and that existing wells do not need to be retrofitted or replaced to meet the requirements of these standards.

§47-60-3. Definitions

3.5 The definition of "Appropriate groundwater regulatory agency," when coupled with other sections of the proposed regulation, places inappropriate restraints on certain activities. There are a number of situations in which parties legitimately have a need to assess ground water quality that have no involvement with regulatory programs. For instance, in the matter of property transfers, it is prudent to conduct environmental assessments that often include ground water assessment. As there is no "Appropriate groundwater regulatory agency" for this activity, the Director would be required to designate an agency. The Company suggests that this could result in the imposition of a long and needless bureaucratic process if persons engaging in such activities were required to obtain a director designation and an agency approval each time a property assessment were to be performed. The Company submits that this points out the need to refrain from imposing a set of regulatory monitoring well criteria. Such problems can be avoided by, instead, establishing a program whereby well installers are held to using appropriate published standards.

§47-60-6. Well Location and Reporting Requirements

6.1 This section of the proposed regulation states "Where prior groundwater regulatory agency approval is required monitoring wells shall be installed at the locations indicated on the approved plans and specifications." This requirement is inappropriate and could exceed the Director's authority in that this creates an enforceable provision that a person must comply with another set of regulations. Such a requirement could lead to a person being held to be in noncompliance with two separate and distinct regulations for the same act. A violation of a regulatory requirement that is already part of a separate stand-alone rule provides sufficient opportunity for the Division to seek redress without the need to double the Director's enforcement power by making the violation of one set of rules an automatic violation of a second set. This section should be deleted.

6.2. This section prescribes the schedule for reporting routine information to the director following completion of well installations. The requirement to report the requested information by the 15th of the month immediately following the well installation is too restrictive, particularly if a well is installed late in the preceding month. It is also not clear how this section applies to "temporary wells". To improve this section, it is recommended that the first sentence be modified as follows:

"Following installation of permanent wells, each certified monitoring well driller shall report to the director, on forms provided by the director, the following information within 60 days after completion of the well installation:"

6.2.3. This section requires that well locations be given in terms of latitude and longitude coordinates. It is recommended that well coordinates be surveyed and referenced to the North American Datum of 1983 and elevation be referenced to the National Geodetic Vertical Datum of 1988.

6.3 This section requires that the driller assign a registration number to each monitoring well. If the State must impose a numbering scheme, it is suggested that the State assign the number on the well completion form as opposed to requiring the driller to assign and keep track of the well numbers.

§47-60-7. Well Riser

7.1 Section 7.1 discusses the minimum height for a monitoring well riser in a floodplain or floodway. As part of this discussion, the regulations require that a "water tight, vented cap" be used in these areas "unless it can be demonstrated that inundation will not occur,..." There is an apparent contradiction in this requirement in that a normal well cap with a vent oriface will allow the introduction of flood waters to the aquifer if the well head were to be submerged. If the intention is to require some form of pressure vented

cap (i.e., one that allows built up interior gases to vent but does not permit the introduction of outside fluids to the well) this should be so specified.

7.2. This section describes the specifications required for the well riser. The last sentence of this section states, "However, in most instances, a minimum of 2 inches (50.8 mm) is needed to accommodate sampling devices." As this sentence is in fact simply a comment on normal practices and adds nothing to the specification and, as the practice being described is adequately covered in the sentence preceding this one, it should be deleted to avoid confusion.

§47-60-8 Well Screen

8.2 This section requires that well screens be sized to retain at least 90% of the collapsed (natural pack) formation. The Company is unaware of any scientific or engineering basis for this requirement. It is recommended that this section be revised to eliminate this requirement.

This section also requires that well screens not exceed five feet in length on "piezometers". It is suggested that this requirement be revised to allow more flexibility for wells installed in fine-grained silts and clays having moderate to low permeability or in situations involving multiple perched water tables where there is no need to distinguish between each perched water table.

Note: At no point in this regulation is the use of well/screen centralizers discussed. The use of these devices should be addressed (and allowed).

§47-60-9 Tremie Pipes and Sealing Procedures

9.2 This subsection describes groundwater regulatory agency approved sealant placement methods that must be employed when a tremie pipe is used. The wording of this section implies that there are already other regulations or policies in place which deal with this issue. If this is the case, there is no need to reproduce these criteria in the proposed regulations. In addition, as discussed in the comment on Section 6.1 above, this could subject one to an inappropriate double enforcement situation.

§47-60-10 Filter Packs

10.2 This section of the proposed regulation attempts to establish performance criteria for well screen filter packs. This section should be revised to eliminate the requirement that filter packs for wells installed in unconsolidated formations be sized to retain at least 50% of the surrounding formation. The Company knows of no scientific or engineering basis for such a requirement. It is generally more important to design the filter pack based on the formation's uniformity coefficient. In addition, the way the proposed regulations are currently written, sieve analyses for both the filter pack media and the in-situ formation

soils would have to be completed prior to the actual installation of a monitoring well to ensure that the proposed standards were met. This will significantly increase the cost for monitoring well installations and will result in longer project completion times (i.e. waiting for sieve analysis results).

10.3 The first sentence in this section provides general requirements related to the length of the filter pack above and below the well screen. It is recommended that this sentence be revised to allow more flexibility to account for the wide variety of well installations. It is recommended that all specific requirements related to the length of well screen be deleted from this section. In addition, the use of prepacked screens should be allowed as an alternative to field constructed filter packs.

10.4 This section requires that the grain size distribution of the collapsed formation be such that at least 90% of the formation be retained by the well screen. To ensure good hydraulic connection with the aquifer in collapsed formations, sound engineering judgment would allow 40 to 60% to pass the screen slot size for natural pack wells. Accordingly, it is recommended that the last sentence in this section be deleted.

§ 47-60-11 Sealing Requirements

6.1 Section 11.6.1 contains an ambiguous reference to a minimum annular space seal length requirement. Specifically, the part in question states "If the monitoring well depth is such that both a minimum 2 foot annular space seal and a minimum 2.5 foot ground surface seal cannot both be placed, the ground surface seal may be shortened." The language of this sentence implies that a "2 foot minimum annular space seal" is a requirement of the regulation. However, the Company has been unable to find such a requirement at any point in the regulation. If this is intended to be a required specification, it should be clearly stated as such in an appropriate part of the regulation.

6.2 Section 11.6.2. - (Protective cover pipe) contains an apparent error in the last sentence. This sentence states "For observation wells constructed in areas where the depth to water table is less than 7 feet, the required length (depth) of protective cover shall be reduced and may not extend through the annular space seal or into the filter pack." It would appear, based upon the other design criteria in the proposed regulations, that "annular space seal" should actually be "filter pack seal" in this sentence.

§47-60-15 Borehole Diameter

This section defines minimum borehole diameters based on geological formations and drilling methods. It is suggested that this section be revised to allow more flexibility in regard to the installation of piezometers. Piezometers installed in certain low permeable media utilize the smallest possible filter pack to reduce the dampening effect produced by the filter pack when conducting slug tests or when monitoring for routine piezometric

levels. Using smaller diameter boreholes improves the quality of the data obtained and should be encouraged rather than prohibited.

The last sentence of §15.1.3 should be amended to state "The temporary outer casing shall be pulled immediately before, or as, the annular space is sealed." The purpose of temporary casing is to prevent the borehole from collapsing during the well installation process. Whether the temporary casing should be pulled prior to sealing the annular space, or removed at the same time the annular space is being sealed, is a function of the local geology (soil conditions). In some situations, it may be more practical to seal the annular space after the temporary casing has been removed, especially if the local soil conditions are such that the borehole will not collapse.

§47-60-16 Recovery Wells

The first sentence of §16. (Recovery Wells) states "Recovery wells may be used for pressure head monitoring or water quality monitoring only with the approval of the appropriate groundwater regulatory agency." This requirement is overly restrictive and should be deleted. The proper collection of groundwater samples from, and/or the gauging of, a recovery well does not pose a threat to groundwater resources.

§47-60-17 Well Development, Redevelopment and Reconditioning

17.1 There is a possibility that §17.1 and §17.1.1 could conflict with one another. Section 17.1 states "All monitoring wells which cannot be purged dry shall be developed until 10 well volumes of water are removed or until the well produces sediment free water." Section 17.1.1 states "Alternately surge and purge the well for a minimum of 30 minutes." The conflict could arise if sediment free water is encountered in 10 minutes utilizing the Surge and Purge Method. These regulations would require that an additional 20 minutes of development be completed. It is also interesting to note that this was the only method that established a minimum time duration for monitoring well development.

17.1.4 Section 17.1.4. (Well Jetting Method) - This monitoring well development method utilizes water from an outside source to "pressure wash" the interior of the well screen and surrounding filter pack. The proposed regulation asserts that "Water added during this development procedure will alter the natural, ambient water quality and may be difficult to remove." This sentence is inappropriate in a regulatory scheme since it is simply a comment regarding the potential for added water to alter the natural, ambient water quality of the groundwater, and that any added water may be difficult to remove. It adds nothing to the specifications and should be removed to avoid confusion.

17.2 This section requires the use of deionized, Type II reagent-grade water for well development. This is an unnecessary requirement that will only increase costs without providing added benefits. It is suggested that this section be revised to permit the use of water of quality at least equal to the natural ambient water quality.

In addition, this section also requires that "an equal volume of water shall be purged upon completion of development." This requirement may not be practical or realistic because, if the formation is yielding very little water to begin with, and depending upon where the standing water level is, screen length, etc., a certain amount of loss of the well development water would be expected. The purpose of developing the well in the first place is to create conditions that will provide representative groundwater for sampling purposes; by using well development water which is of a quality at least equal to the natural ambient water quality of the surrounding formation, no adverse impact to the formation water is anticipated if a small quantity of the well development water should not be recovered following the well development process. This part of the proposed regulations should be amended to read "and an approximately equal volume of water shall be purged upon the completion of development."

Note: The language of this section restricts the development of monitoring wells to those methods specified in the Subsection 17.1. The Company notes that there are specific types of monitoring wells for which the specified development methods are inappropriate (for instance Geomon wells and the bundled multi-level monitoring wells the West Virginia Utility Consortium is intending to use in its upcoming multi-plant ground water study). This again illustrates the wisdom of not establishing a regulation-based set of inflexible monitoring well specification and argues in favor of relying instead on industry accepted or technology specific standards of practice. In the absence of any such rewrite of the regulation, the sentence immediately preceding Section 17.1.1 should be rewritten as follows: "Unless the type of monitoring well or location conditions call for other methods, the following well development methods should be employed."

§47-60-18 Well and Borehole Construction Documentation

18.1. This section requires submittal of well logs to the owner within 60 days after a well has been installed. This provision does not adequately address major site investigations where the installation of the wells, and the required surveying, may easily exceed 60 days. Rather than require a piecemeal approach to such submittals, it is suggested that this section be revised to allow for the submittal of a complete package of well logs and survey data on a project by project basis. Submittal of the documents to the owner could then be required within 60 days following the completion of the well installation and surveying phases of any given site investigation project. This will eliminate unnecessary steps from an already burdensome process without increasing the potential for groundwater contamination.

This section of the proposed regulation also requires that the forms documenting the monitoring well installation must be retained by the person the wells were installed for, for a period of five (5) years after the wells have been abandoned. This time period should be shortened to a more reasonable time period (such as two years).

This section continues on to specify that monitoring well documents are not transferable without notification to the proper groundwater regulatory agency. This section could lead to another situation where a company would be exposed to "double enforcement" if such notification is also a requirement of the other regulatory program.

This section further enumerates specific articles which comprise a complete well and borehole construction report. Section 18.1.9. of this section simply lists "Sieve analysis,". At no place in the regulation is the completion of sieve analyses discussed per se. If sieve analyses are to be required, a specific standard should be referenced for how to complete these analyses. Further, it is not clear whether the intent of this section was to include sieve analyses for formation materials, filter packs, or both.

§47-60-19 Abandonment Procedures

This section prescribes a very restrictive approach to the abandonment of wells. The Company knows of no engineering or scientific basis for the prescribed abandonment depths listed within this section. We urge the Division to adopt a more practical approach such as that which is outlined in ASTM D-5299-92 - "Standard Guide for the Decommissioning of Ground Water Wells, Vadose Monitoring Devices, Boreholes and Other Devices for Environmental Activities."

19.1.2 This section requires that all monitoring wells be properly abandoned within 60 days after their use has been discontinued. Ninety (90) days would be a more appropriate time period to complete this activity. By making this change, these requirements would also be similar to monitoring well abandonment requirements in other states (e.g. Virginia).

19.1.4 Section 19.1.4 also specifies a 60 day well abandonment window for wells that must be abated, abandoned and/or replaced by order of the appropriate agency. This time frame should also be extended to 90 days.

19.2.2 Section 19.2.2 (under Abandonment Procedures) states "If the well riser is to be removed, the well shall be sealed as the riser is removed, pursuant to subsection 19.3 of this rule." This is not a practical requirement in that the existing language of this section would prohibit the use of "overdrilling" as a valid monitoring well abandonment method. Secondly, this section is not practical from an operational or cost perspective in that in most circumstances, it will not be possible to remove the well riser and seal the well (as specified in Section 19.3.) at the same time. The use of well overdrilling should be specifically allowed in these regulations, and in addition, more flexibility allowed regarding the removal of well risers and the subsequent, or concurrent, sealing of the resulting borehole.

19.2.3 Section 19.2.3. is very similar to Section 19.2.2., and should be modified in the same manner as discussed above.

§47-60-20 Temporary Monitoring Wells

It is unclear whether this section applies to technology such as Geoprobe or Hydropunch. If such technologies fall under the category, it is recommended that the pre-installation agency approval be waived. Further, abandonment procedures prescribed in § 47-60-19. are not appropriate for these technologies. It is recommended that this section be revised to allow more flexibility in regard to such installations.

§47-60-22 Special Circumstances and Exceptions

This section requires that the Owner obtain written approval to utilize alternative materials, well designs or drilling procedures. This requirement is inappropriate considering the anticipated routine occurrences of situations that would require such alternative methods. It is suggested that this section be revised to allow for exceptions based on site-specific conditions, the well design of a registered Professional Engineer, Geologist, or other qualified groundwater scientist, and/or the development and use of new, cost-effective technologies without going through a formal approval process with each occurrence. However, as the Company has recommended, a reasonable solution to this dilemma would be to issue a regulation allowing wells to be constructed, etc., in accordance with selected published guidelines and criteria. We suggest that the Division adopt an approach that is consistent with recognized federal guidance documents or the guidance documents currently available in other states.

Conclusion

The Company appreciates this opportunity to comment on this proposal and looks forward to the continuance of a good working relationship with the Division.

Mr. K.O. Damron

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Submits the following Comments,
this 7th day of July, 1995,
on behalf of the

West Virginia Mining and Reclamation Association

1624 Kanawha Blvd., E, Charleston, WV 25311

and the

West Virginia Coal Association

1301 Laidley Tower, Charleston, WV 25301

****

in response to

The Proposed Monitoring Well Design Standards, 47 CSR Series 60, Division of Environmental Protection

Mr. K.O. Damron, Vice President, West Virginia Mining & Reclamation Association
submits the following comments, this 7th day of July, 1995, in response to the
Proposed Monitoring Well Design Standards, 47 CSR Series 60, Division of Environmental Protection:

I. ABOUT THE PUBLIC COMMENT OPPORTUNITY:

A. OUR REPRESENTATION:

The West Virginia Mining and Reclamation Association and the West Virginia Coal Association represent over 300 coal producing companies and associate member companies who provide products and services to the coal industry. Our comments on this proposed rule are on behalf of all of the members of the WVMRA and the WVCA..

B. OUR APPRECIATION FOR THIS OPPORTUNITY:

We are grateful for this opportunity to offer comments on this proposed new rule.

II. BACKGROUND ON THE WEST VIRGINIA COAL INDUSTRY:

The coal mining industry in West Virginia produces hundreds of millions of tons of high quality coal for domestic and foreign use as an energy source for the production of electricity, steel and a host of other applications. Employment directly in West Virginia mines and indirectly in the mining support trades and the hundreds of millions of dollars of taxes generated by coal related sources are the **economic backbone** of the Mountain State.

A recent study found that one out of every ten payroll dollars in West Virginia comes from the coal industry. It was further revealed that one of every three business tax dollars being collected by the State comes directly from the coal industry.

Every influence which alters the production of West Virginia coal changes the fragile **competitive balance** between coal mines here and coal mines in other coal producing states and other nations. Therefore, changes in the governmental regulations affecting this industry must be made with the potential negative impacts of those changes foremost in the minds of those considering such changes.

III. OUR COMMENTS ABOUT THE PROPOSED RULES:

1. SIMPLICITY: The committee that worked on the issue of monitoring well design has obviously expended a lot of effort, however, they may have missed an opportunity to simplify an agency rule.

Yes, groundwater monitoring wells are important in many situations. But why continue to dictate in code, regulations, and rules that which could be reached by application of simple reasoning.

We recommend the entire contents of this rule read as follows:

> **"Wells created for the express purpose of monitoring groundwater shall be constructed and maintained in a responsible, workmanlike manner. Further, when such wells are located on properties permitted for coal mining, such wells shall be designed in compliance with the standards of the federal Surface Coal Mining Reclamation Act of 1977 (with amendments)."**

2. DETAILS: There are numerous questions being expressed by members of the coal industry about the proposed rule. Does the rule properly exclude "boreholes" that were created for purposes other than monitoring? Are there other solutions available for the discontinuation of a monitoring well? Should existing wells be altered? Are there more economical methods of constructing wells without compromising the security or effectiveness of the wells?

Since coal has been excluded from some parts of the Groundwater Act, and since the coal industry is seldom engaged in the handling or disturbing of life threatening chemicals or other agents, shouldn't the coal industry continue to be exempted from these new regulations?

We believe: "If it ain't broke, don't fix it!" The coal industry has been practicing monitoring well activities since the passage of the 1977 federal mining act without a single shred of evidence of one well failure resulting in the pollution of an aquifer. Why must we now be considered for compliance with a new, higher standard?

IV. SUMMARY:

It will be burdensome and expensive for most coal operators to be restricted by the language of this proposed new rule.

We recommend that the Division of Environmental Protection revisit the language of this proposed rule and take into account the comments provided herein and from other affected parties from within the coal industry.

The detail found in this proposed rule is unnecessary. More flexibility is recommended.

We recommend you go back to the drawing boards with this one.

(end of comments)

Wayne Wilson

TERRADON

TERRADON CORPORATION
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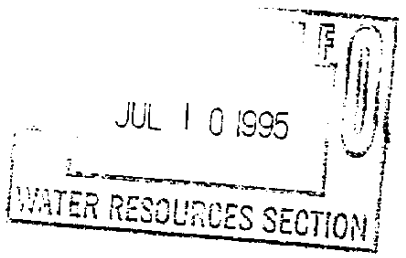
July 7, 1995

Mr. Jim Waycaster
Office of Water Resources
Division of Environmental Protection
State of West Virginia
1201 Greenbrier Street
Charleston, West Virginia 25311



Dear Mr. Waycaster:

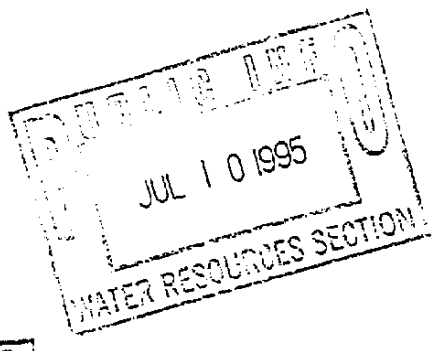
TERRADON Corporation technical personnel have reviewed the proposed West Virginia Monitoring Well Design Standard regulation and have comments we would like considered prior to closure of the comment period.

Comment One: (Reference paragraph 18.1.9, "Sieve Analysis.")

The apparent requirement to run a sieve analysis of the monitored zone, presumably to determine the appropriate slot size of a well screen, indicates the need to halt well completion progress until sieve results are obtained. A completion shutdown at such a point in the drilling progress is detrimental to efficient and effective completion of a well. Not only is extensive time, and thus dollars, lost in the simple waiting period and the cost of the analysis, but the open wellbore formation is potentially impacted severely that extends development actions unnecessarily. This equates to additional cost and potential long-term purging and sampling difficulties. The use of standard 10 slot screen and fine sand filter pack would meet the concerns reducing fines entering the wellbore. There is little further need or gain by completing a sieve analysis on a monitored zone. We believe the requirement for completing a sieve analysis should be removed from the standards.

Comment Two: (Reference paragraph 19.2 and corresponding paragraph 19.3 referring to borehole abandonment.)

Boreholes used for shallow geotechnical soils sampling and evaluation that do not intercept groundwater, which according to the new standard must be abandoned by filling with grout, are adding unnecessary burden to the activity. Boreholes that do not reach groundwater can be very effectively plugged using the native materials removed from the borehole as cuttings. If groundwater is reached, then an impermeable grout plug that reaches above the groundwater interval followed by replacement with the native



borehole material, is an effective and appropriate abandoning method.

Comment Three: (Reference paragraph 18.1.12 referring to elevation of bottom of screen.)

The bottom elevation of the screen has no relevance to the groundwater information or to the total completion data of the well. It would be more appropriate to record the surface elevation, which would be necessary in any event to determine the bottom of the screen elevation, and/or the elevation of the top of the casing. Without the additional information, the elevation of the bottom of the screen is meaningless. In addition, Paragraph 18.1 requires that the information reported shall be done using forms and instructions provided by the director, and since paragraph 18.1.18 allows the agency to request additional information other than what is elaborated in these regulations, then the last sentence in paragraph 18.1 should reflect that this is the minimum information which needs to be recorded.

We appreciate this opportunity to review and comment on a needed set of standards.

Sincerely,

TERRADON Corporation

David N. Junker, PG

Robert L. Jelacic

DNJ/fd

FACSIMILE COVER SHEET

To: Jim Waycaster
Company: WV Office of Water Resources
Phone: 558-4022
Fax: 558-5903

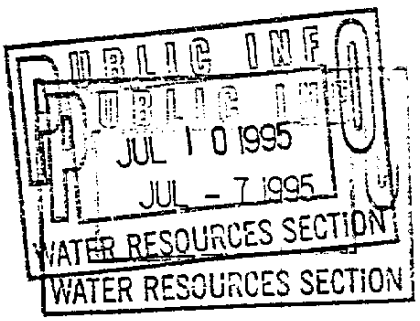
From: Robert L. Jelacic/Dave Junker
Company: TERRADON Corporation
Phone: 304 755-8291
Fax: 304 755-2636

Date: July 7, 1995
Time: 3:20 pm

Pages including this cover page: 3

Comments: Comments on Monitoring Well Design Standards Regulations, Title 47 Series 60

7-10 Copy to MP/WW



47-60

BUREAU OF ENVIRONMENT
DIVISION OF ENVIRONMENTAL PROTECTION

RESPONSIVENESS SUMMARY
July 1995

Proposed Rule: "Monitoring Well Design Standards"

The West Virginia Division of Environmental Protection (DEP) has received numerous comments during the public comment period on proposed "Monitoring Well Design Standards", Title 47, Series 60. The rule establishes minimum acceptable documentation and standards for the design, installation, construction, and abandonment of monitoring wells and for the abandonment of all boreholes.

To comply with federal and state public participation requirements the DEP issued on June 2, 1995 a notice announcing the beginning of a thirty day public comment period and a public hearing on the proposed rule. The notice was published in nine newspapers, representing the various geographic areas across the state. The public notice was also published in the State Register.

Nine people attended the public hearing that was held July 6, 1995 at 7:00 p.m. in the DEP training room at the DEP Nitro Office Building in Nitro, West Virginia.

In addition to the four oral comments, the DEP received eight written statements by July 7, 1995 at 4:00 p.m., the date on which the official record was closed. All public comments were reviewed in developing the final draft regulations.

The following is this agency's response to recommendations and concerns raised in oral and written comments.

GENERAL One commentor (WVDOH) spoke at the hearing and another (Baker) submitted a written comment concerning the fiscal note for the proposed rule and its impact on State government. The Division of Highways (DOH) just wanted to point out that this statement was not exactly correct. There would be some impact as the DOH averages approximately 1200 borings per year with about 120 of these are observation wells. Another commentor (Baker) stated that this legislation will increase the Department of Highway's cost of conducting subsurface investigations.
DEP agrees with verbal comments of the commentor that the fiscal note does not adequately reflect the cost to the DOH and other industries involved in drilling and abandoning geo-technical boreholes. Therefore, DEP will amend section 19 of the rule by incorporating a subsection on "Low Risk Boreholes." By incorporating this subsection to allow for these borehole in certain situations to be abandoned by complete filling from bottom to top with drill cuttings or tailings rather than

8.40

mobilizing a crew to abandon the hole with concrete, bentonite grout, bentonite slurry, etc. would substantially decrease the cost to the DOH and other similar industrial activities. The fiscal note will also be corrected to more accurately reflect the cost to State government and private industry.

One commentor (WVMA) states that the scope of the rules incorporates more than groundwater monitoring wells by inclusion of the term "boreholes," without limitation, throughout the text of the rule. They further stated that using the term "borehole" in different contexts by implication includes boreholes drilled for other purposes, such as foundations investigations, construction of footers, and geologic exploration for coal and oil and gas purposes. They further stated that the scope of the rules is limited to groundwater monitoring wells and should not be extended to include boreholes drilled for other purposes. This commentor repeated this comment in the specific comments section. This comment is addressed under subsection 1.1 in the specific comments section.

One commentor (WVMA) states the scope of the rules should further be clarified to ensure that the provisions of the rules are prospective only and do not encompass existing monitoring wells already installed. They stated that they do not believe it was the intent of this rule to require replacement or retrofitting the hundreds of groundwater monitoring wells currently in place and pointed out that the Groundwater Protection Act does not require any action with respect to existing wells unless there is evidence that the wells are contributing to groundwater contamination. They urged that clarifying language be inserted to the effect that the provisions of the rule only apply to monitoring wells installed after the effective date of the rule. This commentor repeated this comment in the specific comments section. This comment is addressed under subsection 1.1 in the specific comments section.

One commentor (WVMA) states that the term "contamination" is used in different contexts throughout the rule. Section 3.20 states a specific legal meaning whereas the use of the word "decontaminated" results in an inconsistency in relation to the definition which encompasses a change in existing groundwater quality. They questioned what extent of "contamination" must be removed so that equipment is considered "decontaminated". They further suggested the definition of the term "contamination" be revised to reflect its usage within the rule to cure any inconsistency or misunderstanding that may result from the proposed definition. DEP disagrees with the commentor in that the term is used in different contexts. The term "contamination" is defined and shall remain as proposed. The term "decontamination" has been added so as to clarify any inconsistencies this commentor may perceive. The definition of decontamination (taken from ASTM D 5299) shall read as follows: "means the process of removing undesirable physical or chemical constituents, or both, from equipment to reduce the potential for

cross contamination." However, so as not to imply that well screens and well risers must necessarily go through a decontamination process prior to installation, Subsections 7.2 and 8.1 have been revised to read: "...should be decontaminated, as needed, to be appropriate for the constituents being monitored and the protection of public health.

One commentor (WVMA) suggested the definition of "borehole" be revised. DEP answers this under the specific comment section of 3.14.

One commentor (WVMA) pointed out that there are internal inconsistencies between the definitions of particular types of groundwater monitoring wells that need to be resolved. The definitions are circularly defined and these definitions as proposed expand the scope of the activities covered by the rule. They suggested revising "driven point well", "excavated well", "groundwater observation well", "tank pit observation well" and "vapor observation well" to resolve internal circular definitions. They suggested deleting the term "well" in its entirety for it is unnecessary and broadens the scope of the rule in every instance where the rule uses the term "well" instead of "monitoring well". DEP has revised the term "monitoring well" to be consistent with the same definition found in the Title 47, Series 59, Monitoring Well Regulations. Therefore, the words, "surrounding media, including"; "water table"; "excavated wells and aquifer test wells which are"; "...for exploration of water, for dewatering, or to function as heat pump wells" have been deleted from the proposed definition. The revised definition reads as follows: ""Monitoring Well" means any cased excavation or opening into the ground made by digging, boring, drilling, driving, jetting or other methods for the purpose of determining the physical, chemical, biological or radiological properties of groundwater. The term 'monitoring well' includes piezometers and observations wells which were installed for purposes other than those listed above, but does not include wells whose primary purpose is to provide a supply of potable water."

One commentor (WVMA) states the Director of the DEP does not have the authority to restrict the authority specifically granted to other agencies (such as the Bureau of Public Health and the Department of Agriculture) to regulate groundwater under the Groundwater Protection Act. DEP answers this under the specific comments Section 4.

One commentor (WVMA) suggests incorporating by reference the industry standards established by the American Society for Testing and Materials. They urge the DEP to reconsider its proposed rule and to simplify the monitoring well design standards by specifically referencing ASTM standards in lieu of the adoption of a separate set of standards. DEP recognizes the ASTM standards as one of many useful publications valued by the monitoring well drilling industry. However, the various publications, manuals, handbooks, etc.. often used by industry

are too volumus to legislate. The American Society for Testing and Materials (ASTM) standards are continually revised and would thus require DEP to initiate rulemaking each time there was a revision in which DEP would have little or no input into the changes. These are a worldwide set of standards that do not take into account West Virginia's unique geological setting.
Another commentor (AEP) suggested that the proposed regulation be limited to requiring that monitoring well installation be in accord with selected published criteria that are appropriate to the specific task at hand. They suggest a list be published as a policy document, thereby allowing updating and amendment without need for regulatory procedure. They suggested that the following documents be specified as the core of the approved criteria descriptions:

- RCRA Ground-water Monitoring - EPA/530-R-93-001
- Subsurface Characterization and Monitoring Techniques Volume 1, EPA/625/R-93/003a
- Subsurface Characterization and Monitoring Techniques Volume 2, EPA/625/R-93/003b

DEP recognizes these documents as useful guidelines and encourages their use in meeting the minimum standards set forth in the proposed rule.

One commentor (WVMA) believes that the rule should have flexibility and adaptability included within the rule to accommodate the different guidance documents and regulatory requirements of other state and federal programs. They pointed out because many of the drilling techniques, installation procedures and construction materials are too diverse to be incorporated into one set of standards, the rule should recognize the various guidance documents such as:

-Procedures Manual for Ground-water monitoring at Solid Waste Disposal Facilities, EPA-530/sw-611
-RCRA Ground-water Monitoring, EPA-530-R-93-001
-Subsurface Characterization and Monitoring Techniques Volumes 1 and 2-EPA/625/R-93/0036.

DEP contends that the above publications do not provide flexibility or adaptability whereas this proposed rule does allow for greater flexibility as provided in section 22, Special Circumstances and Exceptions. Monitoring wells may be installed using any available guidance documents, publications, or manuals so long as the minimum standards in the rule are met.

One commentor (WVMA) urged due consideration of the coordination between the implementation of these rules and the already existing "Monitoring Well Regulations" - 47 CSR 59, to ensure ample time to allow for certification. The certification program, embodied in the Series 59 regulations, must be implemented prior to the provisions of this rule to ensure that certified monitoring well drillers are available to perform groundwater monitoring well installations services. They also pointed out that the release and use of the forms required by the proposed rules should precede the implementation of this rule so as not to cause unnecessary delay in installing groundwater

monitoring wells. DEP agrees with the commentor that ample time will need to be given to allow for the certification of monitoring well drillers, therefore, DEP will not implement the certification requirements as well as the minimum design standards until six months after the effective date of this rule. However, it will be incumbent upon any driller(s) desiring to become certified to undergo this certification process as soon as the certification program goes into effect which will be the effective date of this rule. Historically, most rules become effective on or around June 1st of that year following legislative approval and the Governor's signature authorizing the rule. DEP anticipates that the date of January 1, 1997 be the likely implementation date of this rule.

One commentor (WVMR & WVCA together) recommended, for reasons of simplicity, the entire contents of this rule read as follows: "Wells created for the express purpose of monitoring groundwater shall be constructed and maintained in a responsible, workmanlike manner. Further, when such wells are located on properties permitted for coal mining, such wells shall be designed in compliance with the standards of the federal Surface Coal Mining Reclamation Act of 1977 (with amendments)." They also questioned if this rule properly excluded boreholes that were created for purposes other than monitoring. They questioned if existing wells should be altered. They questioned if there are more economical methods of constructing wells without compromising the security or effectiveness of the wells. In summary, this commentor recommended going back to the drawing board on this rule. See subsection 1.1 below in regards to boreholes and existing wells. DEP disagrees with the commentor's suggested contents of the rule and also disagrees with their recommendation of going "back to the drawing boards with this one."

SPECIFIC SECTIONS

Subsection 1.1 - Scope and Purpose: One commentor (WVMA) stated that the scope and purpose section of the rule should be refined and clarified to ensure that only groundwater monitoring wells installed and put in service after the effective date of the rule are covered by the rule. They further state that the rule should not be construed to require groundwater monitoring wells that do not meet the design standards to be closed or upgraded unless there is evidence that a particular groundwater monitoring well is contributing to groundwater contamination. It is not the intent of this rule to require upgrades or the abandonment of wells not meeting the design standards, installed prior to the effective date of this rule, except where there is evidence that a particular monitoring well is contributing to groundwater contamination. However, the scope of this rule does encompass the abandonment requirements of ALL monitoring wells installed before and after the effective date of this rule. The same commentor suggested the scope of this rule should be clarified to exclude boreholes drilled for purposes other than groundwater

monitoring wells and offered new language to address this section.
The DEP disagrees with the commentor to exclude these boreholes and contends that one of the purposes of this rule is to prevent ALL boreholes, that are not already regulated, from acting as conduits for groundwater contamination. Therefore, subsection 1.1 has been clarified to read "1.1. Scope and Purpose. - This rule establishes minimum acceptable documentation and standards for the design, installation, construction, and abandonment of monitoring wells and for the abandonment of all boreholes."

Section 2 - Applicability: Two commentors (WVMA, AEP) suggested Section 2 be revised. One (AEP) sugessted clearly stating that these standards apply to new wells only and that existing wells do not need to be retrofitted or replaced to meet the requirements of these standards. DEP concurs with this comment, however, this rule may require existing monitoring wells to be replaced or abandoned if monitoring wells are poorly constructed. The other commentor (WVMA) suggested and provided a revision for this section which supported their position that this rule should not regulate any existing monitoring wells or boreholes. This comment included striking the words "owns, operates," from applying to any person the rule would apply to and only apply to any person who constructs, installs, or abandons monitoring wells. DEP disagrees with this suggestion and this rule will also apply to any person who either owns or operates a monitoring well. This commentor also suggested adding "groundwater" before monitoring wells. DEP disagrees with this suggestion as this is the "Monitoring Well Design Standards" rule and "groundwater" is not part of this title nor is "groundwater monitoring well" defined in this rule. This commentor also suggested that "this rule also applies to boreholes associated with the construction and installation of groundwater monitoring wells installed after the effective date of this rule." DEP disagrees with this suggestion as this rule does apply to ALL boreholes as the Scope and Purpose subsection 1.1 was clarified based on this commentors' previous suggestion and is now reflected in the rule. This commentor also suggested in their revision that the abandonment requirements in section 19 of this rule only apply to boreholes and monitoring wells installed after the effective date of this rule. DEP disagrees with this as previously mentioned. This commentor further revised this section to state that "Existing groundwater monitoring wells that do not meet the design standards as set forth in this rule are not required to be abandoned, closed, or upgraded in accordance with this rule unless there is reliable evidence that the groundwater monitoring well is contributing to groundwater contamination. This rule does not apply to constructed, installed or abandoned boreholes that were constructed or installed for purposes other than groundwater monitoring. Such other purposes include geologic exploration or extraction of coal, oil and gas or other minerals." DEP disagrees with this revision in that the agency would have to show that the monitoring well IS contributing to groundwater contamination. If the potential to contaminate

exists due to an existing monitoring well being improperly installed in the past, then a groundwater regulatory agency may certainly require that a monitoring well or borehole be abandoned if necessary due to the fact that they may provide a pathway or conduit for contaminants to cause groundwater contamination. Therefore, section 2 has been revised for clarification to read "Applicability. This rule applies to any person who either owns, operates, constructs, installs, or abandons monitoring wells and boreholes. All monitoring wells and boreholes shall be abandoned according to section 19 of this rule. This rule does not apply to monitoring wells installed prior to the effective date of this rule, except as provided for in section 19 of this rule."

Section 3 - Definitions One commentor (Baker) suggested defining "Certified Monitoring Well Driller" or referencing this definition to 47 CSR 59. DEP concurs and has added the following definition to this rule to read as subsection "3.15. "Certified Monitoring Well Driller" means an individual granted a written certificate by the director to drill, construct, alter, or abandon monitoring wells and who meets the requirements of 47 CSR 59, Monitoring Well Regulations." DEP has renumbered the remaining subsections of section 3 accordingly.

Subsection 3.5 "Appropriate groundwater regulatory agency". One commentor (Baker) asked "What is the avenue for the Director to assign primary regulatory oversight?" The Director of the DEP in concurrence with other designated agencies such as the Department of Agriculture and the Bureau of Public Health has the authority to authorize these agencies to be groundwater regulatory agencies for purposes of regulating such facilities or activities to satisfy the requirements of the Groundwater Protection Act. This authority is found in the Act itself (Chapter 22, Article 12, Section 5).
Another commentor (AEP) suggests that this definition when coupled with other (unspecified) sections of the proposed regulation places inappropriate restraints on certain activities. For example, many environmental assessments often require groundwater assessments as part of a property transfer and this may impose a long bureaucratic process if a person doing the assessment were required to contact the director for obtaining the proper groundwater regulatory agency to determine an approval for each time a property assessment were to be performed. Groundwater assessments do not normally require prior agency approval except where the assessment is required by an enforcement action in which case the appropriate groundwater regulatory agency would be directly involved with the enforcement action.

Subsection 3.6 "Aquifer test well". One commentor (WVMA) suggested that the definition be revised to mean "a monitoring well installed..." to clarify that this type of well is a monitoring well that first must meet the requisites of the monitoring well definition. DEP will add the word "monitoring"

before the word "well" in this definition for clarification purposes.

Subsection 3.9 "Bentonite". One commentor (WVMA) suggested that the proposed definition may be too restrictive and could result in technical noncompliance with the specific provision because of the manufacturer's specifications relative to the material. Normally, there is a certain percentage of the material which passes a mesh size in order to be marketable for its intended purposes. This principle is not specified in the rule and may lead to confusion. For example, some manufacturers consider 200 mesh bentonite to mean bentonite where 80 percent of the material passes the 200 mesh sieve. As written, it is unclear whether the definition requires 100 percent of the material to pass the sieve or if 80 percent would be acceptable. The commentor also mentioned following ASTM Standards (ASTM D 5092-90) for bentonite granules and suggested that the requirements are approximations. DEP and industry have written this subsection as definitions that are consistent with industry standards including ASTM D 5299-92 Decommissioning of Ground Water Wells, Vadose Zone Monitoring Devices, Boreholes, and Other Devices for Environmental Activities. There are two instances of bentonite sizing requirements in the rule. One is for the annular space seal installation, subsection 11.4, which requires bentonite chips, pellets, or granules with a diameter of 3/8 inches or less to be poured freely down the borehole or added through a tremie pipe and the other is in subsection 19.3, sealing requirements, in which case the abandonment of a borehole or monitoring well without a tremie pipe requires that bentonite chips or pellets must be smaller than 1/5 the diameter of the hole or annular space.

Subsection 3.10 "Bentonite-cement grout" One commentor (Baker) questioned who makes the determination of an "uncontaminated water source" referring to "water from an uncontaminated source" as found in the proposed definition? It is the intent of this rule that the responsible party in charge of drilling the well in this case "the certified monitoring well driller" make this determination. Since it is the intent of this rule to prevent contamination as well as provide a minimum set of construction standards in order to provide quality assurance and quality control of data derived from these wells that it is incumbent upon the certified monitoring well driller to provide a source of water free from contamination in order to prevent cross contamination or to introduce contamination to the groundwater from an undetermined source of water.

Subsection 3.11 "Bentonite-fine sand slurry" One commentor (Baker) questioned who makes the determination of an "uncontaminated water source" referring to "water from an uncontaminated source" as found in the proposed definition?
See subsection 3.10 above.

Subsection 3.12 "Bentonite granular slurry" One commentor (Baker) questioned who makes the determination of an "uncontaminated water source" referring to "water from an uncontaminated source" as found in the proposed definition? See subsection 3.10 above.

Subsection 3.13 "Bentonite high-solids grout" One commentor (Baker) questioned who makes the determination of an "uncontaminated water source" referring to "water from an uncontaminated source" as found in the proposed definition? See subsection 3.10 above.

Subsection 3.14 "Borehole" One commentor (WVMA) suggested and provided a revised definition for this term to be in agreement with their previous comments concerning the scope and purpose section and applicability section of this rule to exclude boreholes drilled specifically for purposes other than the installation of groundwater monitoring wells. See subsection 1.1 above.

Subsection 3.18 "Concrete" One commentor (Baker) questioned who makes the determination of an "uncontaminated water source" referring to "water from an uncontaminated source" as found in the proposed definition? See subsection 3.10 above.

Subsection 3.20 "Contamination" One commentor (Baker) questioned that this definition does not address who is responsible for the determination of contaminated water in excess of existing groundwater quality. This comment is beyond the scope of this rule and will not be addressed in this rule.

Subsection 3.22 "Driven point well" One commentor (WVMA) stated for purposes of the rule that this term must first meet the definition of a "monitoring well" and suggested adding "monitoring" before the word "well" in the definition. DEP disagrees because a driven point well is not necessarily a monitoring well. These types of wells are addressed in Section 20 and may be used as permanent monitoring wells if prior groundwater regulatory approval is obtained.

Subsection 3.23 "Excavated Well" One commentor (WVMA) suggested that this term be stricken from the rule because it is not a groundwater monitoring well authorized by the Groundwater Protection Act. Rather, an excavated well as set forth in this rule is a release detection device and includes "tank pit observation wells". The commentor goes on to say that that none of these devices are groundwater monitoring wells as that term should be defined. The commentor states that if the agency justifies the need to include the term within this rule, then the definition should be revised to mean "any well which is constructed..." deleting the word "monitoring" before the word "well" from the present definition to show a distinction between groundwater monitoring wells and excavated wells. DEP agrees that an excavated well is not necessarily a groundwater

monitoring well. However, excavated well as defined in this section, is a monitoring well and is subject to this rule.

Subsection 3.29 "Groundwater Observation Well" One commentor (APS) stated this definition was too specific. The commentor stated that ASTM 5092 used the term observation well as a well used to measure changes in hydraulic head. It is unclear as to why the proposed rule only identifies backfill and unconsolidated material because this term is applicable in all types of material and bedrock. The commentor suggested deleting the phrase "in the backfill or unconsolidated material" from the definition.
DEP agrees and has deleted "in the backfill or unconsolidated material" and replaced the word "excavated" with "monitoring" so that this type of observation well is a monitoring well and not exclusively an excavated well.

Subsection 3.30 "Groundwater Regulatory Agency" One commentor (Baker) suggested the Director publish a list of those agencies or political subdivisions that have received approval to regulate facilities/activities for groundwater protection. Chapter 22, Article 12, Groundwater Protection Act clearly states which agencies/political subdivisions have authority to regulate groundwater relevant to those facilities/activities that they oversee. Furthermore, all groundwater regulatory agencies have been given interim groundwater certification by the Director confirming that these agencies and agency programs are protective of groundwater. These agency programs have been given this interim certification based upon their regulations. DEP contends that since these agencies are clearly designated by statute and regulation that a listing is redundant and unnecessary.

Subsection 3.34 "Monitoring well" One commentor (WVMA) suggested this definition be revised to include only those wells which are installed for the purpose of monitoring groundwater. The commentor suggests further that the definition be amended to exclude those activities not dealing with groundwater monitoring. The commentor points out that the proposed definition "expands the universe of wells beyond those installed and constructed for monitoring groundwater. Moreover, the definition set forth in these proposed rules differs from that authorized in the groundwater certification rules." (DEP is assuming the commentor is referring to Title 47, Series 59, "Monitoring Well Regulations" which is a legislative rule establishing the certification of monitoring well drillers and monitoring well installations and alterations which was effective June 1, 1994). DEP concurs with part of this comment and will revise the definition of "monitoring well" in this proposed rule to coincide with the definition of "monitoring well" found in the current "Monitoring Well Regulations", Title 47, Series 59. Another commentor (Baker) had three comments concerning this definition. One stated by the proposed wording of this definition, it included geotechnical borings that use wireline, hollow stem or flush joint casing in the drilling process. This commentor also suggested that the term be modified to clearly exclude

geotechnical borings. DEP contends that casing used for borehole integrity during the advancement of the drill bit is a drilling method and not a completed well.
The second comment addressed by the proposed wording of this definition states that geotechnical borings often contain a tremie pipe where borehole collapse or caving is of a concern, that the definition clearly exclude geotechnical borings utilizing a tremie pipe to maintain an open borehole until it is properly abandoned. See previous response.
The third comment addressed by the proposed wording of this definition states that it would include "vibrating-wire piezometers which are electrical sensing devices which are commonly buried beneath a proposed embankment to monitor pore-water pressures during consolidation settlement." They point out that "the construction of these devices is very different from the typical piezometer. However, the proposed legislation requires them to adhere to the monitoring well and permanent monitoring well requirements." They suggest "a review of these requirements and appropriate modifications to address the differences in construction." If the commentor is referring to a buried wire, this application would not be covered by this rule. If a cased well is installed to allow for the lowering of an electronic or other measuring device, this would constitute a monitoring well. The regulated community should be able to determine which sections of this rule apply. For instance, if a borehole is drilled to obtain geologic or groundwater related data, then this would not be a monitoring well, but the borehole requirements would apply to this activity.

Subsection 3.37 "Neat cement grout" One commentor (Baker) suggests that "uncontaminated source" of water be defined. They further stated that this subsection as well as others implies that water may be drawn from virtually any source. See subsection 3.10 above.

Subsection 3.42 "Piezometer" One commentor (WVMA) stated under "Section 3.4 Piezometer" (DEP assumes they mean section 3.42) that the definition of "piezometer" is overly broad. They state that a piezometer is designed and installed for measuring water levels only and not for determining groundwater properties. They suggest revising the definition to strike the words "or physical, chemical, biological, or radiological properties of groundwater, or both". DEP contends that in some instances, a piezometer can be used to monitor parameters other than the potentiometric surface.

Subsection 3.61 "Water table observation well" One commentor (WVMA) suggested that the definition is overly broad as to make it coextensive with the definition for monitoring wells and also provided a revised version of the definition basically to mean that this type of well is installed for the purpose of determining the elevation of water. However, the resultant definition would then be synonymous with the term "piezometer" and then why is this term even necessary? A "water table

monitoring well" is a type of monitoring well and thus, is coextensive with the definition of a "monitoring well" to some extent. However, the definition for a "monitoring well" does not include "...intersects a water table."

Subsection 3.62 "Well" One commentor (Baker) suggested the the term "well" included the following: all geotechnical borings; testpits; soil perk-test holes; agronomic auger holes; test holes drilled (typically excavated with a jack-hammer in the base of caissons to conform integrity of bearing medium such as rock. They further suggest that the definition be modified to exclude these and other similar items. DEP agrees that these types of borings are "wells" as defined, however, these borings are not "monitoring wells" but "boreholes" subject to sections 5 and 19 of this rule.
Another commentor (WVMA) suggested as an alternative to deleting the term "well" in its entirety as suggested in the general comments, a revised definition striking the words "other excavation or" and "the surrounding media, including" from the proposed definition. This commentor feels that clarification is necessary so that wells covered by the rule are monitoring wells as that term is defined. This commentor stated that by retaining the definition of "well", it would necessitate the insertion of "monitoring" before "well" throughout the rule where the intent is to regulate "monitoring wells" and not "wells". DEP will keep the definition of "well" which for the purpose of this rule implies "monitoring well" or "borehole" as they are defined. Any occurrence of the word "well" in this rule refers to a well which is subject to this rule in whole or in parts that are applicable (i.e. section 19).

Subsection 3.64 "Well volume" One commentor (WVMA) suggested that this definition should not include the water in the filter pack and further stated that the "filter pack is similar to the actual soil formation and should contain water that is representative, i.e. stagnant water will not be found in the filter pack." DEP contends that this comment is incorrect. The volume of water in a filter pack shall be accounted for as it is part of the well volume formula found in section 17 of this rule.

Section 4 - Conflicting Provisions - One commentor (WVMA) had the following statements concerning this section: "This section ascribes broad authority to the Director to make a determination on the applicable rule in the event there is a conflict between the proposed rule and an existing rule. This authority is beyond that granted to the Director by statute, especially where there is a conflict with a rule promulgated by the Bureau of Public Health or the Department of Agriculture. The WVMA suggests that the language in this section needs to be tempered to comport with the authority of the Director as contemplated by statute; that is, the Director does not have the authority to pick and chose whatever standard he or she determines because there exists a regulatory conflict. Instead, the rules of statutory construction are applicable to conflicts in regulations just as

those rules are applicable to conflicts in statutes. In determining conflict resolution, the rules of statutory construction should be consulted." DEP disagrees with the commentors assertion that the Director hasn't the authority through statute to resolve conflicts in regulations. Mechanisms are in place within the statute that can be used to resolve these conflicts. One is through the Groundwater Coordinating Committee, another is through the certification powers given by statute in Chapter 22, Article 12, Section 8, to the Director. This authority is granted by statute by the statement that DEP is the head groundwater protection agency except for the Department of Agriculture's (DOA) level of authority over the use and application of pesticides and fertilizers. This rule does not apply to those water wells and heat pump wells regulated by the Bureau of Public Health. The DOA has no such regulations. Therefore, DEP does not intend to change the wording or meaning of the "conflicting provisions" section.

Another commentor (Baker) questioned at what point or within what time frame is the Director to take action to resolve specific regulatory conflicts. DEP responds that there are no provisions either within statute or regulation that prescribes a time limit for the Director to resolve conflicts in regulations. Therefore, it is DEP's assertion that conflicts will be resolved at such times as the Director, in communication with the Groundwater Coordinating Committee, determines there is a need to undertake such action. Such conflicts would have to be resolved through legislative action which implies time frames set by legislative agendas.

Section 6 - Well Location and Reporting Requirements - One commentor (Baker) questioned whether this section applies to temporary as well as permanent wells and if boreholes require location/reporting. This section applies to both temporary and permanent monitoring wells but does not apply to boreholes installed for purposes other than monitoring wells".

Another commentor (WVMA) suggested that the word "Monitoring" be added to the section heading to clarify its contents. DEP concurs and has made this change.

Subsection 6.1 One commentor (Baker) suggested this section be clarified as to the meaning of "prior groundwater regulatory agency approval" and "approved plans and specifications." A groundwater regulatory agency within or outside DEP may require that monitoring wells be installed through enforcement actions, permitting requirements, site assessment activities, or corrective action plans.
Another commentor (WVMA) stated the provisions of this section are awkward and confusing as written. After suggesting the deletion of this section in its entirety, they offered the following language in lieu thereof: "Where the installation of monitoring wells was required by a groundwater regulatory agency, approval for the location of such wells must be obtained before

the wells are constructed. Approval of plans or specifications setting forth the proposed locations for groundwater monitoring wells shall deemed to be approval of such locations." They further stated this "revised language simply clarifies the intent of the provision in a more coherent manner. DEP disagrees with the commentor to delete this entire section and their suggested language. Their suggested language changes the intent of this subsection from "Where prior groundwater regulatory approval is required" to "Where the installation of monitoring wells was required". The intent of this subsection is to install the monitoring wells where the approved plans indicate and not simply whereever they want to when they get on site. This also leaves the requirement of approving monitoring well locations prior to installation up to each individual groundwater regulatory agency. Therefore, this subsection remains unchanged.

A third commentor (AEP) stated this requirement is inappropriate and could exceed the Director's authority in that this creates an enforceable provision that a person must comply with another set of regulations. Such a requirement could lead to a person being held to be in noncompliance with two separate and distinct regulations for the same act. A violation of a regulatory requirement that is already part of a separate stand-alone rule provides sufficient opportunity for the Division to seek redress without the need to double the Director's enforcement power by making the violation of one set of rules an automatic violation of a second set. This commentor suggested deleting this section. DEP is unclear as to the meaning of this comment; however in an attempt to address the meaning of this statement DEP offers the following: If it is the commentor's contention that a person could be held responsible for violation of two separate regulations, DEP must point out the double jeopardy provisions within the Groundwater Protection Act, Chapter 22, Article 12, Section 10, whereby a person held accountable under one statute cannot be held accountable for the same violation under this statute. Therefore DEP will not delete this section.

Subsection 6.2 Two commentors (AEP & APS) suggested that the requirement to report the requested information by the 15th of the month immediately following well installation is too restrictive if the well were installed late in the preceding month. Both of these commentors suggested rewording the required information to be submitted within 60 days following well installation. DEP concurs with the commentor and will adopt the following language "Following installation of a monitoring well, each certified monitoring well driller shall report to the director, on forms provided by the director, the following information within sixty (60) days after completion of the well installation".

One commentor (AEP) questioned whether the location and reporting requirements applied to temporary wells and suggested adding the word "permanent" before the word "wells" in this section. DEP for the sake of clarification states that the definition of wells in section 3 of the regulation encompasses both permanent and

temporary wells". Therefore, it is not necessary to add the word "permanent" to this section.

One commentor (Baker) questioned whether all boreholes drilled had to be completed by a certified monitoring well driller and do temporary wells need to be reported like permanent wells. DEP is unclear as to the commentor's meaning of the word "completed", however if the commentor is questioning as to whether a borehole drilled for the purposes of installing a monitor well needs to be completed by a certified monitoring well driller the answer is "Yes".

Another commentor (WVMA) suggested clarifying that the reports are due on the 15th of the month following the "calendar" month in which the wells were installed. See the adopted language above.

Paragraph 6.2.1 One commentor (WVMA) suggested replacing "person" with "entity" so that monitoring well drillers will not incorrectly identify the specific employee rather than the name of the company for which the work the work is being performed, where work is for someone other than an individual. DEP disagrees that the word "entity" needs to be exchanged for the word "person". Person is clearly defined by statute and this regulation and will be further clarified during the training provided for the certification of monitoring well drillers. Therefore, DEP will not change the wording in this section.

Paragraph 6.2.3 One commentor (WVMA) states that identifying the monitoring well by latitude and longitude coordinates in degrees to the nearest second, is too precise, not necessary and not a common industry practice. Instead, this commentor suggests that monitoring wells should be identified on a U.S. Geological Survey topographical map or a sketch map.

DEP disagrees with this commentor's contention that latitude and longitude coordinates to the nearest second are to precise. In fact in this age of advanced technology the collection of such locational data is easily achieved. It is also a fact that it is a federal requirement from EPA that locational data to these precise coordinates is required as a Minimum Set Of Data Elements that are necessary to issue permits or other regulatory requirements. Also, for tracking purposes using a Geographic Information System (GIS) to accomplish these tasks, coordinates to this precision can be achieved through the use of Global Position Systems (GPS) and surveying.

Another commentor (AEP) recommended that well coordinates be surveyed and referenced to the North American Datum of 1983 and elevation be referenced to the National Geodetic Vertical Datum of 1988. DEP will not specify which datum to use, however, the datum used will have to be noted on the reporting forms provided by the Director. Elevation is not required to be reported by this regulation.

Subsection 6.3 One commentor (WVMA) states that it is not clear whether the scheme proposed in this section can be implemented at locations with complicated monitoring well networks. Further

investigation concerning alternatives should be pursued to ensure that the numbering system proposed may be altered to the extent necessary. DEP contends for the purpose of this regulation that DEP is interested in the name, certification number of the driller, and number of wells drilled in a particular year, and does not envision there being a problem with adhering to this well numbering identification system. Therefore DEP proposes no change to this section. Other numbering scheme used for any purpose other than that intended by this regulation is up to the discretion of the individual authorizing the installation of the well and is not to be considered a part of this regulation.
Two commentors (Baker & AEP) suggested that the State assign the registration number to each monitoring well instead of the monitoring well driller. DEP disagrees since the monitoring well driller's certification number will be one component of the monitoring well registration number.

Subsection 6.4 One commentor (Baker) stated the format and/or standard for numbering should be determined/prescribed at the state level. DEP contends that subsection 6.3 of this regulation addresses this comment by prescribing the format to be used for the numbering of monitoring wells.

Subsection 7.1 One commentor (WVMA) states that requiring well risers to be both water tight and with a vented cap is inconsistent. They suggest that the section should read that the well risers are water tight at ground level, but with a vented cap. They also suggested the term "groundwater monitoring" be inserted before "wells". They further suggested defining the terms "floodplain" and "floodway" as the area identified as the 100 year floodplain as determined by the federal government.
DEP suggests that for the purposes of addressing this comment that the commentor (WVMA) see the response to the next comment.
Another commentor (Marshall Miller) suggested at the hearing that the word "vented" be deleted from the proposed rule. DEP agrees with this commentor and will adopt the following language "The well riser for wells constructed in a floodplain or floodway shall terminate a minimum of 2 feet above ground level and be provided with a water tight cap, unless it can be demonstrated that inundation will not occur, except as provided for under subsection 11.6 of this rule". However, DEP disagrees with (WVMA) that floodplain and floodway be further defined as the area identified as the 100 year floodplain as determined by the federal government. It is the intent of this regulation that any well constructed in any floodplain or floodway be protected from inundation so that the integrity of the monitoring well is not compromised in any possible flooding situation.

Another commentor (AEP) pointed out the contradiction of a "water tight vented cap". They suggested that if the intention is to require a pressure vented cap that allows built up interior gases to vent without permitting the introduction of outside fluids to the well, this should be specified. See comment above.

Monitoring well caps in floodplains may be vented to allow interior gases to escape, however, they must also be water tight.

Subsection 7.2 One commentor (AEP) suggests removing the last sentence since it is a comment on normal practices and adds nothing to the specification. DEP agrees with the commentor that the last sentence is a comment on normal practices but DEP disagrees that it adds nothing to the specifications. It is a reminder that in most cases a minimum of 2 inches is needed for the experienced well driller and in the case of an inexperienced well driller it is a learning tool. Therefore, DEP will not delete the last sentence.

Subsection 7.3 One commentor (WVMA) suggested that this section be revised to clearly state that glues should not be used for coupling the riser joints even if the well is not to be used for organics because the glue has the potential of contaminating the water samples. DEP disagrees with adding the word "glue" to this subsection, because the term coupling method precludes the use of any material for which organic compounds may be introduced into the well, or on the other hand, in situations where organic compounds are not a concern, glue may be an industry accepted method.

Subsection 7.4 One commentor (Baker) questioned who will do the inspecting. DEP states that it is the responsibility of the certified monitoring well driller to inspect the well riser.

Subsection 7.5 One commentor (Baker) questioned why do the risers have to be centered in the borehole and the rational for this requirement. DEP is requiring the centering of well risers in the borehole to eliminate shoddy installation practices and to further insure the integrity of the well. This also allows for the filter pack material to fill the annular space evenly around the screen and the annular space sealant material to fill the annular space evenly around the riser.

Subsection 8.1 One commentor (WVMA) states that this regulation does not indicate where, when, or how the decontamination should be undertaken. This commentor believes the proper term is "uncontaminated" so that the sentence should read "Each section of well screen should be uncontaminated prior to installation. This commentor suggests "...appropriate to the constituents being monitored for and the protection of public health." be stricken from the sentence. DEP agrees with the commentor and will adopt the following language "Each section of well screen should be uncontaminated prior to installation". DEP also agrees that since the first sentence in this subsection requires "well screen materials that will not alter the quality of water samples" that the phrase "appropriate to the constituents being monitored for and the protection of public health" is unnecessary for the intent of this subsection. DEP will also make a similar change in subsection 7.2 for consistency throughout the rule.

Subsection 8.2 One commentor (Baker) suggested regulatory justification for this requirement should be required. DEP contends that this responsiveness summary is the proper justification format for proposed regulations.

Another commentor (APS) pointed out various scenarios in which the maximum well screen length requirement may be too restrictive. The commentor believes that these screen length limits should be eliminated from this condition and replaced with: "Well screen intervals should be of appropriate length to adequately monitor the water bearing strata of interest." DEP agrees with the commentor that the screen length requirement may be too restrictive and will adopt the following language with some modification: "Well screen interval lengths should be chosen to adequately monitor the water bearing zone of interest and to comply with section 13 of this rule".

Another commentor (AEP) stated that they were unaware of any scientific or engineering basis for requiring well screens to be sized to retain at least 90 % of the collapsed (natural pack) formation and they recommended eliminating this requirement. DEP agrees with commentor, however, DEP has agreed as a result of an earlier comment to eliminate the requirement for sieve analysis for filter pack material, this exclusions also applies to collapsed formations, therefore, DEP has opted to required a number 10 screen slot size, as a minimum, that would be used to preclude the need for a sieve analysis to meet the 90% retention of the filter pack material required in this subsection. Therefore DEP will adopt the following language for subsection 8.2: "All monitoring well screens shall be constructed of material which is nonreactive with the constituents in soils and groundwater at the monitoring location. The well screen slot size shall be sized to retain at least 90% of the grain size of the collapsed formation where such is used as filter pack material or at least 90% of the grain size of the filter pack, if material other than collapsed formation is used. In lieu of a sieve analysis or where other well design considerations require a different slot size, a number 10 slot screen size may be used, as a maximum, to retain at least 90% of the filter pack material."

This same commentor pointed out that the proposed rule requires that well screens not exceed five feet in length on piezometers. DEP disagrees with the commentor that there is no scientific or engineering basis for this requirement. DEP offers that portions of the revised language has come from excerpts from ASTM D 5092 -90, and the Groundwater Monitoring Well Drillers Advisory Board which is made up of industry experts.

They suggested that this requirement be revised to allow more flexibility for wells installed in fine-grained silts and clays having moderate to low permeability or in situations involving multiple perched water tables where there is a need to distinguish between each perched water table. DEP disagrees with the commentor's assertion that no flexibility is written into this subsection. DEP contends that the requirement of 5 feet in length applies,"except where potentiometric surfaces may fluctuate over greater intervals."

Another commentor (WVMA) stated that the proposed length of 20 feet of well screen as a maximum is generally a good idea as long as the water level fluctuation is less than 20 feet. They further stated that in a carbonate rock environment, this fluctuation may be greater than 20 feet. They provided a revision to read: "well screens on water table observation wells should not usually exceed 20 feet in length." They further commented that the screen lengths for piezometers should be determined by the specific application at the groundwater monitoring well site and the rule should set forth a guideline or recommendation and not mandate this standard. DEP agrees with commentor. See above revisions to this subsection.

Subsection 8.4 One commentor (WVMA) mentioned that the proposed rule failed to discuss the use of well screen centralizers. DEP concurs and will revise subsection 8.4 to read: "Well screens shall be centered in the borehole, using centralizers if necessary, except in the case of nested monitoring wells." Similar language concerning the centering of well risers has been added to subsection 7.5 for consistency throughout the rule.

Subsection 9.1 One commentor (WVMA) stated this section is unduly restrictive and does not make provisions for the use of newly developed or substitute materials of equal effectiveness. They suggested following the words "sealant materials shall be" by inserting the words "constructed of" and following the last word "materials" by inserting "or any other material." DEP agrees that other materials may come along in the future that would be appropriate for monitoring well construction. DEP has anticipated such an event by allowing for alternate well construction materials to be used with prior approval of the proper regulatory agency under section 22 of this rule. DEP will also set as policy any technological updates in monitoring well construction activities by making these revisions available to the certified monitoring well drillers through annual upgrades to their certification.

Subsection 9.2 One commentor (AEP) stated this section implies there are other regulations or policies in place which address sealant placement methods using a tremie pipe. If this is the case, the commentor pointed out, then there is no need to reproduce these criteria and subject the driller to a double enforcement situation. DEP agrees that there are other regulations or policies which address sealant placement methods using a tremie pipe, however, DEP contends that this rule sets a minimum set of criteria that will be used for monitoring well construction. If more stringent standards are imposed by another rule or groundwater regulatory agency for the construction of monitoring wells then that rule will prevail. If less stringent standards are required for the construction of a monitoring well, section 22 of this rule allows the proper groundwater regulatory agency to authorize these less stringent standards. In any case the reporting requirements and all other requirements as proposed

by this rule must be met by the certified monitoring well driller.

Paragraph 9.2.5 One commentor (WVMA) stated that the annular space between the borehole and riser is typically too small to accommodate the use of a J-hook or side discharge device. The commentor suggests that since reducing or regulating the injection pressure of the sealing material will not compromise the integrity of the filter pack, seal and riser, that the rule should be revised to allow such reduction or regulation as an alternative. DEP agrees that sealant material could be placed by other methods than that required by this regulation. The purpose of this requirement is to comply with subsection 9.2.1 of this rule, therefore, allowing for the placement of materials other than by a J-hook end or a closed end with side discharge device. DEP will adopt the following language with the understanding that if subsection 9.2.1 of this rule is violated then section 23 of this rule shall apply. The adopted language shall read: "Tremie pipes used for the placing of pumped slurry or grout should be fitted with a J-hook end or a closed end with side discharge." DEP feels with the adoption of this language it will give the commentor the flexibility they were seeking to allow for other means of sealant placement.

Subsection 10.2 One commentor (WVMA) stated that the language: "thin, flat or elongated pieces of gravel, the maximum dimension of which exceeds three times the minimum dimension, may not constitute more than 2% of the material by weight." may be too restrictive. They further suggested a general industry standard should be identified or an appropriately identified commercial material, and to use a range that is generally accepted throughout the industry. They further stated that there should be some built in flexibility to design filter packs on a site specific basis. DEP agrees with the commentor that a general industry standard should be identified, therefore, DEP will replace "Thin, flat or elongated pieces of gravel, the maximum dimension of which exceeds 3 times the minimum dimension, may not constitute more than 2% of the material by weight" and adopt language which is consistent with the following industry standards: ASTM D5092-90 and the National Drilling Contractors Association Drillers Handbook. "Uniformity coefficients for filter pack material shall range from 1 to 3. All filter pack material should be purchased from a reputable supplier who has properly cleaned and bagged the material."
Another commentor (MM) suggested an allowance should be made for the use of a fine sand filter pack in bedrock formations that are heavily fractured or karstic. DEP agrees with the commentor and has added the following language to the sentence: "In bedrock, the filter pack shall be a medium or coarse sand or gravel, except in karst or highly fractured bedrock formations where fine sand filter packs may be used." DEP has also added the following note concerning the use of fine grain filter packs in karst or highly fractured bedrock formations to the end of this subsection:

"Note - When installing a monitoring well in karst or highly fractured bedrock, a pre-packed or double sleeved screen may be necessary to hold the filter pack material in place."

Another commentor (AEP) suggests that this section be revised to eliminate the requirement that filter packs for wells installed in unconsolidated formations be sized to retain at least 50% of the surrounding formation. They further stated that they knew of no scientific or engineering basis for such a requirement and that it is generally more important to design the filter pack based on the formation's uniformity coefficient. They further stated that sieve analyses for both the filter pack media and the in-situ formation soils would have to be completed prior to well installation to ensure that the standards were met, thus, significantly increasing the cost of monitoring well installation and longer project completion times. DEP has deleted the sentence: "The filter pack for wells installed in unconsolidated material shall be sized to retain at least 50% of the surrounding formation." from this subsection. DEP has amended the next sentence to read: "In lieu of a sieve analysis, for unconsolidated material which is predominantly silt and clay, the filter pack shall be a fine sand."

Subsection 10.3 One commentor (AEP) recommended revising the first sentence to allow more flexibility to account for the wide variety of well installations. They further recommended that all specific requirements related to the length of well screen be deleted from this section. They further suggested that the use of pre-packed screens should be allowed as an alternative to field constructed filter packs. DEP contends that the first sentence states "...shall generally extend..." is flexible to account for a variety of well installations. DEP is not sure what the commentor is questioning concerning well screen lengths in this specific subsection as well screen lengths are not mentioned in this subsection. DEP agrees that pre-packed screens may be used and has added this to the end of the subsection to read: "Pre-packed screens may be used if necessary."

Subsection 10.4 One commentor (AEP) stated that this section requires that the grain size distribution of the collapsed formation be such that at least 90% of the formation be retained by the well screen. They further stated that to ensure good hydraulic connection with the aquifer in collapsed formations, sound engineering judgement would allow 40 to 60% to pass the screen slot size for natural pack wells. They recommended deleting the last sentence of this section. See subsection 8.2 above. DEP has not made any changes.

Paragraph 11.4.3 One commentor (Baker) said to define "protective cap". The intent of a protective cap is to protect anything from entering the monitoring well during sealing procedures. A protective cap on the well riser may also be necessary during the installation of the annular space seal, the filter pack, the filter pack seal and the ground surface seal to prevent any of

these materials from entering the monitoring well. Another subsection (7.6) has been added to address this preventative measure. DEP does not feel it is necessary to define "protective cap".

Paragraph 11.6.1 One commentor (AEP) stated this section contains an ambiguous reference to a minimum annular space seal length requirement. They further stated that they were unable to find such a requirement at any point in the regulation. If the intention is to require a minimum 2 foot annular space seal, then it should be clearly stated. DEP agrees and has added language to subsection 11.3 to read: "For permanent monitoring wells constructed with filter packs, the annular space seal shall extend from the filter pack seal to the ground surface seal and should be at least 2 feet in length."

Another commentor (APS) believes the minimum depth of the ground surface seal can be reduced to 6 inches below the frost line which extends to a depth of 18-20 inches in this part of the country. DEP disagrees with the commentor and the minimum depth shall remain at 2.5 feet to ensure a adequate ground surface seal regardless of the frost line depth.

Paragraph 11.6.2 One commentor (AEP) stated there appears to be an apparent error in the last sentence. They further stated that it would appear, based on other design criteria in the proposed regulations, that "annular space seal" should actually be "filter pack seal" in the last sentence. The intent of this sentence is to prevent a protective cover pipe from being shoved through the sealant material into the filter pack. Therefore, "through the annular space seal or" has been deleted and now reads: "...protective cover shall be reduced and may not extend into the filter pack."

Paragraph 11.7.2 One commentor (WVMA) suggested that while it may not be prudent to install flush mounted protective covers in areas subject to ponding or flooding, in traffic areas it may be a necessity and should be specifically allowed under the rule. DEP does not want flush mounted protective covers installed in areas subject to ponding and flooding and that was the intent of the first sentence. However, section 22 may allow for this if necessary. The word "should" has been replaced by the word "shall" to clearly prohibit the installation of flush mounted protective covers in areas subject to ponding or flooding.

Section 12 One commentor (Baker) suggested local surface waters should be allowed if no obvious contamination is present (visual/odor) for boreholes where samples are not to be collected. This section does not prohibit the use of uncontaminated local surface waters.

Another commentor (APS) requested clarification on the term "coalescing air filter". DEP agrees that clarification is needed and has changed the wording to read: "If air is used as a

drilling fluid, the air shall be filtered by an oil-air filter or oil trap to reduce or remove the oil content discharged from the compressor."

Subsection 14.1 One commentor (WVMA) suggested this section be revised to allow for authorization and approval to return drill cuttings to the borehole. Mandating alternative means of disposal is unnecessary, causes additional expense and creates no environmental benefit. DEP disagrees with the commentor in that if this material is a hazardous waste, then it must be handled as such and therefore, containerized and disposed of properly, not simply returned to the borehole. Drill cuttings are not allowed to be returned to boreholes in a suspected contamination area. Any variation from this section must be in accordance with section 22 of this rule.

Subsection 14.2 One commentor (WVMA) suggested inserting the words "contamination or" after "as needed to prevent" in this section. DEP concurs and has revised this section to read: "14.2. All borehole and monitoring well construction and development equipment shall be decontaminated as needed to prevent contamination or cross-contamination of boreholes or monitoring wells."

Section 15 One commentor (AEP) suggests this section be revised to allow more flexibility in regard to the size of the borehole when installing piezometers. They further stated piezometers installed in certain low permeable media utilize the smallest possible filter pack to reduce the dampening effect produced by the filter pack when conducting slug tests or when monitoring for routine piezometric levels. They stated that using smaller diameter boreholes improves the quality of the data obtained and should be encouraged rather than prohibited. DEP disagrees the purpose of this requirement is to ensure adequate filter packs and seals. Any deviation from this requirement must be addressed under section 22 of this rule.

15.1.3 One commentor (AEP) suggested amending the last sentence to read "The temporary outer casing shall be pulled immediately before, or as, the annular space is sealed." This commentor states that in some situations it may be more practical to seal the annular space after the temporary casing has been removed, especially if the local soil conditions are such that the borehole will not collapse. DEP concurs and has revised this sentence to read: "The temporary outer casing shall be pulled immediately before, or as, the annular space is sealed, depending on site specific geology."

Section 16 Two commentors (AEP & WVMA) have questioned why this section limits monitoring using recovery wells only with approval of the regulatory agency. One commentor mentioned that the proper collection of groundwater samples from, and/or the gauging of, a recovery well does not pose a threat to groundwater resources and also suggested deleting the requirement as it is

overly restrictive. The other commentor suggested a revision to allow for the sampling from recovery wells as there is no environmental consequence from sampling recovery wells and the data from recovery wells can be quite useful. It is not the intent to prohibit recovery wells from providing groundwater data. However, DEP will not necessarily accept water quality data from some recovery wells as they may not meet the design standards of a monitoring well or they may produce false positive analytical results. DEP has deleted the first sentence from this section. DEP has added the following to this section: "Groundwater quality data from recovery wells may not be acceptable as some recovery wells may not meet the minimum design standards required for monitoring wells."

Subsection 17.1 One commentor (AEP) points out that 17.1 and 17.1.1 could conflict with one another because 17.1.1 states that a minimum of 30 minutes is required if this method is used for well development while 17.1 states that all permanent monitor wells that cannot be purged dry shall be developed until 10 well volumes of water are removed or until the well produces sediment free water. The conflict could arise if sediment free water is encountered in 10 minutes utilizing the Surge and Purge Method. The proposed rule would require that an additional 20 minutes of development be completed. This commentor noted that there are specific types of monitoring wells for which the specific development methods are inappropriate (for instance Geomon wells and bundled multi-level monitoring wells). They further suggested revising the last sentence in 17.1 (preceding 17.1.1.) to read: "Unless the type of monitoring well or location conditions call for other methods, the following well development methods should be employed." DEP partially agrees with the commentor that there is a conflict between subsection 17.1 and paragraph 17.1.1. Therefore, the first sentence of paragraph 17.1.1 has been deleted. DEP disagrees with the second portion of their comment and has made no changes. However, section 22 remains available for special circumstances and exceptions if necessary.

Another commentor (WVMA) had a concern that this section is intended towards well purging prior to sampling and 10 well volumes is not correct. They further stated that normal purge procedures use 3 well volumes, with slow recovery wells being pumped dry and allowed to recover once. They suggested changing this section accordingly. DEP does not intend for this section to apply to well purging but only for well development. DEP is certainly not going to require removing 10 well volumes for purging prior to all sampling.

Another commentor (APS) states that the purging of 10 well volumes constituting development is too arbitrary. They point out that 10 well volumes does not ensure proper or adequate development of a well. This commentor recommends that this provision be reworded to state: "Removal of well bore volumes should continue until representative water is obtained.

Representative water is assumed to be obtained when pH, temperature, and specific gravity measurements are repetitively constant and stabilized, and the water is visually clear of suspended solids." DEP disagrees with the commentor that pH, temperature, and specific gravity need to be measured during the development of a well. These parameters may be monitored during the purging of a well prior to sampling but not as a well development requirement. The purpose of well development is to clean any fine sediments from the well for the purpose of producing sediment free water. Industry experts serving on the monitoring well advisory board agreed that 10 well volumes should produce sediment free water but if it did not, this may indicate a problem with the design and/or installation of the monitoring well. These experts also pointed out that in rare instances, sediment free water may be difficult to achieve under certain geologic conditions. DEP has added "...a minimum of ..." so the first sentence now reads: "All permanent monitoring wells that cannot be purged dry shall be developed until a minimum of 10 well volumes of water are removed or until the well produces sediment free water."

Paragraph 17.1.4 One commentor (Baker) questioned what parameters needed to be tested for to meet this requirement conerning "...known chemistry." DEP has changed "...from a source of known chemistry." to: "...from an uncontaminated source." for consistency with other sections in this rule.

Another commentor (AEP) asserts that the sentence "Water added during this development procedure will alter the natural, ambient water quality and may be difficult to remove." is inappropriate in a regulatory scheme since it is simply a comment and adds nothing to the specifications and should be removed from the rule. The above sentence sets the foundation for the requirement that follows. DEP has not removed this sentence.

Subsection 17.2 Two commentors (WVMA & AEP) state that it is unnecessary to use deionized Type II reagent-grade water for well development in wells that can be purged dry. One suggested it be revised to permit the use of water of quality at least equal to the natural ambient quality while the other commentor (WVMA) suggested the use of potable water from a public water supply would be more than adequate. DEP has replaced "...deionized, Type II reagent-grade water,..." with "...from an uncontaminated source,..." Another comment (AEP) pointed out was that if the formation is yielding very little water to begin with, and depending upon where the standing water level is, screen length, etc., a certain amount of loss of the well development water would be expected. Therefore, they suggested adding the word "approximately" before "...equal volume of water shall be purged upon the completion of development." DEP disagrees and contends that more than an equal volume should be removed to compensate for the mixing of development water with formation water. No change has been made regarding the volume of water purged upon completion of development.

Section 18 One commentor (Baker) asked if this section only applied to permanent wells rather than boreholes for construction documentation and reporting requirements. Boreholes are not subject to construction documentation requirements of section 18. However, boreholes are subject to the abandonment requirements of section 19 of this rule.
Another commentor (WVMA) suggested revising this section heading to read: "Monitoring Well Construction Documentation". DEP concurs and has revised the rule to reflect this.

Subsection 18.1 One commentor (WVMA) suggested this section be amended by deleting the sentence "These forms are not transferable without notification to the proper groundwater regulatory agency." and inserting in lieu thereof, an affirmative statement to read: "These forms are transferable with notification to the proper groundwater regulatory agency."
DEP concurs and has amended the sentence as suggested.
Another commentor (AEP) suggested that 60 days may not be an adequate amount of time to report construction details for major site investigations. They suggested the submission of this data on a project by project basis rather than a piecemeal approach as the proposed rule stands now. They suggested a 60 day submittal deadline after the completion of the well installations and surveying phases of any given site investigation project.
They also suggested reducing the time frame in which the monitoring well documentation form had to be retained by the person the well was installed for from 5 years to 2 years.
DEP disagrees with the commentor and believes 60 days is an adequate amount of time. There may be many phases to a total project and the person for whom the wells were installed for cannot be expected to wait until the end of a project for the monitoring well construction details. Many major site investigations have gone on for years. DEP also disagrees with the commentor concerning the time frame in which this monitoring well construction data must be retained. Therefore, no changes have been made to this subsection.
Another commentor (Terradon) suggested that since section 18.1.18 allows the agency to request additional information other than what is elaborated in these regulations, then the last sentence should reflect that this is the minimum information which needs to be recorded. See subsection 18.1.18 below.

Paragraph 18.1.9 Sieve analysis. Three commentors (WVMA, MM, & Terradon) suggested deleting this requirement from the rule. DEP concurs and has revised the rule to reflect this.

Paragraph 18.1.12 Elevation of bottom of screen. Two commentors (Terradon and MM) questioned the need for "elevation". One commentor (MM) suggested changing the word "elevation" to "depth". DEP concurs and has made the change to reflect this.
The other commentor pointed out that it would be more appropriate to record the surface elevation which would be necessary in any event to determine the bottom of the screen elevation and/or the elevation of the top of the casing. See previous response.

Paragraph 18.1.18 Three commentors (WVMA, Baker, & APS) had concerns with "Any other information deemed necessary by a groundwater regulatory agency." One commentor (APS) stated it was too broad and capricious. Another commentor (WVMA) stated it was overly broad and should be deleted, or in the alternative, limited in its scope. The third commentor (Baker) stated that "any other information" sounds excessive for "minimum statewide guidelines". They further stated that it is understood that minimum is minimum and other information may be required for individual cases. DEP has deleted this paragraph from the rule and has added: "At a minimum, " at the beginning of the last sentence in subsection 18.1 for the purpose of clarifying that the individual paragraphs found within subsection 18.1 are the minimum information required.

Section 19 One commentor (Baker) stated that this section applies clearly to all boreholes - to abandon/report. DEP agrees that all boreholes must be abandoned in accordance with section 19 of this rule which includes reporting requirements.
Another commentor (AEP) stated that this section prescribes a very restrictive approach to the abandonment of wells and further stated that they know of no engineering or scientific basis for the prescribed abandonment depths listed in this section. They further urged the DEP to adopt a more practical approach such as that which is outlined in ASTM D-5299-92 - "Standard Guide for the Decommissioning of Ground Water Wells, Vadose Monitoring Devices, Boreholes and Other Devices for Environmental Activities." Industry experts agreed to these sealing requirements and any deviation from such will require an exception as required under section 22 of this rule.
Another commentor (WVMA) suggested that the closure order language should read: "so that the 'appropriate groundwater regulatory agency may require, by order or other appropriate means, that a groundwater monitoring well that is likely to contribute or is contributing to groundwater contamination be abandoned.'" The commentor went on to say that the factors used to make a determination of closure set forth in the rule are acceptable and appropriate; however, the trigger on ordering closure should be limited to those wells that are contributing to groundwater contamination. They further stated the agency should not have the untrammeled authority to require abandonment of a monitoring well. DEP disagrees with the commentor. Any action arising from this rule are subject to the appeal and review procedures set forth in section 11 of the Groundwater Protection Act.

Subsection 19.1 One commentor (WVMA) believes it would be appropriate to include a provision which allows the preclusion of abandonment and closure of monitoring wells where the well has a bona fide future use and suggested the following language: "Upon notice to the Director, a monitoring well is not required to be abandoned and closed if there is a bona fide future use for the monitoring well." DEP has not set a time frame requirement for the abandonment of a monitoring well which is still in use.

However, age and condition of the well are appropriately included factors in determining whether a monitoring well should be abandoned.

Paragraph 19.1.1 One commentor (APS) stated that 3 working days can be an unreasonable time for abandoning a borehole with regard to equipment mobilization. They suggested rewording this condition to state: "A borehole shall be abandoned within 60 days after its use has been discontinued." DEP disagrees with the commentor and contends that open boreholes shall be properly abandoned as soon as possible and protective measures shall be taken in the interim in accordance with Section 5 of this rule. As the term "use" is somewhat open to interpretation, 3 working days after the boreholes' use has been discontinued is not unreasonable. However, deviations from this requirement may be addressed under subsection 22.2.

Paragraphs 19.1.1. and 19.1.2. Another commentor (WVMA) stated the rule should be revised so that the determination as to when the borehole or monitoring wells use has been discontinued is to be identified as well as the mechanism for notifying the regulatory agency when it is determined that this condition has been met. They further stated the abandonment should not be required of existing boreholes unless there is evidence of contamination or contribution of contamination to groundwater because of the presence of the well. The commentor urges this section to be amended accordingly. See previous response.

Paragraph 19.1.2 One commentor (AEP) stated that 90 days would be a more appropriate time period to abandon a monitoring well after its use has been discontinued. See previous response. DEP contends that 60 days is an appropriate amount of time for abandonment.

Paragraph 19.1.3 One commentor (APS) suggested that the time frame be changed from 15 days to 30 days to provide ample time to mobilize a driller on an emergency basis given the urgency of eliminating a well that is an obvious conduit for contamination of groundwater. DEP disagrees with the commentor and contends that 15 days is ample time for mobilization on an emergency basis. DEP has added the wording "or borehole" after "Any monitoring well..." in the first sentence of this paragraph for consistency with subsection 1.1, Scope and Purpose, and section 2, Applicability, of this rule.

Paragraph 19.1.4 One commentor (WVMA) stated this section should be amended to be consistent with the scope, purpose and applicability of the rule, i.e. to reflect that wells installed prior to the effective date of this rule are not governed by these minimum standards and abandonment should not be ordered or required absent a finding that the groundwater monitoring well is likely to contribute to groundwater contamination. See the response in subsection 1.1 to this commentors' prior comment concerning this issue.

Another commentor (AEP) suggested extending the time frame from 60 days to 90 days after written notification by the appropriate groundwater regulatory agency that the well is noncomplying. DEP disagrees with the commentor and contends that 60 days after written notification is an adequate time frame. Exceptions may be allowed under section 22 of this rule.

Subsection 19.2 and 19.3 One commentor (Terradon) grouped these two subsections into one comment concerning the abandonment of boreholes used for shallow geotechnical soils sampling and evaluations that do not intercept groundwater. The commentor went on to say that abandoning (by filling with grout) these types of boreholes will add an unnecessary burden to the activity. They stated that boreholes that do not reach the groundwater can be effectively plugged using the native soil removed as cuttings. They further stated that if groundwater is encountered, then an impermeable grout plug that reaches above the groundwater interval followed by replacement with the native borehole material, is an effective and appropriate abandoning method. DEP has amended paragraph 19.2.1 to provide for the abandonment of low risk boreholes.

Paragraph 19.2.1 One commentor (WVMA) stated this paragraph should be deleted because there should not be an absolute requirement for the abandonment of a borehole unless groundwater contamination has already occurred. DEP strongly disagrees with this comment.

Paragraph 19.2.2 One commentor (AEP) suggests that sealing the well as the riser is removed would prohibit overdrilling as a valid well riser removal method. They also pointed out that it is not practical from an operational or cost perspective to remove the well riser and seal the well at the same time. DEP agrees with the commentor in that overdrilling should be allowed as a well riser removal method. This is an industry accepted method and was simply left out of this rule. DEP also agrees that it may not be practical to seal the monitoring well as the riser is removed in all cases. Therefore, paragraph 19.2.2 now reads: "Monitoring wells with impermeable annular space seals - Monitoring wells known to be constructed with an impermeable annular space seal shall be abandoned according to the requirements of subsection 19.3 of this rule after the protective cover pipe or the flush mounted protective cover and the ground surface seal have been removed and the well riser cut off at least 30 inches below the ground surface. The well riser may be completely removed during abandonment by pulling the well riser, overdrilling around the riser and then pulling the well riser out of the ground or by drilling out the well riser completely. If the well riser is to be removed, the well should be sealed as the riser is removed, pursuant to subsection 19.3 of this rule."

Paragraph 19.2.3 One commentor (AEP) suggested that this section be modified in the same manner as Paragraph 19.2.2 above. DEP has changed this paragraph to read: "19.2.3. Monitoring wells

with permeable annular space seals and wells in waste areas - A monitoring well not known to be constructed with an impermeable annular space seal or located in an existing or planned future waste disposal or treatment area shall be abandoned by removing the protective cover pipe or the flush mounted protective cover and the ground surface seal and then completely removing the well riser. The well riser may be completely removed during abandonment by pulling the well riser, overdrilling around the riser and then pulling the well riser out of the ground or by drilling out the well riser completely. The well riser is to be removed from the well and should be sealed as the riser is removed, pursuant to subsection 19.3 of this rule."

Subsection 19.3 One commentor (WVMA) stated that the use of a J-hook or side discharging device at the end of a tremie pipe for the abandonment of boreholes and monitoring wells greater than 100 feet is required. They further stated that the purpose of these devices is to insure that the integrity of the filter pack, seal and riser are not compromised. They further pointed out that none of these features are present in a soil boring and there is no need to require the use of a J-hook or side discharging device when abandoning a soil boring. DEP has added the sentence: "A J-hook end or closed end with side discharge is recommended, but not required when placing sealant materials for the abandonment of a borehole." to this subsection.

Subsection 19.5 One commentor (Baker) suggests modification of "... report any decontamination procedures..." to read: "...to report any associated decontamination procedures...". DEP does not see the need to add the word "associated" before decontamination procedures. Therefore, no revisions have been made to this subsection.

Section 20 (and possibly Section 21) One commentor (AEP) is unclear if this/these section(s) applies to technologies such as Geoprobe or Hydropunch. If so, they recommend that the pre-installation agency approval be waived. They further stated abandonment procedures prescribed in section 19 are not appropriate for these technologies and recommended this section be revised to allow more flexibility. DEP disagrees with the commentor in that pre-approval should not be required and the abandonment procedures are not appropriate. Technologies such as Geoprobe or Hydropunch may only be used if prior approval is obtained because these types of monitoring wells certainly do not meet these minimum design standards and groundwater data collected from these types of sampling devices are not going to be acceptable from a regulatory standpoint. These types of technologies may be useful in obtaining soil samples for field screening or laboratory purposes but obtaining a groundwater sample for laboratory analysis is not going to be acceptable from these types of wells due to the lack of quality assurance/quality control mechanisms. A well of this type is not going to be acceptable for sampling groundwater for quarterly monitoring purposes unless prior groundwater regulatory approval is

obtained. These types of wells will be required to be installed by certified monitoring well drillers and all notification and abandonment requirements apply to these types of monitoring wells.

Section 21 One commentor (Baker) stated that the object of this regulatory effort is to protect groundwater. They questioned why the installation of any well should be administered in a less stringent manner. DEP believes the wording "less stringent" may not be the best choice and has changed this section to read: "Temporary monitoring wells may be installed according to alternate standards than specified for permanent monitoring wells. Any temporary monitoring well construction shall be approved by the appropriate groundwater regulatory agency prior to its installation. All temporary monitoring wells shall be abandoned in accordance with section 19 of this rule within 120 days after their installation unless an exception is allowed under section 22 of this rule."

One commentor (WVMA) stated there should not be a time requirement for the abandonment of a temporary monitoring well not causing groundwater contamination as this type of well may be useful long after 120 days. DEP disagrees with the commentor and if this monitoring well is planned to be used long after 120 days then DEP contends that the monitoring well meet the minimum design standards required for permanent monitoring wells unless an exception has been granted under section 22 of this rule. A permanent monitoring well is defined as any monitoring well in place for 60 days or longer.

Another commentor (APS) believes that if a situation is unique enough to require temporary wells, construction of which needs to be approved by the WVDEP, then the estimated time frame for which a temporary well is being installed may also prove to be unique. They recommend that no time limitation be given in this regulation, but rather be determined on a case by case basis along with the request for approval on construction. For example, a temporary well may need to be installed for determining seasonal trends in groundwater quality or water table elevation. DEP disagrees and if it is necessary to use this monitoring well in excess of 60 days then it should meet the minimum design standards required for permanent monitoring wells unless an exception has been granted under section 22 of this rule.

Subsections 22.1 & 22.2 One commentor (WVMA) states the Director is given overbroad authority to require more restrictive well drilling requirements. This commentor asserts that the first sentence in subsection 22.1 should state that "The appropriate groundwater regulatory agency may approve alternative well material, assembly installation, development or abandonment procedures if the contaminant concentrations or geologic setting require alternative construction." They further stated that subsection 22.2 states that exceptions to the rule "may be

approved by the appropriate groundwater regulatory agency prior to installation or abandonment." They suggested that this section should clarify that "an exception request shall state the reasons why compliance with the rule requirements is infeasible or unnecessary." DEP partially disagrees with the commentors' suggested language in that it may inhibit the Director's authority to require more restrictive well material, assembly, installation, development or abandonment procedures if the contaminant concentrations or geologic setting require alternative construction. Therefore, subsection 22.1 will remain as it is proposed. DEP agrees with this commentors' suggested language to add "or unnecessary." at the end of the second sentence in subsection 22.2.

Another commentor (AEP) stated that the owner obtain written approval to utilize alternative materials, well designs or drilling procedures. They further stated that this requirement is inappropriate considering the anticipated routine occurrences of situations that would require such alternative methods. They suggested this section be revised to allow for exceptions based on site-specific conditions, the well design of a registered Professional Engineer, Geologist, or other qualified groundwater scientist, and/or the development and use of new, cost-effective technologies without going through a formal approval process with each occurance. They further recommended that a reasonable solution to this dilemma would be to issue a regulation allowing wells to be constructed, etc., in accordance with selected published guidelines and criteria. They suggested that DEP adopt an approach that is consistent with recognized federal guidance documents or the guidance documents currently available in other states. DEP disagrees with the commentor that written approval is inappropriate for using an alternative method. DEP also disagrees that exceptions based on site-specific conditions do not need written approval. DEP also disagrees that adopting federal or other states' guidance documents would be a reasonable solution. The State of West Virginia would not have any input into the development of these types of documents which would be adopted as a rule in this state. This section has remained unchanged, except for the language adopted from the prior comment.

DIVISION OF ENVIRONMENTAL PROTECTION
10 McJunkin Road
Nitro, WV 25143-2506

GASTON CAPERTON
GOVERNOR

LAIDLEY ELI MCCOY, PH.D.
DIRECTOR

August 24, 1995

FILED
SEP 14 12 42 PM '95
OFFICE OF WEST VIRGINIA SECRETARY OF STATE

The Honorable Vicki V. Douglas, Co-Chair
The Honorable Mike Ross, Co-Chair
Legislative Rule-Making Review Committee
West Virginia Legislature
State Capitol, Room MB47
Charleston, West Virginia 25305

Dear Delegate Douglas and Senator Ross:

On July 27, 1995, the West Virginia Division of Environmental Protection filed with the Secretary of State and the Legislative Rule-Making Review Committee a "Notice of Agency Approval of a Proposed Rule and Filing" for the new rule "Monitoring Well Design Standards", 47 CSR 60. This filing was made to meet the time constraints placed on the filing of rules.

While the filing contained most of the appropriate information required, it did not include the agency's response to the comments received nor a rule modified as a result of the response to comments. This happened because of the volume and complexity of the comments, and the interrelatedness of the proposed rule and its modifications to other programs/rules both within WVDEP and other state agencies.

The WVDEP has completed its review and response to the comments received and has modified the proposed rule accordingly. Enclosed are copies of the response summary and the modified rule. The WVDEP requests that it be allowed to file a "Notice of Rule Modification of a Proposed Rule" for 47 CSR 60.

Thank you for your consideration.

Sincerely,

Laidley Eli McCoy, Ph.D.
Director

RECEIVED
SEP 01 1995
Legislative Rule Making
Review Committee

LEM:jrb

Enclosures

FISCAL NOTE FOR PROPOSED RULE

Rule Title: Monitoring Well Design Standards 47 C.S.R. 60

Type of Rule: _X_ Legislative _____ Interpretive _____ Procedural

Agency: WV Division of Environmental Protection, Office of Water Resources

Address: 1201 Greenbrier Street, Charleston, WV 25311

1. Effect of Proposed Rule		ANNUAL Increase	ANNUAL Decrease	FISCAL YEAR Current	FISCAL YEAR Next	FISCAL YEAR Thereafter
Estimated Total Cost	$	N.A.	N.A.	N.A.	N.A.	N.A.
Personal Services	$					
Current Expenses	$					
Repairs & Alterations	$					
Equipment	$					
Other	$					

2. Explanation of above estimates: This rule is expected to increase state revenues and costs as described in the Fiscal Note accompanying the Groundwater Protection Act Fee Schedule, 47 CSR 55, and to slightly increase Division of Highways costs related to the construction and abandonment of wells and boreholes in high risk areas, providing such minimum level of protection historically was not a common practice.

3. Objectives of this rule: To provide a minimum statewide guideline, ensuring that monitoring wells and boreholes do not constitute a significant pathway for the movement of pollutants or the contamination of groundwater.

4. Explanation of Overall Economic Impact of Proposed Rule.

A. Economic Impact on State Government. If currently, similar or more stringent practices are not employed, there could be some economic impact to private industry and agencies of state government as a result of this rule.

B. Economic Impact on Political Subdivisions; Specific Industries; Specific groups of citizens. As stated above, if minimal practices to protect groundwater have not been used in the past, there could be some costs to implementing this rule.

C. Economic Impact on Citizens/ Public at Large. The overall economic impact on the public at large is expected to be beneficial. Individuals relying on ground water for domestic use will not have to develop alternate sources of supply, or treat contaminated water. And, industry and state and federal governments will not have to mitigate or remediate contamination resulting from use of inadequate monitoring well construction/abandonment practices.

Date: 8/30/95

Signature of Agency Head or Authorized Representative

Barbara E. Taylor

Director, Division of Environmental Protection