

## Comments for 35CSR8 Rules Governing Horizontal Well Development



Vertical Marcellus well in Kanawha county not covered by the proposed regulation. The operator received a number of violations for this well but not for contaminating an aquifer used for domestic water supply, allowing fracture flowback to contaminate the stream below the site, nor for widespread surface contamination. The tipped tank is floating in a dike filled with water and cattails.

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## **Comments for 35CSR8, Rules Governing Horizontal Well Development**

We're commenting on this proposed regulation and two associated Office of Oil and Gas guidance documents, *Well Site Safety Plan Standards* and *Casing and Cementing Standards*.

### **Introduction**

In our area we've noted a grave need for a complete revision of the state's oil and gas regulatory program. We've found low levels of compliance with the state's laws at well sites in Putnam and Kanawha counties. We've found wells that are polluting the state's ground water.<sup>1</sup>

We've learned of other instances throughout the state where wells that are polluting groundwater have not been repaired or plugged.<sup>2</sup>

In the face of these problems and the pressing need for an overhaul of the state's regulatory program, not just new regulations but also their administration, we are severely disappointed with the Department's new regulation.

We believe that the Department and Office are not unaware of the problems across this state. We are surprised, therefore, to see a regulation that so handily plays into the stated desires of state industry spokespersons.<sup>3</sup>

We'll be commenting on the rule according to section. In the past we've offered suggestions for improvement or changes. This regulation is so flawed that improvement by slight change is not possible.

### **General Comment**

We take issue with the new regulation's exclusivity to horizontal wells and limitation to those sites of 3.5 acres or more. While we believe that these larger sites and horizontal wells require specific regulatory attention, the way this rule

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<sup>1</sup> George Monk and Molly Schaffnit, 2011, *Thirty Wells*.

<sup>2</sup> We know of incidents in Monroe, Wetzel, Putnam and Kanawha counties. See <http://wvgazette.com/News/marcellus/201108221527> for a description of contaminated drinking water source in Jackson county.

<sup>3</sup> Corky DeMarco of the West Virginia Oil and Natural Gas Association stated in February 2011: "We strongly feel that horizontal drilling needs some regulation. We equally feel as strong about leaving the conventional development regulations alone and hold that type of exploration and production harmless." West Virginia Public Radio, 2011, <http://www.wvpubcast.org/newsarticle.aspx?id=18971>.

is written excludes vertical wells or those sites with smaller footprints, which are of equal concern.

The Department's oil and gas regulations, on the whole, are ill-conceived, poorly written, and fragmented. This new regulation readily demonstrates all three flaws.

### **Section 3 – Permit Application Requirements**

This section requires an erosion and sediment control plan using the so-called Best Management Practices of the Office's obsolete *Erosion and Sediment Control Field Manual* (cited hereafter as Field Manual).<sup>4</sup> If the Office and Department are concerned about erosion and sedimentation of the state's waters, then the DEP's Division of Water's erosion and sediment control manual should be used.<sup>5</sup> The Office of Oil and Gas has a somewhat better revision of the Field Manual, but that is not linked to on the Oil and Gas forms page on the Office's website.

The oil and gas industry has created its own RAPPS manual which is excellent for sites with less than 15% grade. For sites on steeper grades, the RAPPS manual, along with the DEP Division of Water's manual, augmented with RUSLE2 modeling would provide the erosion and sediment control required.<sup>6</sup>

Nowhere in the regulation is there a limitation as to the relation of the edge of the pad to surface water. This is a serious fault.

Nowhere in the regulation is there a requirement for a well-vegetated buffer zone between disturbed areas and surface water. This is another serious fault.

Nowhere in the regulation is there a requirement for a berm around the perimeter above downslope grades. This is required to limit the extent of spills. Site drainage must be to an area that can be sequestered in the case of a spill.

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<sup>4</sup> West Virginia Division of Environmental Protection, [1992], *West Virginia Erosion and Sediment Control Field Manual*.

<sup>5</sup> West Virginia Department of Environmental Protection, 2007, *West Virginia Erosion and Sediment Control Best Management Practice Manual*.

<sup>6</sup> Terracon, [2009], *Reasonable and Prudent Practices for Stabilization (RAPPS) of Oil and Gas Construction Sites*, cited in the text as RAPPSS. RUSLE2 is a modeling program created by the Natural Resource Conservation Service, U.S. Department of Agriculture, Agricultural Research Service, and the University of Tennessee. It is available to the public without charge.

Nowhere in this regulation or the *Well Site Safety Plan* is there rule or guidance regarding the proper storage of chemicals on site, their handling, and state and federal secondary containment requirements.

3.1: Certification by a professional engineer for larger sites is a good requirement but if the Office's guidance is the Field Manual then little good can come from the provision. Construction of roads and pipelines is a serious concern that is ignored by this regulation.

3.1.b: The drawings submitted to the Office must include both plan and elevation, not plan alone. The elevation drawing is important for those sites, especially, where water storage for hydraulic fracturing is at a different location above the pad where the well is sited. The professional engineer must consider the hydraulic factors in these situations, so that, if necessary, different couplings and valves be specified in the water delivery system.<sup>7</sup>

3.2.b.2: The requirement of topsoil stockpiling is excellent.

3.2.b.6: Both fill and cut slopes must have the proper slopes. We've noted that cut slopes are often nearly vertical, collapsing during drilling or later. While fill slope integrity is an important issue, cut slope integrity is just as important.

3.2.b.10: The requirement for a diversion ditch above the cut slope exists already in the obsolete Field Manual. It is a necessary requirement that has been ignored at every site we've examined. There is no reason to expect operators to behave any differently due to its regulated requirement for large sites.

3.3: The regulation doesn't cover dewatering structures and should. Dewatering structures must have the approval of the Division of Water.

3.3.e: The listing of products used for fracturing a well must include the quantities per 1,000 gallons of water. There are certain products such as glutaraldehyde which, by Federal regulation, require that personal safety

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<sup>7</sup> See Urs Corporation, 2009, *Engineering Study in Response to Order Dated September 24, 2009, Prepared for Cabot Oil and Gas Corporation, for Submittal to Pennsylvania Department of Environmental Protection.*

equipment be worn during use.<sup>8</sup> There are other products which require special handling to prevent environmental contamination such as dipropylene glycol monomethyl ether.<sup>9</sup> The state's allowing the burial of wastes on site must be forbidden when these and other chemicals are present.<sup>10</sup>

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The *Well Site Safety Plan Standards* prepared by the Office has shortcomings. These include a lack of a specific period of time within which emergency calls must be made and the lack of a stated perimeter within which local residents are covered (it should be a mile, the same as schools).

The well control section has serious lapses. Blowout preventers require hydraulic pressure to work. In a loss of control situation, power to the drill rig's hydraulic system must be shut off to prevent explosion. All wells, therefore, require a separate auxiliary hydraulic system for the blowout preventer placed a distance from the well (at least 50 feet).

In this state operators have lost control of wells while drilling out fracture plugs. A snubbing unit should be used in this process. Some operators/crew members are not aware that a blowout preventer's stripper rubber is unable to take pressure. A stripper rubber cannot be used to control a well.<sup>11</sup>

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#### **Section 4 – Rules to Protect Water Quality and Quantity**

4.1.c: It is extremely troubling to read that the Office and DEP condones sediment in the state's waters. Constructed properly and with the right sediment control, no sediment (or pollution) should leave a construction site.

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<sup>8</sup> J. Routt Reisart & James R. Roberts, 1999, *Recognition and Management of Pesticide Poisonings*, page 197. For glutaraldehyde, 29CFR1910.132-134 requires skin and eye protection and the wearing of a respirator. Ingested, glutaraldehyde causes severe health effects.

<sup>9</sup> This chemical is used as a solvent for some slickwater fracture fluids, e.g., Halliburton's LGC-HEC, LGC HEC 3.45, LGC-16, LGC-37UC. The EPA has determined that this chemical will travel through soil to groundwater and that a surface application of 1 pound per acre is safe (Keri Grinstead & Brenda May, 9 May 2006, *Memorandum*, EPA, Office of Prevention, Pesticides and Toxic Substances, page 12).

<sup>10</sup> See our comments for section 4.3.

<sup>11</sup> See John Vittitow, Sr., 2010, *Well Control Incident Analysis*, EOG Resources, Inc., *Punxatawney Hunting Club 36H, Clearfield County, Pennsylvania*. The use of a snubbing unit while drilling out fracture plugs in horizontal wells is essential.

Operators for years have ignored the provisions of the existing Field Manual, which is one reason the state's waters run muddy. We saw, last January at a well site on the Pocatalico River in Kanawha county, a bulldozer push overburden over the bank and into the River. There was, of course, no sediment control at the site.

4.2.c.1: Flowback/produced water volume, along with products used for fracturing individual wells, must be given to the Office and made public on the Office's website.

4.2.c.1.A and B: The Office in a conference call with the EPA in 2008 stated that fracture flowback was produced water.<sup>12</sup> It is confusing, therefore, to see this section in the regulation separating the two. If there is a meaningful difference, the regulation must specify this difference, otherwise fracture flowback is produced water.

4.2.c.2: The disposal of solid and liquid waste must be reported to the Office, both volume and name and location of the disposal site.

4.3: There are a number of reasons to prohibit the burial of solid waste on a well site. If this waste has been contaminated by fracture flowback, it must be disposed of otherwise. The state's General Water Pollution Control Permit (cited hereafter as General Permit) doesn't require sequestration of the waste,<sup>13</sup> nor does the state have limitations of the waste's location in relation to groundwater (it must be at least 5 feet above seasonally high groundwater according to the Argonne National Laboratory) or surface water (it must be at least 100 feet distant). As it is now, unencapsulated waste is buried in some locations near or in ground water. Additionally, the General Permit's requirement for proper cover is, as is typical with regulation and guidance for oil and gas, not specific. Exposed pit waste has been found at 27% of the sites we've visited in Putnam and Kanawha counties, in violation of the General Permit and its concern for surface water.<sup>14</sup>

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<sup>12</sup> EPA Marcellus Shale Conference Call on 21 October 2008 where Gene Smith, of the Office of Oil and Gas, stated: ". . . when does frac water become produced water? Ans. When it comes back to the surface."

<sup>13</sup> West Virginia Office of Oil and Gas, *General Water Pollution Control Permit*. GP-WV-1-88.

<sup>14</sup> Surface waste has been found at 8 of 30 sites in Kanawha and Putnam counties. See Monk and Schaffnit, 2011, *Thirty Wells*.

Unless the operator can show by laboratory analysis that the waste is not hazardous (RCRA TCLP test for metals, along with TPH GRO and DRO, and test for radioactive materials such as radium 226 and 228) waste should not be buried at well sites. The current General Permit's parameters are demonstrably deficient to protect ground and surface water.

#### **Section 4.4 -- Casing and Cementing Standards**

The well integrity section of this regulation and Office's guidance is loosely adapted from API's HF1, *Hydraulic Fracturing Operations – Well Construction and Integrity Guidelines*.<sup>15</sup> API's guidance is written for all wells being hydraulically fractured, vertical and horizontal, shale and non-shale. The fact that the DEP is applying some of these recommendations only to horizontal Marcellus wells is arbitrary and capricious. The glaring absence of well integrity requirements for all wells shows the weakness of the DEP's regulatory program.

Without, as a minimum, incorporation of all the requirements in API's HF1, this section of the regulation and the Office's *Casing and Cementing Standards* are not protective of the environment.

If the DEP really desires to prevent the migration of pollution from oil and gas wells to fresh water aquifers and surface water it needs to publicly acknowledge that even if operators follow this regulation's requirements and the Office's *Casing and Cementing Standards* a certain percentage of wells will leak. The documented percentage of offshore wells using similar standards that leak after completion is 5%.<sup>16</sup> That number increases to 50% over time as wells deteriorate. The DEP needs to institute regulations covering well integrity including remedial actions to be taken for leaking wells and, if repair isn't possible, then the well must be plugged. Remedial action must take place within a reasonable time frame after discovery – 30 days. The presence of methane alone in ground or surface water is an indicator of a leaking well. A poorly cased and cemented well may leak methane from formations other than the producing formation(s). This means that industry's requirement for fingerprinting to determine the source of methane is a denial of what is actually happening underground. If an operator cannot show satisfactory casing pressure and formation pressure integrity test results for surface/freshwater, coal/intermediate, and production casing and

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<sup>15</sup> API, 2009, *Hydraulic Fracturing Operations – Well Construction and Integrity Guidelines*.

<sup>16</sup> Tony Ingraffea, Dwight C. Baum Professor of Engineering and Weiss Presidential Teaching Fellow at Cornell, presentation in Ithaca, NY on 25 July 2011, <http://www.youtube.com/watch?v=eaivKGwoTgU>.

cement bond logging that demonstrates the well's integrity, that is *a priori* evidence of a leak taking place.<sup>17</sup>

In West Virginia when a natural gas well leaks and contaminates ground water, the state steps aside and forces the surface owner to sue the operator for replacement water supply. Wells in this state are currently polluting ground water without any attempt at remediation or requirement for plugging.

The well inspection program that currently exists is self-regulated.<sup>18</sup> Even when a complaint has been made, wells obviously lacking integrity have not been required by the office to be remediated.<sup>19</sup> Without a serious program of well monitoring for integrity, this regulation does nothing to protect the state's waters.<sup>20</sup> Quantitative monitoring should be frequent (quarterly), submitted to the Office, and available for public scrutiny.

The Office's new permit application form requires the grade and weight of casing to be stated by the operator. Nowhere on the form is the expected maximum pressure stated. This regulation requires centralizers during cementing, but the number of centralizers expected to be used is not stated on the form. Pennsylvania requires a centralizer at least every 150 feet.<sup>21</sup> West Virginia's application form, regulation and standard give no assurance that the

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<sup>17</sup> For some reason the Office's *Casing and Cementing Standards* only requires a shoe or formation pressure integrity test for surface casing. According to the API's HF1 both types of pressure tests (casing and formation) are required for all casing strings except conductor, and the production string which requires only a casing pressure test.

<sup>18</sup> Operator's inspection reports are not filed with the Office. Instead the Operator files a form WR-99 which requires that the operator report evidence of "significant leakage or other indications of casing integrity failure [our emphasis]." In inspection report (OP-13) for each well besides well integrity, the operator is also examining secondary containment for condensate storage tanks and erosion and sediment controls. We've found that 68% of wells examined in our area do not have satisfactory secondary containment. See Monk and Schaffnit, 2011, *Thirty Wells*. It's hard to tell the usefulness of OP-13, since the results are not tabulated in any manner in WR-99.

<sup>19</sup> See for example, <http://www.youtube.com/watch?v=GXv99IDyL4k>.

<sup>20</sup> The Norwegian Oil Industry Association's, *117 – OLF Recommended Guidelines for Well Integrity* describes a well barrier schematic which includes data from tests and cement bond logging for baseline comparison (see Chapter 3, page 14 and following). Monitoring would require use of this schematic, making changes due to corrosion, leaks, and alterations in wellhead equipment. Copies of the schematic would be kept by both the operator and regulating agency.

<sup>21</sup> §78.83.(c).

operator is aware of the proper number needed.<sup>22</sup> Inspectors, even if they are using specialized software or have a degree in petroleum engineering, will not be able to determine if the regulation's requirements are being met for casing and cementing when they review the application form.

The Office's WR-35 well completion form does not require the grade and weight of casing actually used to be stated, nor the number of centralizers. There is no requirement on the form to present casing pressure and formation pressure integrity test results or whether or not a cement bond logging was performed and its results.

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The Office's *Casing and Cementing* Standards are a wish list of desired results without providing guidance on how to achieve these results, especially when it comes to cementing. Proper cementing is essential for gas wells and is problematic for horizontal wells where water channeling on the top side of the bore hole is common. "Appendix C: Best Cementing Practices" in *A Review of Sustained Casing Pressure Occurring in the OCS* offers a beginning point for constructing such guidance. Fracturing causes micro-annuli between production casing and cement, left over mud in annulus hampers proper cementing, and other problems must be dealt with in considered well design and construction. Frequent monitoring of annular pressures, remediation and possible plugging must be incorporated in regulation and guidance.

The API HF1 recommendation for protection of USDW, municipal water supply aquifers, is not present in the regulation or standards. API recommends freshwater casing depth at least 100 feet below the aquifer (page 11).

Neither the regulation or standard requires that the casing string be of grade and weight to withstand compression and tension pressures. Unless software is used or the inspector is a petroleum engineer, this cannot be easily determined using the data provided by the operator on the application form.

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## **Section 5 -- Public Notice Requirements**

A public notice is one of the requirements that must be made of operators.

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<sup>22</sup> British Petroleum's Macondo well in the Gulf had centralizers. A factor in the blowout was a cascade of bad management decisions by BP, including the decision to ignore the need for the *proper* number of centralizers to prevent channeling cement. The regulation assumes the operator will install the proper number.

Operators must provide notice (public and specific) when a well is drilled through or near (for instance, 5 miles) an underground municipal drinking water source. Specific notice must be given to governing official (mayor) and municipal water manager. Daily monitoring for, at a minimum, metals, TDS, uranium, radium 226 and 228, and volatile organics (including benzene, ethelbenzene, toluene, xylenes, acrylonitrile, and methane) must be performed at the operator's expense until 6 months after completion of the well and quarterly thereafter.

Operators must provide notice (public and specific) when a well is drilled within a municipal water supply's surface water intake's watershed. Specific notice must be given to governing official (mayor) and municipal water manager. Daily monitoring for, at a minimum, metals, TDS, uranium, radium 226 and 228, and volatile organics (including benzene, ethelbenzene, toluene, xylenes, acrylonitrile, and methane) must be performed at the operator's expense if the well is within 1 mile of intake, weekly otherwise, until 6 months after completion of the well and quarterly thereafter.

Operators drilling within 1 mile of schools, hospitals and business districts must provide public notice and specific notice to school boards and other administrating officials affected.

### **Summary**

We believe the proposed regulation is irreparably flawed. The Office's two standards, *Well Site Safety* and *Casing and Cementing* need revision.

Well integrity, casing and cementing standards deserve a regulation all their own, for all wells, with additions dealing with specific issues pertaining to horizontal wells. The Office's existing well permit application and well completion forms along with operator's well inspection report do not support the requirements of this regulation or the Office's standards. The Office's lack of a working well inspection program and the Department's lack of a program for remediation or plugging of leaking wells imperils the state's precious ground and surface water.

A cynic would think that the state finds its 5% severance tax more important.

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**TITLE 35  
LEGISLATIVE RULE  
DEPARTMENT OF ENVIRONMENTAL PROTECTION  
OIL AND GAS**

**SERIES 8  
RULES GOVERNING HORIZONTAL WELL DEVELOPMENT**

**§35-8-1. General**

1.1 Scope. – This rule shall govern and apply to permit application requirements, operational rules to protect water quantity and quality, and public notice procedures for oil or natural gas operators developing horizontal wells, which wells are also regulated by W. Va. Code § 22-6-1, et seq. and the Legislative Rules promulgated in Title 35 of West Virginia’s Code of State Rules and entitled *Oil and Gas*.

1.2. Authority. – W. Va. Code §§ 22-1-3, 22-6-2, and 22-11-4(a)(16)

1.3. Filing Date. –

1.4. Effective Date. –

1.5. Applicability. – Applications submitted after the effective date of this rule shall be subject to the provisions of this rule.

**§35-8-2. Definitions**

2.1 Unless the context in which the term is used clearly requires a different meaning, the definitions set forth in W. Va. Code §§ 22-6-1 and 22-11-3 and in 35 C.S.R. 4 § 2 shall apply to this Rule.

2.2. “Horizontal well” means any well that is drilled initially on a vertical plane but eventually curved to become horizontal, or nearly horizontal, to parallel or intersect a particular geologic formation or formations, for the purpose of maximizing the length and contact of the wellbore that is exposed to the formation or formations.

**§35-8-3. Permit Application Requirements for Operators Developing Horizontal Wells**

3.1. Erosion and Sediment Control Plan. – Erosion and sediment control plans submitted in conjunction with applications for well work permits involving well sites that disturb three acres or more of surface, excluding pipelines, gathering lines, and roads, shall be certified by, and constructed in accordance with plans certified by, a West Virginia registered professional engineer and in compliance with best management practices (BMPs) established by the Office of

Oil and Gas (Office) and contain both a narrative and a set of drawings. The plans shall be considered conditions of the permit and be enforceable as such.

3.1.a. The narrative components of the plan shall include:

3.1.a.1. A general sequence of events that describe in relative terms how and when each construction phase (i.e. clearing and grubbing, mass grading, stabilization) will occur and when each erosion and sediment control BMP will be installed;

3.1.a.2. A description of the stabilization methods to be used, including the application rates for temporary and permanent seeding and mulching, and provide the timeframes for establishing stabilization; and

3.1.a.3. Details or specifications for the erosion and sediment control BMPs employed on the project.

3.1.b. The drawings submitted with the plan shall include:

3.1.b.1. A vicinity map locating the site in relation to the surrounding area and roads;

3.1.b.2. A plan view site map at a scale of one inch equal to one hundred feet (1" = 100') or greater, showing appropriate detail of all site features, including the identification of site access that provides for a stabilized construction entrance and exit to reduce tracking of sediment onto public or private roads; and

3.1.b.3. The location of all proposed erosion and sediment control BMPs.

3.2. Site Construction Plan. – All applications for well work permits involving well sites that will disturb three acres or more of surface, excluding pipelines, gathering lines, and roads, shall be accompanied by a site construction plan certified by, and constructed in accordance with plans certified by, a West Virginia registered professional engineer. The plan should describe the nature and purpose of the construction project and identify the procedures for construction that will be used to achieve site stability. The plan shall be considered conditions of the permit and be enforceable as such.

3.2.a. The site construction plan shall contain the following information:

3.2.a.1. A vicinity map locating the site in relation to the surrounding area and roads;

3.2.a.2. A plan view site map at a scale of one inch equal to one hundred feet (1" = 100') or greater that shows appropriate detail of all site features and:

3.2.a.2.A. Clearly identifies the limit of disturbance for the project;

3.2.a.2.B. Provides existing topographic information on a contour interval that affords sufficient detail to illustrate site terrain conditions;

3.2.a.2.C. Identifies proposed cut and fill areas with grading contours at an interval that provides sufficient detail to accurately depict slope ratios, indicating top and bottom of slopes; and

3.2.a.2.D. Identifies any existing structures, roads, water bodies, and other critical areas within the area that would most likely be affected by the construction.

3.2.a.3. A cross-section of the length and width of the location, providing cut and fill volumes; and

3.2.a.4. Any other engineering designs or drawings necessary to construct the project.

3.2.b. At a minimum, site construction shall be conducted in accordance with the following criteria:

3.2.b.1. All woody material, brush, and trees shall be cleared from the site area and kept to the minimum necessary for proper construction, including the installation of necessary sediment controls. Trees six inches in diameter and larger shall be cut and logs stacked;

3.2.b.2. Topsoil shall be removed from construction areas and stockpiled for reuse during reclamation. In woodland areas, tree stumps, large roots, large rocks, tree and leaf debris, and ground vegetation shall be removed prior to actual site construction;

3.2.b.3. No embankment fill shall be placed on frozen material;

3.2.b.4. The fill material shall be clean mineral soil, free of roots, woody vegetation, stumps, sod, large rocks, frozen soil or other objectionable material;

3.2.b.5. Embankment material shall exhibit adequate soil strength and contain the proper amount of moisture to ensure that compaction will be achieved;

3.2.b.6. Earthen fill slopes should be constructed with slopes no steeper than a ratio of two-to-one (2:1);

3.2.b.7. Fill material will be placed in lifts or layers over the length of the fill. Lift thickness of the soil shall be as thin as the suitable random excavated material will permit, typically from six to twelve (12) inches; and

3.2.b.8. The size of rock lifts shall not exceed thirty-six (36) inches. The rock shall not be greater in any dimension than thirty-six (36) inches;

3.2.b.9. Compaction shall be obtained by compaction equipment or by routing the hauling equipment over the fill so that the entire surface of each fill lift is compacted by at least one wheel or tread track of equipment or by a compactor. Each lift shall be compacted before beginning the next lift;

3.2.b.10. Surface water diversion ditches shall be constructed above the disturbed area to intercept water and to divert surface water runoff around the site; and

3.2.b.11. In areas of steep terrain, a terraced bench shall be constructed at the base of the slope where fill is to be placed, creating a toe foundation and aid in holding fill material. Additional terracing shall be constructed for each additional fifty (50) vertical feet of slope and shall be a minimum of ten (10) feet wide.

3.3. Water Management Plan. – All applications for well work permits shall include an estimation of the volume of water that will be used in conjunction with drilling, fracturing or stimulating the well for which the permit is sought and, if the drilling, fracturing or stimulating of such well will require water withdrawals from the waters of this State in amounts of two hundred ten thousand (210,000) gallons or more during any one-month period, then the applicant shall file with the Office a water management plan as part of the application for the well work permit.<sup>1</sup> It shall be considered conditions of the permit and be enforceable as such. The water management plan, which may be submitted either on an individual well basis or on a watershed basis, shall include the following information:

3.3.a. The type of water source, such as surface or ground water, the county in which each water source to be used for water withdrawals is located, and the latitude and longitude of each anticipated withdrawal location;

3.3.b. The anticipated volume of each water withdrawal;

3.3.c. The anticipated months when water withdrawals will be made;

3.3.d. The planned management and disposition of wastewater from fracturing, stimulation, and production activities;

3.3.e. A listing of the anticipated additives that may be used in the water used for fracturing or stimulating the well, and, upon well completion, a listing of the additives that were actually used in the fracturing or stimulating of the well shall be submitted as part of the completion report required by W. Va. Code § 22-6-22;

3.3.f. For all surface water withdrawals, the water management plan shall include the following, in addition to the information required in subdivisions 3.3.a. through 3.3.e. above:

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<sup>1</sup> This Rule in no way abrogates the statutory requirement that water withdrawals in excess of seven hundred fifty thousand (750,000) gallons per calendar month be registered with the Division of Water and Waste Management. *See*, W. Va. Code § 22-26-1, et seq.

3.3.f.1. Identification of the current designated and existing water uses, including any public water intakes within one mile downstream of the withdrawal location;

3.3.f.2. A demonstration, using methods acceptable to the Secretary, that sufficient in-stream flow will be available immediately downstream of the point of withdrawal. Sufficient in-stream flow is maintained when pass-by flow that is protective of the identified use of the stream is preserved immediately downstream of the point of withdrawal; and

3.3.f.3. Identification of the methods to be used to minimize significant adverse impact to aquatic life.

3.4. Well Site Safety Plan. – All applications for well work permits involving well sites that will disturb three acres or more of surface, excluding pipelines, gathering lines, and roads, shall be accompanied by a well site safety plan to address measures to be employed by the operator for the protection of persons on the site, as well as the general public and the environment. The plan shall encompass all aspects of the operation, including the actual well work for which the permit is sought, completion activities, and production activities, and shall provide an emergency point of contact and twenty-four (24)-hour contact information for the well operator. The well operator shall provide a copy of the well site safety plan to the local emergency planning committee for the emergency planning district in which the well work will occur or to the county office of emergency services at least seven days before commencement of well work or site preparation work that involves any disturbance of land. It may be modified only upon approval by the Office and shall be considered conditions of the permit and be enforceable as such.

3.4.a. The well site safety plan shall be drafted in accordance with standards developed by the Office and include, at a minimum, the following:

3.4.a.1. A plan view map showing the well location, access road, pits, flare lines, dwellings, and noting the north and prevailing wind directions;

3.4.a.2. An area topographical map showing the well site location;

3.4.a.3. An evacuation plan for the removal of personnel and residents in the surrounding area who have the potential to be affected by an emergency;

3.4.a.4. A list of telephone numbers, including twenty-four (24)-hour contact information, for the following entities (which shall also be posted at the well site): the operator, any contractors of the operator, the Department, the local oil and gas inspector, and local emergency response units;

3.4.a.5. A list of all schools and public facilities within a one-mile radius of the proposed well, including telephone numbers for the same;

3.4.a.6. Material Safety Data Sheets (MSDS) for all materials and chemicals on the well site shall be readily available and maintained at the well site; and

3.4.b. Well site safety meetings. – Safety meetings shall be held on-site weekly, at a minimum, and specifically prior to the beginning of drilling, completion, and work-over operations. Meeting attendance shall be logged, and the log shall be maintained on site. A check-in and check-out list of all personnel shall be maintained during the drilling and completion phases of the operation.

#### **§35-8-4. Operational Rules to Protect Water Quality and Quantity**

4.1. All operators are required to protect the quality and quantity of water in surface and ground water systems both during and after drilling operations and during reclamation by:

4.1.a. Withdrawing water from surface waters of the State using methods deemed appropriate by the Secretary so as to maintain sufficient in-stream flow immediately downstream of the withdrawal location;

4.1.b. Casing, sealing or otherwise managing wells to keep fluids or natural gas from entering ground or surface waters;

4.1.c. Conducting oil and gas operations using BMPs so as to prevent, to the extent practicable, additional contributions of suspended or dissolved solids to stream flow or runoff outside the permit area, but in no event shall the contributions be in excess of requirements set by applicable State or federal law; and

4.1.d. Registering all water supply wells with the Office and constructing and plugging all such wells in accordance with applicable laws governing water well construction.

4.2. All operators who withdraw two hundred ten thousand (210,000) gallons or more of water from waters of this State during any one-month period shall adhere to the following operational and reporting requirements:

4.2.a. Within forty-eight (48) hours, but no less than twenty-four (24) hours, prior to the withdrawal of water, the operator shall identify the location of withdrawal by latitude and longitude; verify, using methods deemed acceptable by the Secretary, that sufficient flow exists to protect designated uses of the stream; and provide notice to the Office as prescribed by the Secretary;

4.2.b. All surface water withdrawal locations and facilities identified in the water management plan set forth in subsection 3.3 above shall be identified with a sign that discloses that the location is a water withdrawal point and the name and telephone number of the operator for which the water withdrawn will be utilized. When the withdrawal location is no longer being utilized, or at the direction of the Secretary, the operator shall notify the Office and remove all signage; and

4.2.c. For all water used in connection with hydraulic fracturing activities and for all produced water from production activities, operators shall comply with the following record-keeping requirements:

4.2.c.1. For production activities, the following information shall be recorded and retained by the operator:

4.2.c.1.A. The quantity of flowback water from hydraulic fracturing of the well;

4.2.c.1.B. The quantity of produced water from the well; and

4.2.c.1.C. The method of management or disposal of the flowback and produced water.

4.2.c.2. For transportation activities, the following information shall be recorded and retained by the operator:

4.2.c.2.A. The quantity of water transported;

4.2.c.2.B. The collection and delivery or disposal location(s) of the water; and

4.2.c.2.C. The name(s) of the water hauling company(ies).

4.3. All drill cuttings and associated drilling mud generated from well sites that disturb three acres or more of surface, excluding pipelines, gathering lines, and roads, or that use two hundred ten thousand (210,000) gallons or more of water during any one-month period shall be disposed of in an approved solid waste facility or managed on-site in a manner otherwise approved by the Secretary.

4.4. Casing and cementing standards. – The operator shall prudently drill through fresh groundwater zones so as to minimize any disturbance of such zones. Further, the operator shall construct the well and conduct casing and cementing activities of all horizontal wells in accordance with standards developed by the Office and in a manner that will provide for control of the well at all times, prevent the migration of gas and other fluids into the fresh groundwater and coal seams, and prevent pollution of or diminution of fresh groundwater. At a minimum, the following standards shall apply:

4.4.a. Casing standards.

4.4.a.1. All casing installed in the well must be new, with a pressure rating that exceeds the anticipated maximum pressure to which the casing will be exposed and meet the appropriate American Petroleum Institute (API) standards;

4.4.a.2. The casing must be of sufficient quality and condition to withstand the effects of tension and maintain its structural integrity during installation, cementing, and subsequent drilling and production operations;

4.4.a.3. Centralizers must be used, with the proper spacing, during the casing installation to ensure that the casing is centered in the hole;

4.4.a.4. Casing shall not be disturbed for a period of at least eight hours after the completion of cementing operations; and

4.4.a.5. No gas or oil production or pressure shall exist on the surface casing or the coal protection casing.

4.4.b. Cement standards.

4.4.b.1. All cement used in the well must meet the appropriate API standards and secure the casing to the wellbore, isolate the wellbore from all fluids, contain all pressures during all phases of drilling and operation of the well, and protect the casing from corrosion and degradation;

4.4.b.2. Cement used in conjunction with surface and coal protection casing must prevent gas flow in the casing annulus;

4.4.b.3. The operator shall provide notice to the Office at least twenty-four (24) hours prior to the commencement of any cementing operations and maintain a copy of the cementing log at the well site during the drilling and completion of the well.

**§35-8-5. Public Notice Procedures**

5.1. Applicants for well work permits seeking to drill the first horizontal Marcellus Shale well on any particular well pad located in an area within the boundaries of any municipality, as that term is defined in W. Va. Code § 8-1-2, shall publish public notice of the filing of such well work permit application as follows: At the time that a well work permit application is filed, the applicant shall also place a Class I legal advertisement in a newspaper of general circulation in the area where the well is proposed to be located. No well work permit shall be issued to any applicant until at least thirty (30) days' notice has been provided to the public. The advertisement shall contain, at a minimum, the name of the applicant, the proposed location of the well, the proposed date on which site preparation for the proposed well will begin, and a contact telephone number for more information.