NEW YORK STATE OF OPPORTUNITY

Department of Environmental Conservation

Chapter 8

Permit Process and Regulatory Coordination

Final

Supplemental Generic Environmental Impact Statement

www.dec.ny.gov

This page intentionally left blank.

Chapter 8 – Permit Process and Regulatory Coordination

CHAPTER 8 PERMIT PROCESS AND REGULATORY COORDINATION 8-1

8.1 INTERAGENCY COORDINATION 8-1
8.1.1 Local Governments 8-1
8.1.1.1 SEQRA Participation 8-1
8.1.1.2 NYCDEP 8-4
8.1.1.3 Local Government Notification 8-4
8.1.1.4 Road-Use Agreements 8-4
8.1.1.5 Local Planning Documents 8-4
8.1.1.6 County Health Departments 8-5
8.1.2 State 8-5
8.1.2.1 Public Service Commission 8-6
8.1.2.2 NYS Department of Transportation 8-18
8.1.3 Federal 8-19
8.1.3.1 U.S. Department of Transportation 8-19
8.1.3.2 Occupational Safety and Health Administration – Material Safety Data Sheets 8-21
8.1.3.3 EPA's Mandatory Reporting of Greenhouse Gases 8-24
8.1.4 River Basin Commissions 8-28

8.2 INTRA-DEPARTMENT 8-29
8.2.1 Well Permit Review Process 8-29
8.2.1.1 Required Hydraulic Fracturing Additive Information 8-29
8.2.2 Other Department Permits and Approvals 8-32
8.2.2.1 Bulk Storage 8-32
8.2.2.2 Impoundment Regulation 8-33
8.2.3 Enforcement 8-42
8.2.3.1 Enforcement of Article 23 8-42
8.2.3.2 Enforcement of Article 17 8-44

8.3 WELL PERMIT ISSUANCE 8-48
8.3.1 Use and Summary of Supplementary Permit Conditions for High-Volume Hydraulic Fracturing 8-48
8.3.2 High-Volume Re-Fracturing 8-48

8.4 OTHER STATES' REGULATIONS 8-49
8.4.1 Ground Water Protection Council 8-51
8.4.1.1 GWPC - Hydraulic Fracturing 8-51
8.4.1.2 GWPC - Other Activities 8-52
8.4.2 Alpha's Regulatory Survey 8-53
8.4.2.1 Alpha - Hydraulic Fracturing 8-53
8.4.2.2 Alpha - Other Activities 8-54
8.4.3 Colorado's Final Amended Rules 8-60
8.4.3.1 Colorado - New MSDS Maintenance and Chemical Inventory Rule 8-60
8.4.3.2 Colorado - Setbacks from Public Water Supplies 8-61
8.4.4 Summary of Pennsylvania Environmental Quality Board. Title 25-Environmental Protection, Chapter 78, Oil and Gas Wells 8-62
8.4.5 Other States' Regulations - Conclusion 8-62

FIGURES
Figure 8.1- Protection of Waters - Dam Safety Permitting Criteria 8-35

TABLES
Table 8.1 - Regulatory Jurisdictions Associated with High-Volume Hydraulic Fracturing (Revised July 2011) 8-3
Table 8.2 - Intrastate Pipeline Regulation 8-10
Table 8.3 - Water Resources and Private Dwelling Setbacks from Alpha, 2009 8-59

This page intentionally left blank.

Chapter 8 PERMIT PROCESS AND REGULATORY COORDINATION

8.1 Interagency Coordination

Table 8.1, together with Table 15.1 of the 1992 GEIS, shows the spectrum of government authorities that oversee various aspects of well drilling and hydraulic fracturing. The 1992 GEIS should be consulted for complete information on the overall role of each agency listed on Table 15.1. Review of existing regulatory jurisdictions and concerns addressed in this revised draft SGEIS identified the following additional agencies that were not previously listed and have been added to Table 8.1:

- NYSDOH;
- USDOT and NYSDOT;
- Office of Parks, Recreation and Historic Preservation (OPRHP);
- NYCDEP; and
- SRBC and DRBC.

Following is a discussion on specific, direct involvement of other agencies in the well permit process relative to high-volume hydraulic fracturing.

8.1.1 Local Governments

ECL §23-0303(2) provides that the Department's Oil, Gas and Solution Mining Law supersedes all local laws relating to the regulation of oil and gas development except for local government jurisdiction over local roads or the right to collect real property taxes. Likewise, ECL §23-1901(2) provides for supersedure of all other laws enacted by local governments or agencies concerning the imposition of a fee on activities regulated by ECL 23.

8.1.1.1 SEQRA Participation

For the following actions which were found in 1992 to be significant or potentially significant under SEQRA, the process will continue to include all opportunities for public input normally provided under SEQRA:

- Issuance of a permit to drill in State Parklands;
- Issuance of a permit to drill within 2,000 feet of a municipal water supply well; and
- Issuance of a permit to drill that will result in disturbance of more than 2.5 acres in an Agricultural District.

Based on the recommendations in this revised draft SGEIS, the Department proposes that the following additional actions will also include all opportunities for public input normally provided under SEQRA:

- Issuance of a permit to drill when high-volume hydraulic fracturing is proposed shallower than 2,000 feet anywhere along the entire proposed length of the wellbore;
- Issuance of a permit to drill when high-volume hydraulic fracturing is proposed where the top of the target fracture zone at any point along the entire proposed length of the wellbore is less than 1,000 feet below the base of a known fresh water supply;
- Issuance of a permit to drill when high-volume hydraulic fracturing is proposed at a well pad within 500 feet of a principal aquifer (to be re-evaluated two years after issuance of the first permit for high-volume hydraulic fracturing);
- Issuance of a permit to drill when high-volume hydraulic fracturing is proposed on a well pad within 150 feet of a perennial or intermittent stream, storm drain, lake or pond;
- Issuance of a permit to drill when high-volume hydraulic fracturing is proposed and the source water involves a surface water withdrawal not previously approved by the Department that is not based on the NFRM as described in Chapter 7;
- Any proposed water withdrawal from a pond or lake;
- Any proposed ground water withdrawal within 500 feet of a private well;
- Any proposed ground water withdrawal within 500 feet of a wetland that pump test data shows would have an influence on the wetland; and
- Issuance of a permit to drill any well subject to ECL 23 whose location is determined by NYCDEP to be within 1,000 feet of its subsurface water supply infrastructure.

Table 8.1
Regulatory Jurisdictions Associated With High-Volume Hydraulic Fracturing
(Updated August 2011)

Regulated Activity or Impact	DEC Divisions & Offices							NYS Agencies				Federal Agencies			Local Agencies		Other	
	DMN	DEP	DOW	DER	DMM	DFWMR	DAR	DOH	DOT	PSC	OPRHP	EPA	USDOT	Corps	Local Health	Local Govt.	NYC DEP	RBCs
General																		
Well siting	P	-	-	-	-	-	-	-	-	-	*	-	-	-	-	-	*	*
Road use	-	-	-	-	-	-	-	-	A	-	-	-	-	-	-	P	-	-
Surface water withdrawals	S	*	P*	-	-	P	-	-	-	-	-	-	-	-	-	-	-	P*
Stormwater runoff	S	-	P	-	-	-	-	-	-	-	-	-	-	-	-	-	*	*
Wetlands permitting	-	P	-	-	-	S	-	-	-	-	-	-	-	P	-	-	*	*
Transportation of fracturing chemicals	-	-	-	S	-	-	-	-	P	-	-	-	P	-	-		-	-
Well drilling and construction	P	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*	-	*
Wellsite fluid containment	P	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hydraulic fracturing/ refracturing	P	-	*	-	-	-	-	*	-	-	-	-	-	-	-	-	-	*
Cuttings and reserve pit liner disposal	P	-	-	A	A	-	-	*	-	-	-	-	-	-	-	-	-	-
Site restoration	P	-	-	-	-	S	-	-	-	-	-	-	-	-	-	-	-	-
Production operations	P	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gathering lines and compressor stations	S	S	-	-	-	-	S	-	-	P	-	-	-	-	-	-	-	-
Air emissions from all site operations	S	-	-	-	-	-	P*/A*	*	-	-	-	-	-	-	-	-	-	-
Well plugging	P	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Invasive species control	S	-	-	-	-	P	-	-	-	-	-	-	-	-	-	-	-	-
Fluid Disposal Plan 6NYCRR 554.1(c)(1)																		
Waste transport	-	-	-	P	-	-	-	-	-	-	-	-	-	-	-	*	-	-
POTW disposal	-	*	P	-	-	-	-	-	-	-	-	-	-	-	-	-	*	*
New in-state industrial treatment plants	-	P	S	-	-	-	-	-	-	-	*	-	-	-	-	-	*	*
Injection well disposal	S	P	S	-	-	-	-	-	-	-	-	P	-	-	-	-	-	*
Road spreading	-	-	-	-	P		-	*	-	-	-	-	-	-	-	P	-	-
Private Water Wells																		
Baseline testing and ongoing monitoring	P	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Initial complaint response	S	-	-	-	-	-	-	*	-	-	-	-	-	-	P	-	-	-
Complaint follow-up	P	-	-	-	-	-	-	-	-	-	-	-	-	-	S	-	-	-

Key:
P = Primary role
S = Secondary role
A = Advisory role
* = Role pertains in certain circumstances

DEC Divisions
DMN = Division of Mineral Resources
DEP = Division of Environmental Permits (DRA in GEIS Table 15.1)
DOW = Division of Water (DW in GEIS Table 15.1)
DER = Division of Environmental Remediation (DSHW in GEIS Table 15.1)
DMM = Division of Materials Management
DFWMR = Division of Fish, Wildlife and Marine Resources
DAR = Division of Air Resources

8.1.1.2 NYCDEP

The Department will continue to notify NYCDEP of proposed drilling locations in counties with subsurface water supply infrastructure to enable NYCDEP to identify locations in proximity to infrastructure that might require site-specific SEQRA determinations.

8.1.1.3 Local Government Notification

ECL §23-0305(13) requires that the permittee notify any affected local government and surface owner prior to commencing operations. Many local governments have requested notification earlier in the process, although it is not required by law or regulation. The Department would notify local governments of all applications for high-volume hydraulic fracturing in the locality, using a continuously updated database of local government officials and an electronic notification system that would both be developed for this purpose.

8.1.1.4 Road-Use Agreements

The Department strongly encourages operators to reach road use agreements with governing local authorities. The issuance of a permit to drill does not relieve the operator of the responsibility to comply with any local requirements authorized by or enacted pursuant to the New York State Vehicle and Traffic Law. Additional information about road infrastructure and traffic impacts is provided in Sections 6.11 and 7.13.

8.1.1.5 Local Planning Documents

The Department's exclusive authority to issue well permits supersedes local government authority relative to well siting. However, in order to consider potential significant adverse impacts on land use and zoning as required by SEQRA, the EAF Addendum would require the applicant to identify whether the proposed location of the well pad, or any other activity under the jurisdiction of the Department, conflicts with local land use laws or regulations, plans or policies. The applicant would also be required to identify whether the well pad is located in an area where the affected community has adopted a comprehensive plan or other local land use plan and whether the proposed action is inconsistent with such plan(s). For actions where the applicant indicates to the Department that the location of the well pad, or any other activity under the jurisdiction of the Department, is either consistent with local land use laws, regulations, plans or policies, or is not covered by such local land use laws, regulations, plans or policies, the

Department would proceed to permit issuance unless it receives notice of an asserted conflict by the potentially impacted local government.

Applicants for permits to drill are already required to identify whether any additional state, local or federal permits or approvals are required for their projects. Therefore, in cases where an applicant indicates that all or part of their proposed project is inconsistent with local land use laws, regulations, plans or policies, or where the potentially impacted local government advises the Department that it believes the application is inconsistent with such laws, regulations, plans or policies, the Department would, at the time of permit application, request additional information so that it can consider whether significant adverse environmental impacts would result from the proposed project that have not been addressed in the SGEIS and whether additional mitigation or other action should be taken in light of such significant adverse impacts.

8.1.1.6 County Health Departments

As explained in Chapter 15 of the GEIS and Chapter 7 of this document, county health departments are the most appropriate entity to undertake initial investigation of water well complaints. The Department proposes that county health departments retain responsibility for initial response to most water well complaints, referring them to the Department when causes other than those related to drilling have been ruled out. The exception to this is when a complaint is received while active operations are underway within a specified distance; in these cases, the Department will conduct a site inspection and will jointly perform the initial investigation along with the county health department.

8.1.2 State

Except for the Public Service Commission relative to its role regarding pipelines and associated facilities (which will continue; see Section 8.1.2.1), no State agencies other than the Department are listed in GEIS Table 15.1. The NYSDOH, NYSDOT, along with the Office of Parks, Recreation and Historic Preservation, are listed in Table 8.1 and will be involved as follows:

- *NYSDOH:* Potential future and ongoing involvement in review of NORM issues and assistance to county health departments regarding water well investigations and complaints;

- *NYSDOT*: Not directly involved in well permit reviews, but has regulations regarding intrastate transportation of hazardous chemicals found in hydraulic fracturing additives and may advise the Department regarding the required transportation plans and road condition assessments; and

- *OPRHP:* In addition to continued review of well and access road locations in areas of potential historic and archeological significance, OPRHP will also review locations of related facilities such as surface impoundments and treatment plants.

8.1.2.1 Public Service Commission

Article VII, "Siting of Major Utility Transmission Facilities," is the section of the New York Public Service Law (PSL) that requires a full environmental impact review of the siting, design, construction, and operation of major intrastate electric and natural gas transmission facilities in New York State. The Public Service Commission (Commission or PSC) has approval authority over actions involving intrastate electric power transmission lines and high pressure natural fuel gas pipelines, and actions related to such projects. An example of an action related to a high-pressure natural fuel gas pipeline is the siting and construction of an associated compressor station. While the Department and other agencies can have input into the review of an Article VII application or Notice of Intent (NOI) for an action, and can process ancillary permits for federally delegated programs, the ultimate decision on a given project application is made by the Commission. The review and permitting process for natural fuel gas pipelines is separate and distinct from that used by the Department to review and permit well drilling applications under ECL Article 23, and is traditionally conducted after a well is drilled, tested and found productive. For development and environmental reasons, along with early reported anticipated success rates of one hundred percent in 2009, it had been suggested that wells targeting the Marcellus Shale and other low-permeability gas reservoirs using horizontal drilling and high-volume hydraulic fracturing may deserve consideration of pipeline certification by the PSC in advance of drilling to allow pipelines to be in place and operational at the time of the completion of the wells. However, as reported in late 2010 and described below, not all Marcellus Shale wells drilled in neighboring Pennsylvania have proved to be economical when drilled beyond what some have termed the "line of death."[509]

[509] Citizens Voice, Wilkes-Barre, PA., Drillers Take Another Chance in Columbia County, May 9, 2011 http://energy.wilkes.edu/pages/106.asp?item=341.

The PSC's statutory authority has its own "SEQR-like" review, record, and decision standards that apply to major gas and electric transmission lines. As mentioned above, PSC makes the final decision on Article VII applications. Article VII supersedes other State and local permits except for federally authorized permits;[510] however, Article VII establishes the forum in which community residents can participate with members of State and local agencies in the review process to ensure that the application comports with the substance of State and local laws. Throughout the Article VII review process, applicants are strongly encouraged to follow a public information process designed to involve the public in a project's review. Article VII includes major utility transmission facilities involving both electricity and fuel gas (natural gas), but the following discussion, which is largely derived from PSC's guide entitled "The Certification Review Process for Major Electric and Fuel Gas Transmission Facilities,"[511] is focused on the latter. While the focus of PSC's guide with respect to natural gas is the regulation and permitting of transmission lines at least ten miles long and operated at a pressure of 125 psig or greater, the certification process explained in the guide and outlined below provides the basis for the permitting of transmission lines less than ten miles long that would typically serve Marcellus Shale and other low-permeability gas reservoir wells.

Public Service Commission

PSC is the five-member decision-making body established by PSL § 4 that regulates investor-owned electric, natural gas, steam, telecommunications, and water utilities in New York State. The Commission, made up of a Chairman and four Commissioners, decides any application filed under Article VII. The Chairman of the Commission, designated by the Governor, is also the chief executive officer of the Department of Public Service (DPS). Employees of the DPS serve as staff to the PSC.

DPS is the State agency that serves to carry out the PSC's legal mandates. One of DPS's responsibilities is to participate in all Article VII proceedings to represent the public interest.

---

[510] Article VII does not however supplant the need to obtain property rights from the State for a transmission line project that proposes to cross State-owned land. PSC has no authority, express or implied, to grant land easements, licenses, franchises, revocable consents, or permits to use State land. The Department, therefore, retains the authority to grant or deny access to State lands under its jurisdiction.

[511] http://www.dps.state.ny.us/Article_VII_Process_Guide.pdf.

DPS employs a wide range of experts, including planners, landscape architects, foresters, aquatic and terrestrial ecologists, engineers, and economists, who analyze environmental, engineering, and safety issues, as well as the public need for a facility proposed under Article VII. These professionals take a broad, objective view of any proposal, and consider the project's effects on local residents, as well as the needs of the general public of New York State. Public participation specialists monitor public involvement in Article VII cases and are available for consultation with both applicants and stakeholders.

Article VII

The New York State Legislature enacted Article VII of the PSL in 1970 to establish a single forum for reviewing the public need for, and environmental impact of, certain major electric and gas transmission facilities. The PSL requires that an applicant must apply for a Certificate of Environmental Compatibility and Public Need (Certificate) and meet the Article VII requirements before constructing any such intrastate facility. Article VII sets forth a review process for the consideration of any application to construct and operate a major utility transmission facility. Natural gas transmission lines originating at wells are commonly referred to as "gathering lines" because the lines may collect or gather gas from a single or number of wells which feed a centralized compression facility or other transmission line. The drilling of multiple Marcellus Shale or other low-permeability gas reservoir wells from a single well pad and subsequent production of the wells into one large diameter gathering line eliminates the need for construction and associated cumulative impacts from individual gathering lines if traditionally drilled as one well per location. The PSL defines major natural gas transmission facilities, which statutorily includes many gathering lines, as pipelines extending a distance of at least 1,000 feet and operated at a pressure of 125 psig or more, except where such natural gas pipelines:

- are located wholly underground in a city;
- are located wholly within the right-of-way of a State, county or town highway or village street; or
- replace an existing transmission facility, and are less than one mile long.

Under 6 NYCRR § 617.5(c)(35), actions requiring a Certificate of Environmental Compatibility and Public Need under article VII of the PSL and the consideration of, granting or denial of any such Certificate are classified as "Type II" actions for the purpose of SEQR. Type II actions are those actions, or classes of actions, which have been found categorically to not have significant adverse impacts on the environment, or actions that have been statutorily exempted from SEQR review. Type II actions do not require preparation of an EAF, a negative or positive declaration, or an environmental impact statement (EIS) under SEQR. Despite the legal exemption from processing under SEQR, as previously noted, Article VII contains its own process to evaluate environmental and public safety issues and potential impacts, and impose mitigation measures as appropriate.

As explained in the GEIS, and shown in Table 8.2, PSC has siting jurisdiction over all lines operating at a pressure of 125 psig or more and at least 1,000 feet in length, and siting jurisdiction of lines below these thresholds if such lines are part of a larger project under PSC's purview. In addition, PSC's safety jurisdiction covers all natural gas gathering lines and pipelines regardless of operating pressure and line length. PSC's authority, at the well site, physically begins at the well's separator outlet. The Department's permitting authority over gathering lines operating at pressures less than 125 psig primarily focuses on the permitting of disturbances in environmentally sensitive areas, such as streams and wetlands, and the Department is responsible for administering federally delegated permitting programs involving air and water resources. For all other pipelines regulated by the PSC, the Department's jurisdiction is limited to the permitting of certain federally delegated programs involving air and water resources. Nevertheless, in all instances, the Department either directly imposes mitigation measures through its permits or provides comments to the PSC which, in turn, routinely requires mitigation measures to protect environmentally sensitive areas.

Pre-Application Process

Early in the planning phase of a project, the prospective Article VII applicant is encouraged to consult informally with stakeholders. Before an application is filed, stakeholders may obtain information about a specific project by contacting the applicant directly and asking the applicant to put their names and addresses on the applicant's mailing list to receive notices of public information meetings, along with project updates. After an application is filed, stakeholders may

request their names and addresses be included on a project "service list" which is maintained by the PSC. Sending a written request to the Secretary to the PSC to be placed on the service list for a case will allow stakeholders to receive copies of orders, notices and rulings in the case. Such requests should reference the Article VII case number assigned to the application.

Table 8.2 - Intrastate Pipeline Regulation[512]

Pipeline Type	Department	PSC
Gathering <125 psig	Siting jurisdiction only in environmentally sensitive areas where Department permits, other than the well permit, are required. Permitting authority for federally delegated programs such as Title V of the Clean Air Act (i.e., major stationary sources) and Clean Water Act National Pollutant Discharge Elimination System program (i.e., SPDES General Permit for Stormwater Discharges).	Safety jurisdiction. Public Service Law § 66, 16 NYCRR § 255.9 and Appendix 7-G(a)**.
Gathering ≥125 psig, <1,000 ft.	Permitting authority for certain federally delegated programs such as Title V of the Clean Air Act (i.e., major stationary sources) and Clean Water Act National Pollutant Discharge Elimination System program (i.e., SPDES General Permit for Stormwater Discharges).	Safety jurisdiction. Public Service Law § 66, 16 NYCRR § 255.9 and Appendix 7-G(a)**. Siting jurisdiction also applies if part of larger system subject to siting review. Public Service Law § 66, 16 NYCRR Subpart 85-1.4.
Fuel Gas Transmission* ≥125 psig, ≤1,000 ft., <5 mi., ≤6 in. diameter	Permitting authority for certain federally delegated programs such as Title V of the Clean Air Act (i.e., major stationary sources) and Clean Water Act National Pollutant Discharge Elimination System program (i.e., SPDES General Permit for Stormwater Discharges).	Siting and safety jurisdiction. Public Service Law Sub-Article VII § 121a-2, 16 NYCRR § 255.9 and Appendices 7-D, 7-G and 7-G(a)**. 16 NYCRR Subpart 85-1. EM&CS&P*** checklist must be filed. Service of NOI or application to other agencies required.
Fuel Gas Transmission* ≥125 psig, ≥5 mi., <10 mi. Note: The pipelines associated with wells being considered in this document typically fall into this category, or possibly the one above.	Permitting authority for certain federally delegated programs such as Title V of the Clean Air Act (i.e., major stationary sources) and Clean Water Act National Pollutant Discharge Elimination System program (i.e., SPDES General Permit for Stormwater Discharges).	Siting and safety jurisdiction. Public Service Law Sub-Article VII § 121a-2, 16 NYCRR § 255.9 and Appendices 7-D, 7-G and 7-G(a)**. 16 NYCRR Subpart 85-1. EM&CS&P*** checklist must be filed. Service of NOI or application to other agencies required.
Fuel Gas Transmission* ≥125 psig, ≥10 mi.	Permitting authority for certain federally delegated programs such as Title V of the Clean Air Act (i.e., major stationary sources) and Clean Water Act National Pollutant Discharge Elimination System program (i.e., SPDES General Permit for Stormwater Discharges).	Siting and safety jurisdiction. Public Service Law Article VII § 120, 16 NYCRR § 255.9, 16 NYCRR Subpart 85-2. Environmental assessment must be filed. Service of application to other agencies required.
* Federal Minimum Pipeline Safety Standards 49 CFR Part 192 supersedes PSC if line is closer than 150 ft. to a residence or in an urban area. ** Appendix 7-G(a) is required in all active farm lands. *** EM&CS&P means Environmental Management and Construction Standards and Practices.		

512 Adapted from the NYSDEC GEIS 1992.

Application

An Article VII application must contain the following information:

- location of the line and right-of-way;
- description of the transmission facility being proposed;
- summary of any studies made of the environmental impact of the facility, and a description of such studies;
- statement explaining the need for the facility;
- description of any reasonable alternate route(s), including a description of the merits and detriments of each route submitted, and the reasons why the primary proposed route is best suited for the facility; and
- such information as the applicant may consider relevant or the Commission may require.

In an application, the applicant is also encouraged to detail its public involvement activities and its plans to encourage public participation. DPS staff takes about 30 days after an application is filed to determine if the application is in compliance with Article VII filing requirements. If an application lacks required information, the applicant is informed of the deficiencies. The applicant can then file supplemental information. If the applicant chooses to file the supplemental information, the application is again reviewed by the DPS for a compliance determination. Once an application for a Certificate is filed with the PSC, no local municipality or other State agency may require any hearings or permits concerning the proposed facility.

Timing of Application & Pipeline Construction

The extraction of projected economically recoverable reserves from the Marcellus Shale, and other low-permeability gas reservoirs, presents a unique challenge and opportunity with respect to the timing of an application and ultimate construction of the pipeline facilities necessary to tie this gas source into the transportation system and bring the produced gas to market. In the course of developing other gas formations, the typical sequence of events begins with the operator first drilling a well to determine its productivity and, if successful, then submitting an Article VII application for PSC approval to construct the associated pipeline. This reflects the risk associated with conventional oil and gas exploration where finding natural gas in paying quantities is not guaranteed and the same appears to be true for potential drilling under the SGEIS as not all wells drilled will be productive. More than one or two wells on the same pad

may need to be drilled to prove economical production prior to an operator making a commitment to invest in and build a pipeline. Actual drilling at any given location is the only way to know if a given area will be productive, especially in the fringe of any predetermined productive fairways. In 2010, it was reported that Encana Oil & Gas USA Inc. drilled several unsuccessful Marcellus Shale wells in Luzerne County, Pennsylvania and that "there wasn't enough gas in either to be marketable."[513]

Consequently, the typical procedure of drilling wells, testing wells by flaring and then constructing gathering lines may or may not be suited for the development of the Marcellus Shale and other low permeability reservoirs depending upon the location of proposed wells and the establishment of productive fairways through drilling experience. In 2009, the success rate of horizontally drilled and hydraulically fractured Marcellus Shale wells in neighboring Pennsylvania and West Virginia, as reported by three companies, was one hundred percent for 44 wells drilled.[514] This early rate of success was apparently due primarily to the fact that the Marcellus Shale reservoir in location-specific fairways appears to contain natural gas in sufficient quantities which can be produced economically using horizontal drilling and high-volume hydraulic fracturing technology. However, as noted above, some Marcellus Shale wells subsequently drilled in Pennsylvania apparently using the same technology did not prove successful. It is highly unlikely that an operator in New York would make a substantial investment in a pipeline ahead of completing a well unless drilling is conducted in a known productive fairway and there is a near guarantee of finding gas in suitable quantities and at viable flow rates.

In addition, the Marcellus Shale formation in some areas is known to have a high concentration of clay that is sensitive to fresh water contact which makes the formation susceptible to re-closing if the flowback fluid and natural gas do not flow immediately after hydraulic fracturing operations. The horizontal drilling and hydraulic fracturing technique used to tap into the Marcellus in these areas could require that the well be flowed back and gas produced immediately after the well has been fractured and completed, otherwise the formation may be

---

[513] Citizens Voice, Despite Encana's Exit, Other Companies Stay Put, November 20, 2010 http://citizensvoice.com/news/despite-encana-s-exit-other-companies-stay-put-1.1066540#axzz1NZF239wB.

[514] Chesapeake Energy Corp., Fortuna Energy Inc., Seneca Resources Corp.

damaged and the well may cease to be economically productive. However, clay stabilizer additives are available for injection during hydraulic fracturing operations which help inhibit the swelling of clays present in the target formation. In addition to possibly enhancing the completion by preventing formation damage, having a pipeline in place when a well is initially flowed would reduce the amount of gas flared to the atmosphere during initial recovery operations. This type of completion with limited or no flaring is referred to as a reduced emissions completion (REC). To combat formation damage during hydraulic fracturing with conventional fluids, a new and alternative hydraulic fracturing technology recently entered the Canadian market and has also been used in Pennsylvania on a limited basis. It uses liquefied petroleum gas (LPG), consisting mostly of propane in place of water-based hydraulic fracturing fluids. Using propane not only minimizes formation damage, but also eliminates the need to source water for hydraulic fracturing, recover flowback fluids to the surface and dispose of the flowback fluids.[515] While it is not known if or when LPG hydraulic fracturing will be proposed in New York, having gathering infrastructure in place may be an important factor in realizing the advantages of this technology. Instead of LPG/natural gas separation equipment being required at individual well pads during flowback, an in-place gas production pipeline would allow and facilitate the siting of centralized separation equipment that could service a number of well pads thereby providing for a more efficient LPG hydraulic fracturing operation.

Also, if installed prior to well drilling, an in-place gas production pipeline could serve a second purpose and be used initially to transport fresh water or recycled hydraulic fracturing fluids to the well site for use in hydraulic fracturing the first well on the pad. This in itself would reduce or eliminate other fluid transportation options, such as trucking and construction of a separate fluid pipeline, and associated impacts. Because of the many potential benefits noted above, which have been demonstrated in other states, it has been suggested that New York should have the option, after drilling experience is gained, to certify and build pipelines in advance of well drilling targeting the Marcellus Shale and other low-permeability gas reservoirs in known productive fairways.

[515] Smith M, 2008, p. 4.

Filing and Notice Requirements

Article VII requires that a copy of an application for a transmission line ten miles or longer in length be provided by the applicant to the Department, the Department of Economic Development, the Secretary of State, the Department of Agriculture and Markets and the Office of Parks, Recreation and Historic Preservation, and each municipality in which any portion of the facility is proposed to be located. This is done for both the primary route proposed and any alternative locations listed. A copy of the application must also be provided to the State legislators whose districts the proposed primary facility or any alternative locations listed would pass through. Service requirements for transmission lines less than 10 miles in length are slightly different but nevertheless comprehensive.

An Article VII application for a transmission line ten miles or longer in length must be accompanied by proof that notice was published in a newspaper(s) of general circulation in all areas through which the facility is proposed to pass, for both its primary and alternate routes. The notice must contain a brief description of the proposed facility and its proposed location, along with a discussion of reasonable alternative locations. An applicant is not required to provide copies of the application or notice of the filing of the application to individual property owners of land on which a portion of either the primary or alternative route is proposed. However, to help foster public involvement, an applicant is encouraged to do so.

Party Status in the Certification Proceeding

Article VII specifies that the applicant and certain State and municipal agencies are parties in any case. The Department and the Department of Agriculture & Markets are among the statutorily named parties and usually actively participate. Any municipality through which a portion of the proposed facility will pass, or any resident of such municipality, may also become a formal party to the proceeding. Obtaining party status enables a person or group to submit testimony, cross-examine witnesses of other parties and file briefs in the case. Being a party also entails the responsibility to send copies of all materials filed in the case to all other parties. DPS staff participates in all Article VII cases as a party, in the same way as any other person who takes an active part in the proceedings.

The Certification Process

Once all of the information needed to complete an application is submitted and the application is determined to be in compliance, review of the application begins. In a case where a hearing is held, the Commission's Office of Hearings and Alternative Dispute Resolution provides an Administrative Law Judge (ALJ) to preside in the case. The ALJ is independent of DPS staff and other parties and conducts public statement and evidentiary hearings and rules on procedural matters. Hearings help the Commission decide whether the construction and operation of new transmission facilities will fulfill the public need, be compatible with environmental values and the public health and safety, and comply with legal requirements. After considering all the evidence presented in a case, the ALJ usually makes a recommendation for the Commission's consideration.

Commission Decision

The Commission reviews the ALJ's recommendation, if there is one, and considers the views of the applicant, DPS staff, other governmental agencies, organizations, and the general public, received in writing, orally at hearings or at any time in the case. To grant a Certificate, either as proposed or modified, the Commission must determine all of the following:

- the need for the facility;
- the nature of the probable environmental impact;
- the extent to which the facility minimizes adverse environmental impact, given environmental and other pertinent considerations;
- that the facility location will not pose undue hazard to persons or property along the line;
- that the location conforms with applicable State and local laws; and
- that the construction and operation of the facility is in the public interest.

Following Article VII certification, the Commission typically requires the certificate holder to submit various additional documents to verify its compliance with the certification order. One of the more notable compliance documents, an Environmental Management and Construction Plan (EM&CP), must be approved by the Commission before construction can begin. The EM&CP details the precise field location of the facilities and the special precautions that will be taken

during construction to ensure environmental compatibility. The EM&CP must also indicate the practices to be followed to ensure that the facility is constructed in compliance with applicable safety codes and the measures to be employed in maintaining and operating the facility once it is constructed. Once the Commission is satisfied that the detailed plans are consistent with its decision and are appropriate to the circumstances, it will authorize commencement of construction. DPS staff is then responsible for checking the applicant's practices in the field.

Amended Certification Process

In 1981, the Legislature amended Article VII to streamline procedures and application requirements for the certification of fuel gas transmission facilities operating at 125 psig or more, and that extend at least 1,000 feet, but less than ten miles. The pipelines or gathering lines associated with wells being considered in this document typically fall into this category, and, consequently, a relatively expedited certification process occurs that is intended to be no less protective. The updated requirements mimic those described above with notable differences being: 1) a NOI may be filed instead of an application, 2) there is no mandatory hearing with testimony or required notice in newspaper, and 3) the PSC is required to act within thirty or sixty days depending upon the size and length of the pipeline.

The updated requirements applicable to such fuel gas transmission facilities are set forth in PSL Section 121-a and 16 NYCRR Sub-part 85-1. All proposed pipeline locations are verified and walked in the field by DPS staff as part of the review process, and staff from the Department and Department of Agriculture & Markets may participate in field visits as necessary. As mentioned above, these departments normally become active parties in the NOI or application review process and usually provide comments to DPS staff for consideration. Typical comments from the Department and Agriculture and Markets relate to the protection of agricultural lands, streams, wetlands, rare or state-listed animals and plants, and significant natural communities and habitats.

Instead of an applicant preparing its own environmental management and construction standards and practices (EM&CS&P), it may choose to rely on a PSC-approved set of standards and practices, the most comprehensive of which was prepared by DPS staff in February 2006.[516] The

[516] NYSDPS, 2006

DPS-authored EM&CS&P was written primarily to address construction of smaller-scale fuel gas transmission projects envisioned by PSL Section 121-a that will be used to transport gas from the wells being considered in this document. Comprehensive planning and construction management are key to minimizing adverse environmental impacts of pipelines and their construction. The EM&CS&P is a tool for minimizing such impacts of fuel gas transmission pipelines reviewed under the PSL. The standards and practices contained in the 2006 EM&CS&P handbook are intended to cover the range of construction conditions typically encountered in constructing pipelines in New York.

The pre-approved nature of the 2006 EM&CS&P supports a more efficient submittal and review process, and aids with the processing of an application or NOI within mandated time frames. The measures from the EM&CS&P that will be used in a particular project must be identified on a checklist and included in the NOI or application. A sample checklist is included as Appendix 14, which details the extensive list of standards and practices considered in DPS's EM&CS&P and readily available to the applicant. Additionally, the applicant must indicate and include any measures or techniques it intends to modify or substitute for those included in the PSC-approved EM&CS&P.

An important measure specified in the EM&CS&P checklist is a requirement for supervision and inspection during various phases of the project. Page four of the 2006 EM&CS&P states "At least one Environmental Inspector (EI) is required for each construction spread during construction and restoration. The number and experience of EIs should be appropriate for the length of the construction spread and number/significance or resources affected." The 2006 EM&CS&P also requires that the name(s) of qualified Environmental Inspector(s) and a statement(s) of the individual's relative project experience be provided to the DPS prior to the start of construction for DPS staff's review and acceptance. Another important aspect of the PSC-approved EM&CS&P is that Environmental Inspectors have stop-work authority entitling the EI to stop activities that violate Certificate conditions or other federal, State, local or landowner requirements, and to order appropriate corrective action.

Conclusion

Whether an applicant submits an Article VII application or Notice of Intent as allowed by the Public Service Law, the end result is that all Public Service Commission-issued Certificates of Environmental Compatibility and Public Need for fuel gas transmission lines contain ordering clauses, stipulations and other conditions that the Certificate holder must comply with as a condition of acceptance of the Certificate. Many of the Certificate's terms and conditions relate to environmental protection. The Certificate holder is fully expected to comply with all of the terms and conditions or it may face an enforcement action. DPS staff monitor construction activities to help ensure compliance with the Commission's orders. After installation and pressure testing of a pipeline, its operation, monitoring, maintenance and eventual abandonment must also be conducted in accordance with and adhere to the provisions of the Certificate and New York State law and regulations.

8.1.2.2 NYS Department of Transportation

New York State requires all registrants of commercial motor vehicles to obtain a USDOT number. New York has adopted the FMCSA regulations CFR 49, Parts 390, 391, 392, 393, 395, and 396, and the Hazardous Materials Transportation Regulations, Parts 100 through 199, as those regulations apply to interstate highway transportation (NYSDOT, 6/2/09). There are minor exemptions to these federal regulations in NYCRR Title17 Part 820, "New York State Motor Carrier Safety Regulations"; however, the exemptions do not directly relate to the objectives of this review.

The NYS regulations include motor vehicle carriers that operate solely on an intrastate basis. Those carriers and drivers operating in intrastate commerce must comply with 17 NYCRR Part 820, in addition to the applicable requirements and regulations of the NYS Vehicle and Traffic Law and the NYS Department of Motor Vehicles (DMV), including the regulations requiring registration or operating authority for transporting hazardous materials from the USDOT or the NYSDOT Commissioner.

Part 820.8 (Transportation of hazardous materials) states "Every person … engaged in the transportation of hazardous materials within this State shall be subject to the rules and regulations contained in this Part." The regulations require that the material be "properly

classed, described, packaged, clearly marked, clearly labeled, and in the condition for shipment…" [820.8(b)]; that the material "is handled and transported in accordance with this Part" [(820.8(c)]; "require a shipper of hazardous materials to have someone available at all times, 24 hours a day, to answer questions with respect to the material being carried and the hazards involved" [(820.8.(f)]; and provides for immediately reporting to "the fire or police department of the local municipality or to the Division of State Police any incident that occurs during the course of transportation (including loading, unloading and temporary storage) as a direct result of hazardous materials" [820.8 (h)].

Part 820 specifies that "In addition to the requirements of this Part, the Commissioner of Transportation adopts the following sections and parts of Title 49 of the Code of Federal Regulations with the same force and effect… for classification, description, packaging, marking, labeling, preparing, handling and transporting all hazardous materials, and procedures for obtaining relief from the requirements, all of the standards, requirements and procedures contained in sections 107.101, 107.105, 107.107, 107.109, 107.111, 107.113, 107.117, 107.121, 107.123, Part 171, except section 171.1, Parts 172 through 199, including appendices, inclusive and Part 397.

NYSDOT would also have an advisory role with respect to the transportation plans and road condition assessments that operators will be required to submit.

8.1.3 Federal

The United States Department of Transportation is the only newly listed federal agency in Table 8.1. As explained in Chapter 5, the US DOT regulates transportation of hazardous chemicals found in fracturing additives and has also established standards for containers. Roles of the other federal agencies shown on Table 15.1 will not change.

8.1.3.1 U.S. Department of Transportation

The federal Hazardous Material Transportation Act (HMTA, 1975) and the Hazardous Materials Transportation Uniform Safety Act (HMTUSA, 1990) are the basis for federal hazardous materials transportation law (49 U.S.C.) and give regulatory authority to the Secretary of the USDOT to:

- "Designate material (including an explosive, radioactive, infectious substance, flammable or combustible liquid, solid or gas, toxic, oxidizing, or corrosive material, and compressed gas) or a group or class of material as hazardous when the Secretary determines that transporting the material in commerce in a particular amount and form may pose an unreasonable risk to health and safety or property; and

- "Issue regulations for the safe transportation, including security, of hazardous material in intrastate, interstate, and foreign commerce" (PHMSA, 2009).

The Code of Federal Regulations (CFR), Title 49, includes the Hazardous Materials Transportation Regulations, Parts 100 through 199. Federal hazardous materials regulations include:

- Hazardous materials classification (Parts 171 and 173);
- Hazard communication (Part 172);
- Packaging requirements (Parts 173, 178, 179, 180);
- Operational rules (Parts 171, 172, 173, 174, 175, 176, 177);
- Training and security (part 172); and
- Registration (Part 171).

The extensive regulations address the potential concerns involved in transporting hazardous fracturing additives, such as Loading and Unloading (Part 177), General Requirements for Shipments and Packaging (Part 173), Specifications for Packaging (Part 178), and Continuing Qualification and Maintenance of Packaging (Part 180).

Regulatory functions are carried out by the following USDOT agencies:

- Pipeline and Hazardous Materials Safety Administration (PHMSA);
- Federal Motor Carrier Safety Administration (FMCSA);
- Federal Aviation Administration (FAA); and
- United States Coast Guard (USCG).

Each of these agencies shares in promulgating regulations and enforcing the federal hazmat regulations. State, local, or tribal requirements may only preempt federal hazmat regulations if one of the federal enforcing agencies issues a waiver of preemption based on accepting a regulation that offers an equal or greater level of protection to the public and does not unreasonably burden commerce.

The interstate transportation of hazardous materials for motor carriers is regulated by FMCSA and PHMSA. FMCSA establishes standards for commercial motor vehicles, drivers, and companies, and enforces 49 CFR Parts 350-399. FMCSA's responsibilities include monitoring and enforcing regulatory compliance, with focus on safety and financial responsibility. PHMSA's enforcement activities relate to "the shipment of hazardous materials, fabrication, marking, maintenance, reconditioning, repair or testing of multi-modal containers that are represented, marked, certified, or sold for use in the transportation of hazardous materials." PHMSA's regulatory functions include issuing Hazardous Materials Safety Permits; issuing rules and regulations for safe transportation; issuing, renewing, modifying, and terminating special permits and approvals for specific activities; and receiving, reviewing, and maintaining records, among other duties.

8.1.3.2 Occupational Safety and Health Administration – Material Safety Data Sheets

The Occupational Safety and Health Administration (OSHA) is part of the United States Department of Labor, and was created by Congress under the Occupational Safety and Health Act of 1970 to ensure safe and healthful working conditions by setting and enforcing standards and by providing training, outreach, education and assistance.[517]

In order to ensure chemical safety in the workplace, information must be available about the identities and hazards of chemicals. OSHA's Hazard Communication Standard, 29 CFR §1910.1200,[518] requires the development and dissemination of such information and requires that chemical manufacturers and importers evaluate the hazards of the chemicals they produce or import, prepare labels and Material Safety Data Sheets (MSDSs) to convey the hazard

[517] OSHA, http://www.osha.gov/about.html.

[518] Available at http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=10099.

information, and train workers to handle chemicals appropriately. This standard also requires all employers to have MSDSs in their workplaces for each hazardous chemical they use.

The requirements pertaining to MSDSs are described in 29 CFR §1910.1200(g), and include the following information:

- The identity used on the label;
- The chemical[519] and common name(s)[520] of the hazardous chemical[521] ingredients, except as provided for in §1910.1200(i) regarding trade secrets;
- Physical and chemical characteristics of the hazardous chemical(s);
- Physical hazards of the hazardous chemical(s), including the potential for fire, explosion and reactivity;
- Health hazards of the hazardous chemical(s);
- Primary route(s) of entry;
- The OSHA permissible exposure limit, ACGIH Threshold Limit Value, and any other exposure limit used or recommended by the chemical manufacturer, importer or employer preparing the MSDS;
- Whether the hazardous chemical(s) is listed in the National Toxicology Program (NTP) Annual Report on Carcinogens (latest edition) or has been found to be a potential carcinogen in the International Agency for Research on Cancer (IARC) Monographs (latest editions), or by OSHA;

---

[519] 29 CFR §1910.1200(c) defines "chemical name" as "the scientific designation of a chemical in accordance with the nomenclature system developed by the International Union or Pure and Applied Chemistry (IUPAC) or the Chemical Abstracts Service (CAS) rules of nomenclature, or a name which will clearly identify the chemical for the purpose of conducting a hazard evaluation."

[520] 29 CFR §1910.1200(c) defines "common name" as "any designation or identification such as code name, code number, trade name, brand name or generic name used to identify a chemical other than by its chemical name."

[521] 29 CFR §1910.1200(c) defines "hazardous chemical" as "any chemical which is a physical hazard or a health hazard," and further defines "physical hazard" and "health hazard" respectively as follows: "Physical hazard means a chemical for which there is scientifically valid evidence that it is a combustible liquid, a compressed gas, explosive, flammable, an organic peroxide, an oxidizer, pyrophoric, unstable (reactive) or water-reactive"; "Health hazard means a chemical for which there is statistically significant evidence based on at least one study conducted in accordance with established scientific principles that acute or chronic health effects may occur in exposed employees. The term 'health hazard' includes chemicals which are carcinogens, toxic or highly toxic agents, reproductive toxins, irritants, corrosives, sensitizers, hepatoxins, nephrotoxins, neurotoxins, agents which act on the hematopoietic system, and agents which damage the lungs, skin, eyes, or mucous membranes."

- Any generally applicable precautions for safe handling and use including appropriate hygienic practices, measures during repair and maintenance of contaminated equipment, and procedures for clean-up of spills and leaks;

- Any generally applicable control measures such as appropriate engineering controls, work practices, or personal protective equipment;

- Emergency and first aid procedures;

- Date of preparation of the MSDS or the last change to it; and

- Name, address and telephone number of the chemical manufacturer, importer, employer or other responsible party preparing or distributing the MSDS, who can provide additional information on the hazardous chemical and appropriate emergency procedures, if necessary.

MSDSs and Trade Secrets

29 CFR §1910.1200(i) sets forth an exception from disclosure in the MSDS of the specific chemical identity, including the chemical name and other specific identification of a hazardous chemical, if such information is considered to be trade secret. This exception however is conditioned on the following:

- that the claim of trade secrecy can be supported;

- that the MSDS discloses information regarding the properties and effects of the hazardous chemical;

- that the MSDS indicates the specific chemical identity is being withheld as a trade secret; and

- that the specific chemical identity is made available to health professionals, employees, and designated representatives in accordance with the provisions of 29 CFR §1910.1200(i)(3) and (4) which discuss emergency and non-emergency situations.

8.1.3.3 EPA's Mandatory Reporting of Greenhouse Gases

In October 2009, the United States EPA published 40 CFR §98, referred to as the Greenhouse Gas (GHG) Reporting Program, which mandates the monitoring and reporting of GHG emissions from certain source categories in the United States. The nationwide emission data collected under the program will provide a better understanding of the relative GHG emissions of specific industries and of individual facilities within those industries, as well as better understanding of the factors that influence GHG emissions rates and actions facilities could take to reduce emissions.[522]

The GHG reporting requirements for facilities that contain petroleum and natural gas systems were finalized in November 2010 as Subpart W of 40 CFR §98. Under Subpart W, facilities that emit 25,000 metric tons or more of CO_2 equivalent[523] per year in aggregated emissions from all sources are required to report annual GHG emission to EPA. More specifically, petroleum and natural gas facilities that meet or exceed the reporting threshold are required to report annual methane (CH_4) and carbon dioxide (CO_2) emissions from equipment leaks and venting, and emissions of CO_2, CH_4, and nitrous oxide (N_2O) from flaring, onshore production stationary and portable combustion emission, and combustion emissions from stationary equipment involved in natural gas distribution.[524]

The rule requires data collection to begin on January 1, 2011 and that reports be submitted annually by March 31st, for the GHG emissions from the previous calendar year.

Onshore Petroleum and Natural Gas Production Sector

For monitoring and reporting purposes, Subpart W divides the petroleum and natural gas systems source category into seven segments including: onshore petroleum and natural gas production, offshore petroleum and natural gas production, onshore natural gas processing, onshore natural gas transmission compression, underground natural gas storage, liquefied natural gas (LNG)

---

522 USEPA, August 2010.

523 CO_2 equivalent is defined by EPA as a metric measure used to compare the emissions from various GHGs based upon their global warming potential (GWP), which is the cumulative radiative forcing effects of a gas over a specified time horizon resulting from the emission of a unit mass of gas relative to a reference gas.

524 USEPA, Fact Sheet for Subpart W, November 2010.

storage and LNG import and export, and natural gas distribution. 40 CFR §98.230(a)(2) defines onshore petroleum and natural gas production to mean:

> "all equipment on a well pad or associated with a well pad (including compressors, generators, or storage facilities), and portable non-self-propelled equipment on a well pad or associated with a well pad (including well drilling and completion equipment, workover equipment, gravity separation equipment, auxiliary non-transportation-related equipment, and leased, rented or contracted equipment) used in the production, extraction, recovery, lifting, stabilization, separation or treating of petroleum and/or natural gas (including condensate)."

Facility Definition for Onshore Petroleum and Natural Gas Production

Reporting under 40 CFR §98 is at the facility level, however due to the unique characteristics of onshore petroleum and natural gas production, the definition of "facility" for this industry segment under Subpart W is distinct from that used for other segments throughout the GHG Reporting Program. 40 CFR §98.238 defines an onshore petroleum and natural gas production facility as:

> "all petroleum or natural gas equipment on a well pad or associated with a well pad and CO_2 enhanced oil recovery (EOR) operations that are under common ownership or common control included leased, rented, and contracted activities by an onshore petroleum and natural gas production operator and that are located in a single hydrocarbon basin as defined in §98.238.[525] Where a person or entity owns or operators more than one well in a basin, then all onshore petroleum and natural gas production equipment associated with all wells that the person or entity owns or operates in the basin would be considered one facility."

[525] 40 CFR §98.238 defines "basin" as "geologic provinces as defined by the American Association of Petroleum Geologists (AAPG) Geologic Note: AAPG-DSD Geologic Provinces code Map: AAPG Bulletin, Prepared by Richard F. Meyer, Laure G. Wallace, and Fred J. Wagner, Jr., Volume 75, Number 10 (October 1991) and the Alaska Geological Province Boundary Map, Compiled by the American association of Petroleum Geologists committee on Statistics of Drilling in Cooperation with the USGS, 1978."

GHGs to Report

Facilities assessing their applicability in the onshore petroleum and natural gas production segment must only include emissions from equipment, as specified in 40 CFR 98.232(c) and discussed below, to determine if they exceed the 25,000 metric ton CO_2 equivalent threshold and thus are required to report their GHG emissions to EPA.[526]

§98.232(c) specifies that onshore petroleum and natural gas production facilities report CO_2, CH_4, and N_2O emissions from only the following source types:

- Natural gas pneumatic device venting;
- Natural gas driven pneumatic pump venting;
- Well venting for liquids unloading;
- Gas well venting during well completions without hydraulic fracturing;
- Gas well venting during well completions with hydraulic fracturing;
- Gas well venting during well workovers without hydraulic fracturing;
- Gas well venting during well workovers with hydraulic fracturing;
- Flare stack emissions;
- Storage tanks vented emissions from producted hydrocarbons;
- Reciprocating compressor rod packing venting;
- Well testing venting and flaring;
- Associated gas venting and flaring from produced hydrocarbons;
- Dehydrator vents;
- EOR injection pump blowdown;
- Acid gas removal vents;

[526] Federal Register, November 30, 2010, p. 77462.

- EOR hydrocarbon liquids dissolved CO_2;
- Centrifugal compressor venting;
- Equipment leaks from valves, connectors, open ended lines, pressure relief valves, pumps, flanges, and other equipment leak sources (such as instruments, loading arms, stuffing boxes, compressor seals, dump lever arms, and breather caps); and
- Stationary and portable fuel combustion equipment that cannot move on roadways under its own power and drive train, and that are located at on onshore production well pad. The following equipment is listed within the rule as integral to the extraction, processing, or movement of oil or natural gas: well drilling and completion equipment; workover equipment; natural gas dehydrators; natural gas compressors; electrical generators; steam boilers; and process heaters.

GHG Emissions Calculations, Monitoring and Quality Assurance

40 CFR §98.233 prescribes the use of specific equations and methodologies for calculating GHG emissions from each of the source types listed above. The GHG calculation methodologies used in the rule generally include the use of engineering estimates, emissions modeling software, and emission factors, or when other methods are not feasible, direct measurement of emissions.[527] In some cases, the rule allows reporters the flexibility to choose from more than one method for calculating emissions from a specific source type; however, reporters must keep record in their monitoring plans as outlined in 40 CFR 98.3(g).[528]

Also, for specified time periods during the 2011 data collection year, reporters may use best available monitoring methods (BAMM) for certain emission sources in lieu of the monitoring methods prescribed in §98.233. This is intended to give reporters flexibility as they revise procedures and contractual agreements during early implementation of the rule.[529]

40 CFR §98.234 mandates that the GHG emissions data be quality assured as applicable and prescribes the use of specific methods to conduct leak detection of equipment leaks, procedures to operate and calibrate flow meters, composition analyzers and pressure gages used to measure quantities, and conditions and procedures related to the use of calibrated bags, and high volume

[527] USEPA Fact Sheet for Subpart W, November 2010.

[528] Federal Register. November 30, 2010, p. 74462.

[529] Federal Register. November 30, 2010, p. 74462.

samplers to measure emissions. Section 98.235 prescribes procedures for estimating missing data.

Data Recordkeeping and Reporting Requirements

Title 40 CFR §98.3(c) specifies general recordkeeping and reporting requirements that all facilities required to report under the rule must follow. For example, all reporters must:

- Retain all required records for at least 5 years;
- Keep records in an electronic or hard-copy format that is suitable for expeditious inspection and review;
- Make required records available to the EPA Administrator upon request;
- List all units, operations, processes and activities for which GHG emissions were calculated;
- Provide the data used to calculate the GHG emissions for each unit, operation, process and activity, categorized by fuel or material type;
- Document the process used to collect the necessary data for GHG calculations;
- Document the GHG emissions factors, calculations and methods used;
- Document any procedural changes to the GHG accounting methods and any changes in the instrumentation critical to GHG emissions calculations; and
- Provide a written quality assurance performance plan which includes the maintenance and repair of all continuous monitoring systems, flowmeters and other instrumentation.

40 CFR §98.236 specifies additional reporting requirements that are specific to the Petroleum and Natural Gas Systems covered under Subpart W.

8.1.4 River Basin Commissions

SRBC and DRBC are not directly involved in the well permitting process, and the Department will gather information related to proposed surface water withdrawals that are identified in well permit applications. However, the Department will continue to participate on each Commission to provide input and information regarding projects of mutual interest.

On May 6, 2010 the DRBC announced that it would draft regulations necessary to protect the water resources of the DRB during natural gas development. The drilling pad, accompanying facilities, and locations of water withdrawals were identified as part of the natural gas extraction project and subject to regulation by the DRBC. A draft rule was published in December 2010 and comments were accepted until April 15, 2011. There is no projected date or deadline for the adoption of rule changes.

8.2 Intra-Department

8.2.1 Well Permit Review Process

The Division of Mineral Resources (DMN) would maintain its lead role in the review of Article 23 well permit applications, including review of the fluid disposal plan that is required by 6 NYCRR §554.1(c)(1). The Division of Water would assist in this review if the applicant proposes to discharge either flowback water or production brine to a POTW. The Division of Fish, Wildlife and Marine Resources (DFWMR) would have an advisory role regarding invasive species control, and would assist in the review of site disturbance in Forest and Grassland Focus Areas. The Division of Air Resources would have an advisory role with respect to applicability of various air quality regulations and effectiveness of proposed emission control measures. When a site-specific SEQRA review is required, DMN would be assisted by other appropriate Department programs, depending on the reason that site-specific review is required and the subject matter of the review. The Division of Materials Management (DMM) would review applications for beneficial use of production brine in road-spreading projects.

8.2.1.1 Required Hydraulic Fracturing Additive Information

As set forth in Chapter 5, NYSDOH reviewed information on 322 unique chemicals present in 235 products proposed for hydraulic fracturing of shale formations in New York, categorized them into chemical classes, and did not identify any potential exposure situations that are qualitatively different from those addressed in the 1992 GEIS. The regulatory discussion in Section 8.4 concludes that adequate well design prevents contact between fracturing fluids and fresh ground water sources, and text in Chapter 6 along with Appendix 11 on subsurface fluid mobility explains why ground water contamination by migration of fracturing fluid is not a reasonably foreseeable impact. Chapters 6 and 7 include discussion of how setbacks, inherent mitigating factors, and a myriad of regulatory controls protect surface waters. Chapter 7 also

sets forth a water well testing protocol using indicators that are independent of specific additive chemistry.

For every well permit application the Department would require, as part of the EAF Addendum, identification of additive products, by product name and purpose/type, and proposed percent by weight of water, proppants and each additive. This would allow the Department to determine whether the proposed fracturing fluid is water-based and generally similar to the fluid represented by Figures 5.3, 5.4, and 5.5. Additionally, the anticipated volume of each additive product proposed for use would be required as part of the EAF Addendum. Beyond providing information about the quantity of each additive product to be utilized, this requirement informs the Department of the approximate quantity of each additive product that would be on-site for each high-volume hydraulic fracturing operation.

The Department would also require the submittal of an MSDS for every additive product proposed for use, unless the MSDS for a particular product is already on file as a result of the disclosure provided during the preparation process of this SGEIS (as discussed in Chapter 5) or during the application process for a previous well permit. Submittal of product MSDSs would provide the Department with the identities, properties and effects of the hazardous chemical constituents within each additive proposed for use.

Finally, the Department proposes to require that the application materials (i) document the applicant’s evaluation of available alternatives for the proposed additive products that are efficacious but which exhibit reduced aquatic toxicity and pose less risk to water resources and the environment and (ii) contain a statement that the applicant will utilize such alternatives, unless it demonstrates to DMN's satisfaction that they are not equally effective or feasible. The evaluation criteria should include (1) impact to the environment caused by the additive product if it remains in the environment, (2) the toxicity and mobility of the available alternatives, (3) persistence in the environment, (4) effectiveness of the available alternative to achieve desired results in the engineered fluid system and (5) feasibility of implementing the alternative.

In addition to the above requirements for well permit applications, the Department would continue its practice of requiring hydraulic fracturing information, including identification of

materials and volumes of materials utilized, on the well completion report[530] which is required, in accordance with 6 NYCRR §554.7, to be submitted to the Department within 30 days after the completion of any well. This requirement can be utilized by Department staff to verify that only those additive products proposed at the time of application, or subsequently proposed and approved prior to use, were utilized in a given high-volume hydraulic fracturing operation.

The Department has the authority to require, at any time, the disclosure of any additional additive product composition information it deems necessary to ensure that environmental protection and public health and safe drinking water objectives are met, or to respond to an environmental or public health and safety concern. This authority includes the ability to require the disclosure of information considered to be trade secret, so long as such information is handled in accordance with the New York State Public Officer's Law, POL§89(5), and the Department's Records Access Regulations, 6 NYCRR §616.7.

In accordance with the discussion in Chapter 7 regarding Publicly Owned Treatment Works (POTWs), the Department proposes to require the disclosure of additional additive composition information as part of any headworks analysis used to determine whether a particular treatment facility can accept flowback or production brine from wells permitted pursuant to this Supplement, or whether a modification to the POTW's SPDES permit is necessary prior to any acceptance of such fluids. This disclosure however, would be handled separately from the application for permit to drill, as the evaluation of headworks analyses and any necessary SPDES permit modifications would be handled through existing Department processes.

Public Disclosure of Additive Information

Although the Department must handle information which is sufficiently justified as trade secret in accordance with existing law and regulation as previously discussed, the Department considers MSDSs to be public information ineligible for exception from disclosure as trade secrets. Therefore, the Department proposes to provide a listing of high-volume hydraulic fracturing additive product names and links to the associated product MSDSs on an individual well basis on its website. This would provide the public with a resource, beyond the Freedom of

[530] The Well Drilling and Completion Report Form is available on the Department's website at http://www.dec.ny.gov/docs/materials_minerals_pdf/comp_rpt.pdf .

Information Law, for obtaining information about the additives utilized in high-volume hydraulic fracturing operations in New York, and it would provide the natural gas industry with a resource for determining if a particular product MSDS is already on file with the Department or if an MSDS needs to be submitted at the time a product is proposed for use.

The New York State Public Officer's Law and the Department's Records Access Regulations would continue to govern the handling of any other records submitted to the Department as part of the well permit application process, or in response to any Department request for additional additive product composition information.

8.2.2 Other Department Permits and Approvals

The Division of Environmental Permits (DEP) manages most other permitting programs in the Department and is therefore shown in Table 8.1 as having primary responsibility for wetlands permitting, review of new in-state industrial treatment plants, and injection well disposal. The Department's technical experts on wetlands permitting reside in DFWMR. Technical review of SPDES permits, including for industrial treatment plants, POTWs and injection wells is typically conducted by DOW. Other programs where DOW bears primary responsibility include stormwater permitting, dam safety permitting for freshwater impoundments, and review of headworks analysis to determine acceptability of a POTW's receiving flowback water. Waste haulers who transport wellsite fluids come under the purview of DER's Part 364 program, and must obtain a Beneficial Use Determination for road-spreading from DMM. DFWMR would review new proposed surface withdrawals to assist DMN in its determination of whether a site-specific SEQRA determination is required. DAR would have a primary permitting role if emissions at centralized flowback water surface impoundments or well pads trigger regulatory thresholds.

8.2.2.1 Bulk Storage

The Department regulates bulk storage of petroleum and hazardous chemicals under 6 NYCRR Parts 612-614 for Petroleum Bulk Storage (PBS) and Parts 595-597 for Chemical Bulk Storage (CBS). The PBS regulations do not apply to non-stationary tanks; however, all petroleum spills, leaks, and discharges must be reported to the Department (613.8).

The CBS regulations that potentially may apply to fracturing fluids include non-stationary tanks, barrels, drums or other vessels that store 1000 kg or greater for a period of 90 consecutive days. Liquid fracturing chemicals are stored in non-stationary containers but most likely would not be stored on-site for 90 consecutive days; therefore, those chemicals are exempt from Part 596, "Registration of Hazardous Substance Bulk Storage Tanks" unless the storage period criteria are exceeded. These liquids typically are trucked to the drill site in volumes required for consumptive use and only days before the fracturing process. Dry chemical additives, even if stored on site for 90 days, would be exempt from 6 NYCRR because the dry materials are stored in 55-lb bags secured on plastic-wrapped pallets.

The facility must maintain inventory records for all applicable non-stationary tanks including those that do not exceed the 90-day storage threshold. The CBS spill regulations and reporting requirements also apply regardless of the storage thresholds or exemptions. Any spill of a "reportable quantity" listed in Part 597.2(b), must be reported within 2 hours unless the spill is contained by secondary containment within 24 hours and the volume is completely recovered. Spills of any volume must be reported within two (2) hours if the release could cause a fire, explosion, contravention of air or water quality standards, illness, or injury. Forty-two of the chemicals listed in Table 5.7 are listed in Part 597.2(b).

8.2.2.2 Impoundment Regulation

Water stored within an impoundment represents potential energy which, if released, could cause personal injury, property damage and natural resource damage. In order for an impoundment to safely fulfill its intended function, the impoundment must be properly designed, constructed, operated and maintained.

As defined by ECL Section 15-0503, a dam is any artificial barrier, including any earthen barrier or other structure, together with its appurtenant works, which impounds or will impound waters. As such, any engineered impoundment designed to store water for use in hydraulic fracturing operations is considered to be a dam and is therefore subject to regulation in accordance with the ECL, the Department's Dam Safety Regulations and the associated Protection of Waters permitting program.

Statutory Authority

Chapter 364, Laws of 1999 amended ECL Sections 15-0503, 15-0507 and 15-0511 to revise the applicability criteria for the dam permit requirement and provide the Department the authority to regulate dam operation and maintenance for safety purposes. Additionally the amendments established the dam owners' responsibility to operate and maintain dams in a safe condition.

Although the revised permit criteria, which are discussed below, became effective in 1999, implementing the regulation of dam operation and maintenance for all dams (regardless of the applicability of the permit requirement) necessitated the promulgation of regulations. As such, the Department issued proposed dam safety regulations in February 2008, followed by revised draft regulations in May 2009 and adopted the amended regulations in August 2009. These adopted regulations contain amendments to Part 673 and to portions of Parts 608 and 621 of Title 6 of the Official Compilation of Codes, Rules and Regulations of the State of New York.[531]

Permit Applicability

In accordance with ECL §15-0503 (1)(a), a Protection of Waters Permit is required for the construction, reconstruction, repair, breach or removal of an impoundment provided the impoundment has:

- a height equal to or greater than fifteen feet;[532] or
- a maximum impoundment capacity equal to or greater than three million gallons.[533]

If, however, either of the following exemption criteria apply, no permit is required:

- a height equal to or less than six feet regardless of the structure's impoundment capacity; or
- an impoundment capacity not exceeding one million gallons regardless of the structure's height.

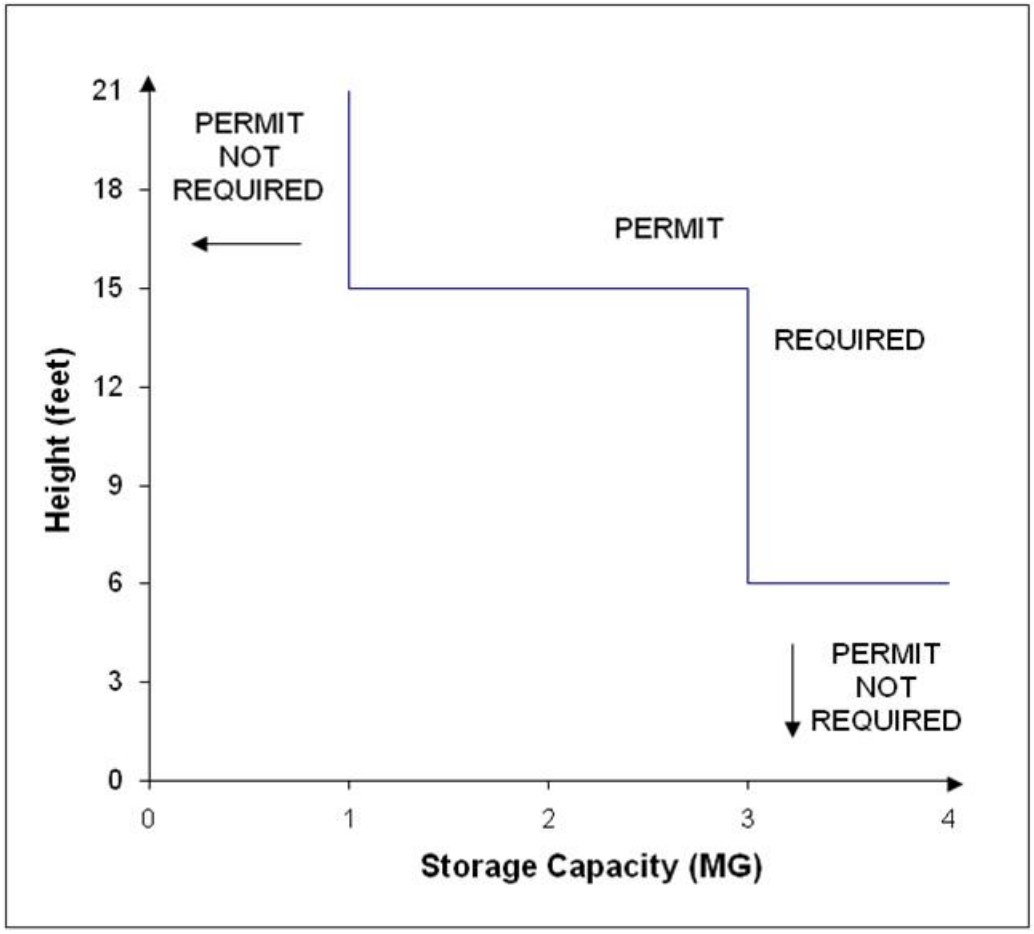
[531] NYSDEC Notice of Adoption of Amendments to Dam Safety Regulations.

[532] Maximum height is measured as the height from the downstream [outside] toe of the dam at its lowest point to the highest point at the top of the dam.

[533] Maximum impounding capacity is measured as the volume of water impounded when the water level is at the top of the dam.

Figure 8.1 depicts the aforementioned permitting criteria and demonstrates that a permit is required for any impoundment whose height and storage capacity plot above or to the right of the solid line, while those impoundments whose height and storage capacity plot below or to the left of the solid line, do not require a permit.

Figure 8.1- Protection of Waters - Dam Safety Permitting Criteria



Protection of Waters - Dam Safety Permitting Process

If a proposed impoundment meets or exceeds the permitting thresholds discussed above, the well operator proposing use of the impoundment is required to apply for a Protection of Waters Permit though the Department's Division of Environmental Permits.

A pre-application conference is recommended and encouraged for permit applicants, especially those who are first-time applicants. Such a conference allows the applicant to explain the

proposed project and to get preliminary answers to any questions concerning project plans, application procedures, standards for permit issuance and information on any other applicable permits pertaining to the proposed impoundment. It is also recommended that this conference occur early in the planning phase, prior to detailed design and engineering work, so that Department staff can review the proposal and comment on its conformance with permit issuance standards, which may help to avoid delays later in the process.

Application forms, along with detailed application instructions are available on the Department's website[534] and from the Regional Permit Administrator[535] for the county where the impoundment project is proposed. A complete application package[536] must include the following items:

- A completed Joint Application for Permit;
- A completed Application Supplement D-1, which is specific to the construction, reconstruction or repair of a dam or other impoundment structure;
- A location map showing the precise location of the project;
- A plan of the proposed project;
- Hydrological, hydraulic, and soils information, as required on the application form prescribed by the Department;
- An Engineering Design Report sufficiently detailed for Department evaluation of the safety aspects of the proposed impoundment that shall include:
    - A narrative description of the proposed project;
    - The proposed Hazard Classification of the impoundment as a result of the proposed activities or project;
    - A hydrologic investigation of the watershed and an assessment of the hydraulic adequacy of the impoundment;

[534] Downloadable permit application forms are available at http://www.dec.ny.gov/permits/6338.html.

[535] Contact information for the Department's Regional Permit Administrators is available on the Department's website at http://www.dec.ny.gov/about/558.html.

[536] Further details regarding the permit application requirement are available on the instructions which accompany the Supplement D-1 application form which is available at http://www.dec.ny.gov/docs/permits_ej_operations_pdf/spplmntd1.pdf.

- An evaluation of the foundation and surrounding conditions, and materials involved in the structure of the dam, in sufficient detail to accurately define the design of the dam and assess its safety, including its structural stability;

- Structural and hydraulic design studies, calculation and procedures, which shall, at a minimum, be consistent with generally accepted sound engineering practice in the field of dam design and safety; and

- A description of any proposed permanent instrument installations in the impoundment; and

- Construction plans and specifications that are sufficiently detailed for Department evaluation of the safety aspects of the dam.

Additionally the following information may also be required as part of the permit application:

- Recent clear photographs of the project site mounted on a separate sheet labeled with the view shown and the date of the photographs;

- Information necessary to satisfy the requirements of SEQRA, including: a completed Environmental Assessment Form (EAF) and, in certain cases, a Draft Environmental Impact Statement (DEIS);

- Information necessary to satisfy the requirements of the State Historic Preservation Act (SHPA) including a completed structural and archaeological assessment form and, in certain cases, an archaeological study as described by SHPA;

- Written permission from the landowner for the filing of the project application and undertaking of the proposed activity; and

- Other information which Department staff may determine is necessary to adequately review and evaluate the application.

In order to ensure that an impoundment is properly designed and constructed, the design, preparation of plans, estimates and specifications, and the supervision of the erection, reconstruction, or repair of an impoundment must be conducted by a licensed professional engineer. This individual should utilize the Department's technical guidance document

"Guidelines for Design of Dams,"[537] which conveys sound engineering practices and outlines hydrologic and other criteria that should be utilized in designing and constructing an engineered impoundment.

All application materials should be submitted to the appropriate Regional Permit Administrator for the county in which the project is proposed. Once the application is declared complete, the Department will review the applications, plans and other supporting information submitted and, in accordance with 6 NYCRR §608.7, may (1) grant the permit; (2) grant the permit with conditions as necessary to protect the health, safety, or welfare of the people of the state, and its natural resources; or (3) deny the permit.

The Department's review will determine whether the proposed impoundment is consistent with the standards contained within 6 NYCRR §608.8, considering such issues as:

- the environmental impacts of the proposal, including effects on aquatic, wetland and terrestrial habitats; unique and significant habitats; rare, threatened and endangered species habitats; water quality[538]; hydrology[539]; water course and waterbody integrity;
- the adequacy of design and construction techniques for the structure;
- operation and maintenance characteristics;
- the safe commercial and recreational use of water resources;
- the water dependent nature of a use;
- the safeguarding of life and property; and
- natural resource management objectives and values.

Additionally, the Department's review of the proposed impoundment will include the assignment of a Hazard Classification in accordance with 6 NYCRR§673.5. Hazard Classifications are assigned to dams and impoundments according to the potential impacts of a dam failure, the

[537] "Guidelines for Design of Dams" is available on the Department's website at http://www.dec.ny.gov/docs/water_pdf/damguideli.pdf or upon request from the DEC Regional Permit Administrator.

[538] Water Quality may include criteria such as temperature, dissolved oxygen, and suspended solids.

[539] Hydrology may include such criteria as water velocity, depth, discharge volume, and flooding potential.

particular physical characteristics of the impoundment and its location, and may be irrespective of the size of the impoundment, as appropriate. The four potential Hazard Classifications, as defined by subdivision (b) of Section 673.5, are as follows:

- Class "A" or "Low Hazard": A failure is unlikely to result in damage to anything more than isolated or unoccupied buildings, undeveloped lands, minor roads such as town or country roads; is unlikely to result in the interruption of important utilities, including water supply, sewage treatment, fuel, power, cable or telephone infrastructure; and/or is otherwise unlikely to pose the threat of personal injury, substantial economic loss or substantial environmental damage;

- Class "B" or "Intermediate Hazard": A failure may result in damage to isolate homes, main highways, and minor railroads; may result in the interruption of important utilities, including water supply, sewage treatment, fuel, power, cable or telephone infrastructure; and/or is otherwise likely to pose the threat of personal injury and/or substantial economic loss or substantial environmental damage. Loss of human life is not expected;

- Class "C" or "High Hazard": A failure may result in widespread or serious damage to home(s); damage to main highways, industrial or commercial buildings, railroads, and/or important utilities, including water supply, sewage treatment, fuel, power, cable or telephone infrastructure; or substantial environmental damage; such that the loss of human life or widespread substantial economic loss is likely; and

- Class "D" or "Negligible or No Hazard": A dam or impoundment that has been breached or removed, or has failed or otherwise no longer materially impounds waters, or a dam that was planned but never constructed. Class "D" dams are considered to be defunct dams posing negligible or no hazard. The Department may retain pertinent records regarding such dams.

The basis for the issuance of a permit will be a determination that the proposal is in the public interest in that the proposal is reasonable and necessary, will not endanger the health, safety or welfare of the people of the State of New York, and will not cause unreasonable, uncontrolled or unnecessary damage to the natural resources of the state.

Timing of Permit Issuance

Application submission, time frames and processing procedures for the Protection of Waters Permit are all governed by the provisions of Article 70 of the ECL – the Uniform Procedures Act

(UPA) – and its implementing regulations, 6 NYCRR § 621. In accordance with subdivision (a)(2)(iii) of Section 621 as recently amended, only repairs of existing dams inventoried by the Department are considered minor projects under the UPA and therefore the construction, reconstruction or removal of an impoundment is considered to be a major project and is thus subject to the associated UPA timeframes.

Failure to obtain the required permit before commencing work subjects the well operator and any contractors engaged in the work to Department enforcement action which may include civil or criminal court action, fines, an order to remove structures or materials or perform other remedial action, or both a fine and an order.

Operation and Maintenance of Any Impoundment

The Department's document "An Owners Guidance Manual for the Inspection and Maintenance of Dams in New York State" should be utilized by all impoundment owners, as it provides important, direct and indirect steps they can take to reduce the consequences of an impoundment failure.

The Dam Safety Regulations, as set forth in 6 NYCRR § 673 and amended August 2009, apply to any owner of any impoundment, regardless of whether the impoundment meets the permit applicability criteria previously discussed (unless otherwise specified). In accordance with the general provisions of Section 673.3, any owner of any impoundment must operate and maintain the impoundment and all appurtenant works in a safe condition. The owner of any impoundment found to be in violation of this requirement is subject to the provisions of ECL 15-0507 and 15-0511.

In order to ensure the safe operation and maintenance of an impoundment, a written Inspection and Maintenance Plan is required under 6 NYCRR §673.6 for any impoundment that (1) requires a Protection of Waters Permit due to its height and storage capacity as previously discussed, (2) has been assigned a Hazard Classification of Class "B" or "C", or (3) impounds waters which pose a threat of personal injury, substantial property damage or substantial natural resources damage in the event of a failure, as determined by the Department. Such a plan shall be retained

by the impoundment owner and updated as necessary, must be made available to the Department upon request, and must include:

- detailed descriptions of all procedures governing: the operation, monitoring, and inspection of the dam, including those governing the reading of instruments and the recording of instrument readings; the maintenance of the dam; and the preparation and circulation of notifications of deficiencies and potential deficiencies;
- a schedule for monitoring, inspections, and maintenance; and
- any other elements as determined by the Department based on its consideration of public safety and the specific characteristics of the dam and its location.

Additionally, the owner of any impoundment assigned a Hazard Classification of Class "B" or "C" must, in accordance with 6 NYCRRR §673, prepare an Emergency Action Plan and annual updates thereof , provide a signed Annual Certification to the Department's Dam Safety Section, conduct and report on Safety Inspections on a regular basis, and provide regular Engineering Assessments. Furthermore, all impoundment structures are subject to the Recordkeeping and Response to Request for Records provision of 6 NYCRR.

All impoundment structures, regardless of assigned Hazard Classification or permitting requirements, are subject to field inspections by the Department at its discretion and without prior notice. During such an inspection, the Department may document existing conditions through the use of photographs or videos without limitation. Based on the field inspection, the Department may create a Field Inspection Report and, if such a report is created for an impoundment with a Class "B" or "C" Hazard Classification, the Department will provide a copy of the report to the chief executive officer of the municipality or municipalities in which the impoundment is located.

To further ensure the safe operation and maintenance of all impoundments, 6 NYCRR §673.17 allows the Department to direct an impoundment owner to conduct studies, investigations and analyses necessary to evaluate the safety of the impoundment, or to remove, reconstruct or repair the impoundment within a reasonable time and in a manner specified by the Department.

8.2.3 Enforcement

Although DMN would retain a lead role in the review of Article 23 well permit applications and DOW would be responsible for implementing the HVHF GP and approving the discharge from POTWs who may accept waste from drilling operations, enforcement of violations of the ECL will require a multi-divisional approach. The SGEIS addresses a broad range of topics and requires mitigation for all aspects of a well drilling operation beginning with the source of fresh water for hydraulic fracturing and proceeding long after production wells are drilled. Some of the proposed mitigation measures identified in Chapter 7 would take the form of permit conditions attached, as appropriate, to the permit to drill issued pursuant to ECL Article 23. However, most of the proposed mitigation measures will be set forth as revisions or additions to the Department's regulations. Appendix 10 contains proposed supplementary permit conditions for high-volume hydraulic fracturing, most of which will become revisions or additions to the Department's regulations. Failure of a well operator to adhere to conditions of the permit would be considered a violation of ECL Article 23 and the failure of a well operator to comply with the HVHF GP would be considered a violation of ECL Article 17. Failure of an operator to follow the regulations of the Department would be considered a violation of the ECL Article 71.

While there are several different types of approvals needed from the Department in order to site wells for high-volume hydraulic fracturing in New York, there are two permits that would be specifically issued by the Department: the Article 23 permit to drill and the HVHF GP. For informational purposes, a more detailed description of how those permits would be enforced is provided below. This description is not intended to be exhaustive, since the type of enforcement response depends entirely on the nature of the violation. For more detailed descriptions of the Department's regulations and enforcement policies, the Department's website should be consulted.

8.2.3.1 Enforcement of Article 23

The Oil, Gas & Solution Mining Law vests the Department with the authority to regulate the development, production and utilization of the state's natural energy resources. There are three essential policy objectives embodied in ECL 23. Those objectives are to: 1) to prevent waste of the oil and gas resource as "waste" is defined in the statute; 2) to provide for the operation and development of oil and gas properties to provide for greater ultimate recovery of the resource,

and; 3) to protect the correlative rights of all owners and the general public. To carry out these objectives, ECL 23 specifically provides the Department with the authority to, among other things:

> "Require the drilling, casing, operation, plugging and replugging of wells and reclamation of surrounding land in accordance with rules and regulations of the department in such manner as to prevent or remedy the following, including but not limited to: the escape of oil, gas, brine or water out of one stratum into another; the intrusion of water into oil or gas strata other than during enhanced recovery operations; the pollution of fresh water supplies by oil, gas salt water or other contaminants; and blowouts, cavings, seepages and fires." ECL 23-0305(8)(d).

Along with other powers enumerated in ECL 23, this broad grant of authority is implemented through the Department's oil and gas well regulations, found at 6 NYCRR Part 550, and through the imposition of conditions attached to a permit to drill issued by the Division of Mineral Resources. ECL Article 71 makes it unlawful for any person to fail to perform a duty imposed by ECL 23 or to violate any order or permit condition issued by the Department. Therefore, a failure of an operator to comply with a permit to drill exposes the well operator to an enforcement action. Enforcement actions may be pursued through administrative, civil or criminal means, depending on the nature of the violation. The Department may also call upon the Attorney General to obtain injunctive relief against any person violating or threatening to violate ECL 23.

Violations which are pursued administratively may result in an Order on Consent, which is a settlement agreement signed by the Department and the well operator. There are two Department policy documents which describe penalty calculations and the necessary components of an Order and Consent: DEE-1, Civil Penalty Policy, and: DEE-2, Order on Consent Enforcement Policy. Both policies can be found on the Department's website at: http://www.dec.ny.gov/regulations/2379.html. In cases where a settlement is not reached, a hearing may be held pursuant to the Department's Uniform Enforcement Hearing Procedures.

The Oil, Gas & Solution Mining Law also provides the Department with the administrative power to shut-in drilling or production operations whenever those operations fail to comply with ECL 23, the Department's regulations or any order issued by the Department. This power, found in ECL 23-0305(8)(g), is injunctive in nature and allows the Department to immediately address a violation without the need for a court order. This is an effective enforcement tool, particularly in the case of producing wells since the Department, through 6 NYCRR Part 558, may serve the shut-in order on a pipeline company or carrier, preventing them from transporting product from an operator found in violation of Article 23.

8.2.3.2 Enforcement of Article 17

The Department will take appropriate action to ensure all regulated point source and non-point source dischargers comply with applicable laws and regulations to protect public health and the intended best use of the waters of the state in accordance with "Technical and Operational guidance Series (TOGS) 1.4.2 – Compliance and Enforcement of State Pollutant Discharge Elimination System (SPDES) Permits." This guidance applies to all SPDES permits, including individual and general permits.

TOGS 1.4.2 supplements existing Department policy regarding civil enforcement actions for dischargers subject to individual and general permits and provides the minimum enforcement response and penalty (if applicable). When appropriate, more stringent enforcement responses may be utilized.

The focus of compliance and enforcement activities is based on resolving priority violations. Any point source or non-point source discharge to an identified current year CWA Section 303(d) List of Impaired Waters segment; water bodies with a TMDL strategy or other restoration measure; or a sole-source and/or primary aquifer is also a priority. Discharges from non-significant class facilities and unregulated non-point source discharges remain subject to compliance and enforcement activities as necessary for the protection of public health and the intended best use of the waters of the state.

Protection of the state's water resources is required regardless of the Department's compliance and enforcement priorities. Any discharge that causes or contributes to a contravention of the

water quality standards contained in 6 NYCRR Part 700 et seq. (or guidance values adopted pursuant thereto), or impairs the quality of waters, or otherwise creates a nuisance or menace to health, is a violation of ECL Article 17 and is subject to enforcement.

Discharging without the appropriate permit is a violation of ECL Article 17 and 6 NYCRR Part 750. A facility discharging without a permit is subject to enforcement prior to issuance of a permit. Therefore, processing and review of a permit application may be suspended if an enforcement action is commenced.

SPDES Compliance Evaluation

SPDES permits are issued to wastewater and stormwater dischargers for the protection of the waters of the State. Operation and maintenance of SPDES-permitted facilities must comply with applicable regulations pursuant to 6 NYCRR Part 750 and additional facility specific and general permit conditions. When conditions of a permit, enforcement order or court decree are not met or not implemented according to a schedule, water quality may be negatively impacted. Permit compliance leads to protection of the public health and the intended best use of the waters of the state.

The Department's SPDES permit compliance program is directly supported by the following elements which allow the Department to evaluate the compliance status of any regulated facility and determine whether violations have or may occur:

Periodic Self-Reporting - The Department controls discharges of pollutants from some SPDES permitted facilities by establishing pollutant specific effluent limits and operating conditions in the permit and/or Order on Consent. Compliance with these limitations and conditions via self-reporting is critical to the protection of water quality.

Some SPDES permits and Orders on Consent require reporting of pollutants that are discharged on a Discharge Monitoring Report (DMR). The DMR is used by the Department to evaluate a facility's compliance with permit limitations. The information reported on DMRs is entered into a database system for compliance assessment, tracking and reporting purposes. Timely and accurate filing of DMRs is vital to ensuring compliance with the permit.

The Division of Water (DOW) also relies on other reports (e.g., monthly operating, annual, toxicity testing and status reports) and notifications (e.g., completion of permit or Order on Consent compliance schedules), to determine the compliance status of a facility. These documents may supplement or be submitted in lieu of a DMR, as specified in each permit or enforcement order.

Inspections - The Department conducts site inspections and effluent sampling to monitor facility performance, and to detect, identify and assess the magnitude of violations by a discharger. The primary focus for inspections of individually permitted facilities is on major and significant minor point source discharges and facilities that pose the highest risk to public health and safety. The number and type of inspections to be performed at permitted facilities are determined during DOW's annual work planning process. The primary focus for inspections of general permitted facilities is established annually through the same work planning process. Standardized inspection forms have been developed to assist Department inspectors in assessing the compliance status of dischargers in relation to the permit conditions, regulatory and record keeping requirements. Additional inspection forms may be developed to comprehensively evaluate compliance with permits issued for this activity.

Inspection information is entered into a database system for compliance evaluation, tracking and reporting purposes. Inspection findings can be rated "satisfactory," "marginal" or "unsatisfactory." An unsatisfactory rating is considered a priority and may be subject to informal and/or formal enforcement.

The Department may use inspection information provided by federal, state and local governmental entities to supplement compliance evaluations.

Citizen Complaints - Citizen complaints and observations of possible violations may assist the Department's compliance and enforcement efforts for SPDES permits. The Department will evaluate the authenticity of alleged violations and impacts to the environment and/or public health and safety to determine an appropriate response. This response may include enforcement. A "Notice of Intent to Sue" is a formal legal letter of intent to commence a federal "citizens suit" that is served by private parties alleging violations of federal environmental laws,

specifically the federal Clean Water Act (CWA). The Department has established a systematic approach in reviewing and responding to such Notices.

SPDES Enforcement

The Department detects, investigates and resolves violations which are likely to impact the public health or the water quality of the state. Staff will respond to each water priority violation using the appropriate tools, including formal enforcement actions if necessary, to expedite a return to compliance. To promote statewide consistency in the handling of water priority violations in all SPDES programs, TOGS 1.4.2 contains a SPDES compliance and enforcement response guide allowing staff to determine when enforcement is necessary to bring the facility back to compliance. TOGS 1.4.2 describes the range of options available to the Department for enforcement, ranging from warning letters and compliance conferences through more formal proceedings involving hearings, summary abatement orders and referral to the Attorney General's Office. For a more detailed description of all the avenues available to the Department for SPDES enforcement, TOGS 1.4.2 can be viewed at on the Department's website at: http://www.dec.ny.gov/docs/water_pdf/togs142.pdf.

SPDES Enforcement Coordination with EPA

The Department's obligations with respect to compliance and enforcement of SPDES permits are specified in the 1987 Enforcement Agreement between Region II of the USEPA and the Department. This agreement outlines the elements essential to ensure compliance by the regulated community. Some of these important elements are: monitoring permit compliance; maintaining and sharing compliance information with EPA; identifying criteria for significant non-compliance; listing facilities that require action by the Department to require non-complying facilities to return to compliance; and timely and appropriate enforcement for priority violations. The Department meets with EPA on a quarterly basis to cooperatively address priority violations at major facilities and agree on enforcement responses to these violations and other significant issues such as treatment plant bypasses, manure spills and citizen complaints.

Goals for the Department's water compliance assurance activities are defined in the Division of Water annual work planning process. The work plan identifies goals for activities such as for the

numbers of inspections of facilities, management of data and number of enforcement actions. The work plan also sets priorities to meet the compliance goals set by the Department and EPA.

Region II EPA also enters into an annual inspection work plan agreement with the Department's Division of Water. The EPA inspection work plan identifies roles and responsibilities for EPA, communication and coordination protocols with Department. Enforcement response to violations detected by EPA inspections may be conducted by EPA and/or the Department depending on the situations. The Division of Water work plan and the EPA inspection work plan may be modified to account for permits required by this activity.

8.3 Well Permit Issuance

8.3.1 Use and Summary of Supplementary Permit Conditions for High-Volume Hydraulic Fracturing

A generic environmental impact statement addresses common impacts and identifies common mitigation measures. The proposed Supplementary Permit Conditions for high-volume hydraulic fracturing capture the mitigation measures identified as necessary by this review (see Appendix 10). These proposed conditions, some or all of which may be promulgated in revised regulations, address all aspects of well pad activities, including:

- Planning and local coordination;
- Site preparation;
- Site maintenance;
- Drilling, stimulation (i.e., hydraulic fracturing) and flowback operations;
- Reclamation; and
- Other general aspects of the activity.

8.3.2 High-Volume Re-Fracturing

Because of the potential associated disturbance and impacts, the Department proposes that high-volume re-fracturing require submission of the EAF Addendum and the Department's approval after:

- review of the planned fracturing procedures and products, water source, proposed site disturbance and layout, and fluid disposal plans;

- a site inspection by Department staff; and

- a determination of whether any other Department permits are required.

8.4 Other States' Regulations

The Department committed in Section 2.1.2 of the Final Scope for this SGEIS to evaluate the effectiveness of other states' regulations with respect to hydraulic fracturing and to consider the advisability of adopting additional protective measures based on those that have proven successful in other states for similar activities. Department staff consulted the following sources to conduct this evaluation:

1) *Ground Water Protection Council, 2009b.* The Ground Water Protection Council (GWPC) is an association of ground water and underground injection control regulators. In May 2009, GWPC reported on its review of the regulations of 27 oil and gas producing states. The stated purpose of the review was to evaluate how the regulations relate to direct protection of water resources;

2) *ICF International, 2009a.* NYSERDA contracted ICF International to conduct a regulatory analysis of New York and up to four other shale gas states regarding notification, application, review and approval of hydraulic fracturing and re-fracturing operations. ICF's review included Arkansas (Fayetteville Shale), Louisiana (Haynesville Shale), Pennsylvania (Marcellus Shale) and Texas (Barnett Shale);

3) *Alpha Environmental Consultants, Inc., 2009.* NYSERDA contracted Alpha Environmental Consultants, Inc., to survey policies, procedures, regulations and recent regulatory changes related to hydraulic fracturing in Pennsylvania, Colorado, New Mexico, Wyoming, Texas (including the City of Fort Worth), West Virginia, Louisiana, Ohio and Arkansas. Based on its review, Alpha summarized potential permit application requirements to evaluate well pad impacts and also provided recommendations for minimizing the likelihood and impact of liquid chemical spills that are reflected elsewhere in this SGEIS;

4) *Colorado Oil & Gas Conservation Commission, Final Amended Rules.* In the spring of 2009, the Colorado Oil & Gas Conservation Commission adopted new regulations regarding, among other things, the chemicals that are used at wellsites and public water supply protection. Colorado's program was included in Alpha's regulatory survey, but the amended rules' emphasis on topics pertinent to this SGEIS led staff to do a separate review of the regulations related to chemical use and public water supply buffer zones;

5) *June 2009 Statements on Hydraulic Fracturing from State Regulatory Officials.* On June 4, 2009, GWPC's president testified before Congress (i.e., the House Committee on Natural Resources' Subcommittee on Energy and Mineral Resources) regarding hydraulic fracturing. Attached to his written testimony were letters from regulatory officials in Ohio, Pennsylvania, New Mexico, Alabama and Texas. These officials unanimously stated that no instances of ground water contamination directly attributable to the hydraulic fracturing process had been documented in their states. Also in June 2009, the Interstate Oil and Gas Compact Commission compiled and posted on its website statements from oil and gas regulators in 12 of its member states: Alabama, Alaska, Colorado, Indiana, Kentucky, Louisiana, Michigan, Oklahoma, Tennessee, Texas, South Dakota and Wyoming.[540] These officials also unanimously stated that no verified instances of harm to drinking water attributable to hydraulic fracturing had occurred in their states despite use of the process in thousands of wells over several decades. All 15 statements are included in Appendix 15;

6) Pennsylvania Environmental Quality Board. Title 25-Environmental Protection, Chapter 78, Oil and Gas Wells, Pennsylvania Bulletin, Col. 41. No. 6 (February 5, 2011); and

7) Statement by Lisa Jackson, EPA Administrator on May 24, 2011 at a House Committee on Oversight and Government Reform that she is "not aware of any proven case where the fracturing process itself has affected water."

Additional information is provided below regarding the findings and conclusions expressed by GWPC, ICF and Alpha that are most relevant to the mitigation approach presented in this

[540] http://www.iogcc.state.ok.us/hydraulic-fracturing.

SGEIS. Pertinent sections of Colorado's final amended rules are also summarized, and a brief discussion of Pennsylvania's recent revisions to its Chapter 78 Rules is presented.

8.4.1 Ground Water Protection Council

GWPC's overall conclusion, based on its review of 27 states' regulations, including New York's, is that state oil and gas regulations are adequately designed to directly protect water resources. Hydraulic fracturing is one of eight topics reviewed. The other seven topics were permitting, well construction, temporary abandonment, well plugging, tanks, pits and waste handling/spills.

Emphasis on proper well casing and cementing procedures is identified by GWPC and state regulators as the primary safeguard against groundwater contamination during the hydraulic fracturing procedure. This approach has been effective, based on the regulatory statements summarized above and included in the Appendices. Improvements to casing and cementing requirements, along with enhanced requirements regarding other activities such as pit construction and maintenance, are appropriate responses to problems and concerns that arise as technologies advance. Chapters 7 and 8 of this SGEIS, on mitigation measures and the permit process, reflect consideration of requirements regarding either hydraulic fracturing or ancillary activities in other states that address potential impacts associated with horizontal drilling and high-volume hydraulic fracturing that are not covered by the 1992 GEIS.

8.4.1.1 GWPC - Hydraulic Fracturing

With respect to the specific topic of hydraulic fracturing, GWPC found that states generally focus on well construction (i.e., casing and cement) and noted the importance of proper handling and disposal of materials. GWPC recommends identification of fracturing fluid additives and concentrations, as well as a higher level of scrutiny and protection for shallow hydraulic fracturing or when the target formation is in close proximity to underground sources of drinking water. GWPC did not provide thresholds for defining when hydraulic fracturing should be considered "shallow" or "in close proximity" to underground sources of drinking water. GWPC did not recommend additional controls on the actual conduct of the hydraulic fracturing procedure itself for deep non-coalbed methane wells that are not in close proximity to drinking water sources, nor did GWPC suggest any restrictions on fracture fluid composition for such wells.

GWPC urges caution against developing and implementing regulations based on anecdotal evidence alone, but does recommend continued investigation of complaints of ground water contamination to determine if a causal relationship to hydraulic fracturing can be established.

8.4.1.2 GWPC - Other Activities

Of the other seven topic areas reviewed by GWPC, permitting, well construction, tanks, pits and waste handling and spills are addressed by this SGEIS. GWPC's recommendations regarding each of these are summarized below.

Permitting

Unlike New York, in many states the oil and gas regulatory authority is a separate agency from other state-level environmental programs. GWPC recommends closer, more formalized cooperation in such instances. Another suggested action related to permitting is that states continue to expand use of electronic data management to track compliance, facilitate field inspections and otherwise acquire, store, share, extract and use environmental data.

Well Construction

GWPC recommends adequate surface casing and cement to protect ground water resources, adequate cement on production casing to prevent upward migration of fluids during all reservoir conditions, use of centralizers and the opportunity for state regulators to witness casing and cementing operations.

Tanks

Tanks, according to GWPC, should be constructed of materials suitable for their usage. Containment dikes should meet a permeability standard and the areas within containment dikes should be kept free of fluids except for a specified length of time after a tank release or a rainfall event.

Pits

GWPC's recommendations target "long-term storage pits." Permeability and construction standards for pit liners are recommended to prevent downward migration of fluids into ground water. Excavation should not be below the seasonal high water table. GPWC recommends against use of long-term storage pits where underlying bedrock contains seepage routes, solution

features or springs. Construction requirements to prevent ingress and egress of fluids during a flood should be implemented within designated 100-year flood boundaries. Pit closure specifications should address disposition of fluids, solids and the pit liner. Finally, GWPC suggests prohibiting the use of long-term storage pits within the boundaries of public water supply and wellhead protection areas.

Waste Handling and Spills

In the area of waste handling, GWPC's suggests actions focused on surface discharge because "approximately 98% of all material generated . . . is produced water,"[541] and injection via disposal wells is highly regulated. Surface discharge should not occur without the issuance of an appropriate permit or authorization based on whether the discharge could enter water. As reflected in Colorado's recently amended rules, soil remediation in response to spills should be in accordance with a specific cleanup standard such as a Sodium Absorption Ratio (SAR) for salt-affected soil.

8.4.2 Alpha's Regulatory Survey

Topics reviewed by Alpha include: pit rules and specifications, reclamation and waste disposal, water well testing, fracturing fluid reporting requirements, hydraulic fracturing operations, fluid use and recycling, materials handling and transport, minimization of potential noise and lighting impacts, setbacks, multi-well pad reclamation practices, naturally occurring radioactive materials and stormwater runoff. Alpha supplemented its regulatory survey with discussion of practices directly observed during field visits to active Marcellus sites in the northern tier of Pennsylvania (Bradford County).

8.4.2.1 Alpha - Hydraulic Fracturing

Alpha's review with respect to the specific hydraulic fracturing procedure focused on regulatory processes, i.e., notification, approval and reporting. Among the states Alpha surveyed, Wyoming appears to require the most information.

[541] GWPC, May 2009, p. 30.

Pre-Fracturing Notification and Approval

Of the nine states Alpha surveyed, West Virginia, Wyoming, Colorado and Louisiana require notification or approval prior to conducting hydraulic fracturing operations. Pre-approval for hydraulic fracturing is required in Wyoming, and the operator would provide information in advance regarding the depth to perforations or the open hole interval, the water source, the proppants and estimated pump pressure. Consistent with GWPC's recommendation, information required by Wyoming Oil and Gas Commission Rules also includes the trade name of fluids.

Post-Fracturing Reports

Wyoming requires that the operator notify the state regulatory agency of the specific details of a completed fracturing job. Wyoming requires a report of any fracturing and any associated activities such as shooting the casing, acidizing and gun perforating. The report is required to contain a detailed account of the work done; the manner undertaken; the daily volume of oil or gas and water produced, prior to, and after the action; the size and depth of perforation; the quantity of sand, chemicals and other material utilized in the activity and any other pertinent information.

8.4.2.2 Alpha - Other Activities

The Department's development of the overall mitigation approach proposed in this SGEIS also considered Alpha's discussion of other topics included in the regulatory survey. Key points are summarized below.

Pit Rules and Specifications

Alpha's review focused on reserve pits at the well pad. Several states have some general specifications in common. These include:

- Freeboard monitoring and maintenance of minimum freeboard;
- Minimum vertical separation between the seasonal high ground water table and the pit bottom, commonly 20 inches;
- Minimum liner thickness of 20 – 30 mil, and maximum liner permeability of 1×10^{-7} cm/sec;

- Compatibility of liner material with the chemistry of the contained fluid, placement of the liner with sufficient slack to accommodate stretching, installation and seaming in accordance with the manufacturer's specifications;

- Construction to prevent surface water from entering the pit;

- Sidewalls and bottoms free of objects capable of puncturing and ripping the liner; and

- Pit sidewall slopes from 2:1 to 3:1.

Alpha recommends that engineering judgment be applied on a case-by-case basis to determine the extent of vertical separation that should be required between the pit bottom and the seasonal high water table. Consideration should be given to the nature of the unconsolidated material and the water table; concern may be greater, for example, in a lowland area with high rates of inflow from medium- to high-permeability soils than in upland till-covered areas.

Reclamation and Waste Disposal

In addition to its regulatory survey, Alpha also reviewed and discussed best management practices directly observed in the northern tier of Pennsylvania and noted that "[t]he reclamation approach and regulations being applied in PA may be an effective analogue going forward in New York."[542] The best management practices referenced by Alpha include:

- Use of steel tanks to contain flowback water at the well pad;

- On-site or offsite flowback water treatment for re-use, with residual solids disposed or further treated for beneficial use or disposal in accordance with Pennsylvania's regulations;

- Offsite treatment and disposal of production brine;

- On-site encapsulation and burial of drill cuttings if they do not contain constituents at levels that exceed Pennsylvania's environmental standards;

- Containerization of sewage and putrescible waste and transport off-site to a regulated sewage treatment plant or landfill;

[542] Alpha, 2009, p. 2-15.

- Secondary containment structures around petroleum storage tanks and lined trenches to direct fluids to lined sumps where spills can be recovered without environmental contamination; and

- Partial reclamation of well pad areas not necessary to support gas production.

Alpha noted that perforating or ripping the pit liner prior to on-site burial could prevent the formation of an impermeable barrier or the formation of a localized area of poor soil drainage. Addition of fill may be advisable to mitigate subsidence as drill cuttings dewater and consolidate.[543]

Water Well Testing

Of the jurisdictions surveyed, Colorado and the City of Fort Worth have water well testing requirements specifically directed at unconventional gas development within targeted regions. Colorado's requirements are specific to two particular situations: drilling through the Laramie Fox Hills Aquifer and drilling coal-bed methane wells. Fort Worth's regulations pertain to Barnett Shale development, where horizontal drilling and high-volume hydraulic fracturing are performed, and address all fresh water wells within 500 feet of the surface location of the gas well. Ohio requires sampling of wells within 300 feet prior to drilling within urbanized areas. West Virginia also has testing requirements for wells and springs within 1,000 feet of the proposed oil or gas well. Louisiana, while it does not require testing, mandates that the results of voluntary sampling be provided to the landowner and the regulatory agency.

Pennsylvania regulations presume the operator to be the cause of adverse water quality impacts unless demonstrated otherwise by pre-drilling baseline testing, assuming permission was given by the landowner. Alpha suggests that the following guidance provided by Pennsylvania and voluntarily implemented by operators in the northern tier of Pennsylvania and southern tier of New York should be effective:

- With the landowner's permission, monitor the quality of any water supply within 1,000 feet of a proposed drilling operation (at least one operator expands the radius to 2,000 feet if there are no wells within 1,000 feet);

[543] Alpha, 2009, p. 2-15.

- Analyze the water samples using an independent, state certified, water testing laboratory; and

- Analyze the water for sodium, chlorides, iron, manganese, barium and arsenic (Alpha recommends analysis for methane types, total dissolved solids, chlorides and pH).

Fluid Use and Recycling

Regarding surface water withdrawals, Alpha found that the most stringent rules in the states surveyed are those implemented in Pennsylvania by the Delaware and Susquehanna River Basin Commissions.

None of the states surveyed have any requirements, rules or guidance relating to the use of treated municipal waste water.

Ohio allows the re-use of drilling and flowback water for dust and ice control with an approval resolution, and will consider other options depending on technology. West Virginia recommends that operators consider recycling flowback water.

Practices observed in the northern tier of Pennsylvania include treatment at the well pad to reduce TDS levels below 30,000 ppm. The treated fluids are diluted by mixing with fresh makeup water and used for the next fracturing project.

Materials Handling and Transport

Alpha provided the review of pertinent federal and state transportation and container requirements that is included in Section 5.5, and concluded that motor transport of all hazardous fracturing additives or mixtures to drill sites is adequately covered by existing federal and NYSDOT regulations.[544] Best management practices such as the following were identified by Alpha for implementation on the well pad:

- Monitoring and recording inventories;

- Manual inspections;

- Berms or dikes;

[544] Alpha, 2009, p. 2-31

- Secondary containment;
- Monitored transfers;
- Stormwater runoff controls;
- Mechanical shut-off devices;
- Setbacks;
- Physical barriers; and
- Materials for rapid spill cleanup and recovery.

Minimization of Potential Noise and Lighting Impacts

Colorado, Louisiana, and the City of Fort Worth address noise and lighting issues. Ohio specifies that operations be conducted in a manner that mitigates noise. With respect to noise mitigation, sample requirements include:

- Ambient noise level determination prior to operations;
- Daytime and nighttime noise level limits for specified zones (in Colorado, e.g., residential/agricultural/rural, commercial, light industrial and industrial) or for distances from the wellsite, and periodic monitoring thereof;
- Site inspection and possibly sound level measurements in response to complaints;
- Direction of all exhaust sources away from building units; and
- Quiet design mufflers or equivalent equipment within 400 feet of building units.

The City of Fort Worth has much more detailed noise level requirements and also sets general work hour and day of the week guidelines for minimizing noise impacts, in consideration of the population density and urban nature of the location where the activity occurs.

Alpha found that lighting regulations, where they exist, generally require that site lighting be directed downward and internally to the extent practicable. Glare minimization on public roads and adjacent buildings is a common objective, with a target distance of 300 feet from the well in

Louisiana and Fort Worth and 700 feet from the well in Colorado. Lighting impact considerations would be balanced against the safety of well site workers.

Setbacks

Alpha's setback discussion focused on water resources and private dwellings. The setback ranges in Table 8.3 were reported regarding the surveyed jurisdictions.

Table 8.3 - Water Resources and Private Dwelling Setbacks from Alpha, 2009

	Water Resources	**Private Dwellings**	**Measured From**
Arkansas	200 feet from surface waterbody or wetland, or 300 feet for streams or rivers designated as Extraordinary Resource Water, Natural and Scenic Waterway, or Ecologically Sensitive Water Body	200 feet, or 100 feet with owner's waiver	Storage tanks
Colorado	300 feet ("internal buffer;" applies only to classified water supply segments – see discussion below)	Not reported	Surface operation, including drilling, completion, production and storage
Louisiana	Not reported	500 feet, or 200 feet with owner's consent	Wellbore
New Mexico	300 feet from continuously flowing water course; 200 feet from other significant water course, lake bed, sinkhole or playa lake; 500 feet from private, domestic, fresh water wells or springs used by less than 5 households; 1000 feet from other fresh water wells or springs; 500 feet from wetland; pits prohibited within defined municipal fresh water well field or 100-year floodplain	300 feet	Any pit, including fluid storage, drilling circulation and waste disposal pits
Ohio	200 feet from private water supply wells	100 feet	Wellhead
Pennsylvania	200 feet from water supply springs and wells; 100 feet from surface water bodies and wetlands	200 feet	Well pad limits and access roads
City of Fort Worth	200 feet from fresh water well	600 feet, or 300 feet with waiver	Wellbore surface location for single-well pads; closest point on well pad perimeter for multi-well sites
Wyoming	350 feet from water supplies	350 feet	Pits, wellheads, pumping units, tanks and treatment systems

Multi-Well Pad Reclamation Practices

Except for Pennsylvania, Alpha found that the surveyed jurisdictions treat multi-well pad reclamation similarly to single well pads. Pennsylvania implements requirements for best management practices to address erosion and sediment control.

As with single well pads, partial reclamation after drilling and fracturing are done would include closure of pits and revegetation of areas that are no longer needed.

Stormwater Runoff

Most of the reviewed states have stormwater runoff regulations or best management practices for oil and gas well drilling and development. Alpha suggests that Pennsylvania's approach of reducing high runoff rates and associated sediment control by inducing infiltration may be a suitable model for New York. Perimeter berms and filter fabric beneath the well pad allow infiltration of precipitation. Placement of a temporary berm across the access road entrance during a storm prevents rapid discharge down erodible access roads that slope downhill from the site.

8.4.3 Colorado's Final Amended Rules

Significant changes were made to Colorado's oil and gas rules in 2008 that became effective in spring 2009. While many topics were addressed, the new rules related to chemical inventorying and public water supply protection are most relevant to the topics addressed by this SGEIS.

8.4.3.1 Colorado - New MSDS Maintenance and Chemical Inventory Rule

The following information is from a training presentation posted on COGCC's website.[545] The new rule's objective is to assist COGCC in investigation of spills, releases, complaints and exposure incidents. The rule requires the operators to maintain a chemical inventory of chemical products brought to a well site for downhole use, *if* more than 500 pounds is used or stored at the site for downhole use or *if* more than 500 pounds of fuel is stored at the well site during a quarterly reporting period. The chemical inventory, which is *not* submitted to the COGCC unless requested, includes:

[545] http://cogcc.state.co.us; "Final Amended Rules" and "Training Presentations" links, 7/8/2009.

- MSDS for each chemical product;
- How much of the chemical product was used, how it was used, and when it was used;
- Identity of trade secret chemical products, but not the specific chemical constituents; and
- Maximum amount of fuel stored.

The operator must maintain the chemical inventory and make it available for inspection in a readily retrievable format at the operator's local field office for the life of the wellsite and for five years after plugging and abandonment.

MSDSs for proprietary products may not contain complete chemical compositional information. Therefore, in the case of a spill or complaint to which COGCC must respond, the vendor or service provider must provide COGCC a list of chemical constituents in any trade secret chemical product involved in the spill or complaint. COGCC may, in turn, provide the information to the Colorado Department of Public Health and Environment (CDPHE). The vendor or service provider must also disclose this list to a health professional in response to a medical emergency or when needed to diagnose and treat a patient that may have been exposed to the product. Health professionals' access to the more detailed information which is not on MSDSs is subject to a confidentiality agreement. Such information regarding trade secret products provided to the COGCC or to health professionals does not become part of the chemical inventory and is not considered public information.

8.4.3.2 Colorado - Setbacks from Public Water Supplies

The following information was provided by Alpha and supplemented from a training presentation posted on COGCC's website.[546]

Colorado's new rules require buffer zones along surface water bodies in surface water supply areas. Buffer zones extend five miles upstream from the water supply intake and are measured from the ordinary high water line of each bank to the near edge of the disturbed area at the well location. The buffer applies to surface operations only and does not apply to areas that do not

[546] http://cogcc.state.co.us; "Final Amended Rules" and "Training Presentations" links, 7/8/2009.

drain to classified water supply systems. The buffers are designated as internal (0-300 feet), intermediate (301-500 feet) and external (501-2,640 feet).

Activity within the internal buffer zone requires a variance and consultation with the CDPHE. Within the intermediate zone, pitless (i.e., closed-loop) drilling systems are required, flowback water must be contained in tanks on the well pad or in an area with down gradient perimeter berming, and berms or other containment devices are required around production-related tanks. Pitless drilling or specified pit liner standards are required in the external buffer zone. Water quality sampling and notification requirements apply within the intermediate and external buffer zones.

8.4.4 Summary of Pennsylvania Environmental Quality Board. Title 25-Environmental Protection, Chapter 78, Oil and Gas Wells

A number of Pennsylvania's recent Chapter 78 revisions relate to enhancements to well control and construction requirements as a result of extensive drilling and completion operations in the Marcellus Shale in that state.[547] Specific casing and cementing procedures designed to protect drinking water supplies are now codified as a result of these revisions.

8.4.5 Other States' Regulations - Conclusion

Experience in other states is similar to that of New York as a regulator of gas drilling operations. Well control and construction, and materials handling regulations, including those pertaining to pit construction, when properly implemented and complied with, prevent environmental contamination from drilling and hydraulic fracturing activities. The reviews and surveys summarized above are informative with respect to developing enhanced mitigation measures relative to multi-well pad drilling and high-volume hydraulic fracturing. Consideration of the information presented above is reflected in Chapters 7 and 8 of this SGEIS.

[547] http://www.pacode.com/secure/data/025/chapter78/chap78toc.html "Chapter 78. Oil and Gas Wells.