

## Section 7 – Proposed Regulatory Framework

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### A. Guidance for a regulatory framework

#### *Federal regulation*

A number of federal environmental statutes apply to oil and gas production activities. Both Congress and the U.S. Environmental Protection Agency (EPA), however, have taken actions to exempt certain activities associated with oil and gas development from federal environmental standards – leaving significant areas of oil and gas regulation to the states.

The **Comprehensive Environmental Response Compensation and Liability Act (CERCLA or the “Superfund” Act)**<sup>539</sup> sets the ground rules for cleanup of sites with environmental contamination. Congress has excluded oil and gas products from the provisions of CERCLA,<sup>540</sup> leaving states to address financial responsibility and liability for contamination caused by oil and gas products.

**Subtitle C of the Resource Conservation and Recovery Act (RCRA)**<sup>541</sup> addresses hazardous waste. Often described as a “cradle to grave” permitting program, Subtitle C regulates hazardous waste from the point of generation of waste to its disposal.<sup>542</sup> In response to a direction from Congress to study the appropriate regulation of oil and gas wastes, EPA decided in 1988 to exempt waste associated with the oil and gas industry from regulation under Subtitle C.<sup>543</sup> EPA found that wastes produced in oil and gas production can include toxic substances and some have the characteristics of hazardous waste regulated under Subtitle C. EPA concluded, however, that RCRA regulation of these wastes would be too inflexible and too costly. Instead of regulating these wastes under Subtitle C of RCRA, EPA proposed to take other steps to improve management of oil and gas wastes:

1. Improve existing federal regulatory programs under the Clean Water Act, Safe Drinking Water Act and Subtitle D of RCRA (standards for disposal of non-hazardous solid waste);
2. Work with states to improve state-level waste management rules tailored to the oil and gas industry.
3. Work with Congress to develop any additional federal statutory authority needed (such as authority to address treatment and transportation of wastes regulated under Subtitle D of RCRA).

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<sup>539</sup> 42 U.S.C. Chapter 103

<sup>540</sup> 42 U.S.C. Chapter 103, Section 9601

<sup>541</sup> 42 U.S.C. §6901 et seq. (1976)

<sup>542</sup> 42 U.S.C. Chapter 82

<sup>543</sup> Regulatory Determination for Oil and Gas and Geothermal Exploration, Development and Production Wastes, 53 FR 25447, July 6, 1988.

The exemption from federal hazardous waste regulation applies to wastes directly associated with oil and gas exploration development<sup>544</sup> including:

- Produced water
- Drilling fluids
- Drill cuttings
- Rigwash
- Well completion, treatment and stimulation fluids
- Pit sludges and contaminated bottoms from storage or disposal of exempt waste
- Pigging wastes from gathering lines
- Pipe scale

Because of the federal exemption, North Carolina will not be able to apply existing state hazardous waste rules to the storage, transportation and disposal of wastes generated in natural gas production even if those wastes would otherwise be considered hazardous wastes. The existing state rules only apply to wastes regulated under Subtitle C of RCRA.

**Subtitle D of RCRA** (standards for solid waste disposal) applies to disposal of drilling wastes. Given the exemption from Subtitle C, wastes that may be toxic or have other characteristics of hazardous wastes now fall under Subtitle D. In the 1988 decision to exempt drilling wastes from Subtitle C, EPA noted that:

“The existing Federal standards under Subtitle D of RCRA provide general environmental performance standards for disposal of solid wastes, including oil, gas, and geothermal wastes, but these standards do not fully address the specific concerns posed by oil and gas wastes.”<sup>545</sup>

In particular, EPA noted the lack of appropriate standards in Subtitle D for storage and transportation of these wastes.

**Hazardous Materials Transportation Act.**<sup>546</sup> The Hazardous Materials Transportation Act regulates the transport of hazardous chemicals to be added to fracturing fluids. The Act would not apply to wastes that fall under the RCRA exemption.

**Safe Drinking Water Act.**<sup>547</sup> The Safe Drinking Water Act sets national drinking water standards, but also regulates the underground injection of waste. The Underground Injection Control (UIC) program sets standards designed to prevent underground injection of waste from

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<sup>544</sup> The exemption does not cover wastes from materials used in natural gas development, but not specific to the industry – such as painting waste, lubrication oils, compressor oil, used hydraulic fluids, waste solvents and pesticide wastes.

<sup>545</sup> Regulatory Determination for Oil and Gas and Geothermal Wastes, 53 FR 25446.

<sup>546</sup> 49 U.S.C. §5101 et seq. (1975)

<sup>547</sup> 42 U.S.C. §300f et seq. (1974)

contaminating underground sources of drinking water. Federal UIC rules establish several different classifications for injection wells and set standards for each class. Class II wells can be used for underground injection of brines and other fluids associated with oil and gas production.

The 2005 Energy Policy Act (P.L.1090-58, August 2005) specifically exempted injection of fluids for hydraulic fracturing from regulation under the UIC provisions of the Safe Drinking Water Act that address underground storage or injection of fluids. The UIC program continues to apply to underground injection of waste from oil and gas production.

**Clean Water Act.**<sup>548</sup> Under the federal Clean Water Act, it is illegal to discharge waste from a point source (such as a pipe or ditch) to navigable waters<sup>549</sup> without a National Pollutant Discharge Elimination System (NPDES) permit. NPDES permits issued for industrial discharges and wastewater treatment plants include specific limits on individual pollutants. EPA has adopted guidelines for industrial discharges associated with oil and gas production, including discharges associated with shale gas extraction.<sup>550</sup>

NPDES permitting requirements also cover municipal and industrial stormwater discharges and stormwater runoff associated with construction. (The construction stormwater permit requires sedimentation control measures to prevent sedimentation pollution and high levels of turbidity in streams.) The 1987 Clean Water Act amendments that directed EPA to address stormwater discharges, however, specifically prohibited EPA from regulating stormwater from oil and gas exploration, development, production and treatment activities as long as the stormwater had not been in contact with raw materials, product (intermediate or finished) or waste.

EPA interpreted the 1987 exemption to apply to uncontaminated stormwater runoff from drilling sites, but continued to require an NPDES stormwater permit for construction-related activities such as building access roads and drill pads. The Energy Policy Act of 2005 overrode EPA's interpretation, adopting a more expansive definition of excluded mining, oil and gas activities. As a result, activities in preparation for drilling and movement of drilling equipment, including road construction, are now exempt from federal construction stormwater regulations addressing sedimentation pollution.

**Clean Air Act.**<sup>551</sup> In 1985, EPA set new source performance standards for emissions of volatile organic compounds (VOCs) and sulfur dioxide from natural gas processing facilities. EPA only recently proposed new source performance standards for other oil and natural gas operations. On Aug. 23, 2011, EPA proposed new source performance standards for emissions of VOCs and sulfur dioxide from a broader range of oil and natural gas exploration and production activities. As proposed, the standards would include operational requirements for completion of hydraulically fractured natural gas wells. EPA originally proposed to adopt a final NSPS rule by Feb. 28, 2012, but extension of the original comment period has delayed action beyond that

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<sup>548</sup> 33 U.S.C. § 1251, et seq

<sup>549</sup> The Clean Water Act defines "navigable waters" very broadly defined; the NPDES permitting requirement covers most rivers, lakes, streams and wetlands nationwide.

<sup>550</sup> 40 CFR Part 435, Subpart C.

<sup>551</sup> 42 U.S.C. §7401 et seq. (1970).

date. Until the proposed rules go into effect, no federal new source performance standards apply to emissions from many activities involved in production of natural gas, including hydraulic fracturing.

On June 17, 1999, the EPA adopted standards for the emission of hazardous air pollutants for certain sources associated with oil and natural gas production and natural gas transmission and storage. Under Section 112 of the Clean Air Act, EPA adopts Maximum Achievable Control Technology (MACT) standards for emissions of hazardous air pollutants by major sources. The Oil and Natural Gas Production MACT standard addressed emissions from glycol dehydration process vents, storage vessels and natural gas processing plant equipment leaks. The Natural Gas Transmission and Storage MACT standard addressed only glycol dehydration process vents. The Aug. 23, 2011, rulemaking notice for new source performance standards also proposed modifications to the MACT standards for these major source categories.

On Jan. 3, 2007, EPA adopted standards for the Oil and Natural Gas Production area source category. Area source standards address an aggregation of smaller sources and are based on generally available control technology. The existing area source standard for oil and natural gas production areas addresses benzene emissions from production areas located near urban areas. No changes have been proposed to the area source standard.

### **Summary**

Since oil and gas exploration and production activities have been exempted from several federal environmental laws, many activities are regulated only at the state level. Storage and disposal of oil and gas wastes have been exempted from federal hazardous waste regulation, specifically to allow states to develop tailored programs for management of those wastes. Land application of wastewater is generally a matter for state rather than federal regulation. Although underground injection of wastewater produced from hydraulic fracturing continues to be subject to the Underground Injection Control provisions of the federal Safe Drinking Water Act, the actual injection of fluids for purposes of fracturing shale has been exempted from those provisions. Congress has also deferred to the states to regulate stormwater runoff from drilling sites, exempting those sites from Clean Water Act permitting requirements for construction stormwater and industrial stormwater discharges.

## **B. STRONGER guidelines for state oil and gas programs**

EPA's 1988 decision not to regulate waste from oil and gas production activities under RCRA Subtitle C noted the need to strengthen state regulatory programs and fill gaps in other federal programs to adequately address drilling wastes. In 1990, EPA and the Interstate Oil Compact Commission (IOCC, now called the Interstate Oil and Gas Compact Commission, or IOGCC) jointly published a Study of State Regulation of Oil and Gas Exploration and Production Waste that included guidelines for the regulation of oil and gas exploration and production wastes by the IOCC member states (the "1990 Guidelines"). The published guidelines, developed by state, environmental and industry stakeholders, provided the basis for the State Review Program, a multi-stakeholder review of state exploration and production (E&P) waste management programs against the guidelines. In 1999, administration of the State Review Program devolved

to a nonprofit organization called State Review of Oil and Natural Gas Environmental Regulations Inc. (STRONGER).

The Guidelines have been revised and expanded several times and in 2009 STRONGER formed a Hydraulic Fracturing Workgroup to develop specific guidelines for state regulation of hydraulic fracturing. In 2010, STRONGER distributed the workgroup's guidelines (the "2010 Hydraulic Fracturing Guidelines") for state regulation of hydraulic fracturing. The guidelines tend to be broadly worded – identifying regulatory issues that should be addressed without recommending specific standards. Among the recommended regulatory program elements:

- Standards for casing and cementing sufficient to handle highly pressurized injection of fluids into a well for purposes of fracturing bedrock and extracting gas.
- Identification of potential conduits for fluid migration; address management of the extent of fracturing; and identify actions to be taken in response to operational or mechanical problems.
- Standards for dikes, pits and tanks, including contingency planning and spill risk management procedures.
- Waste characterization, including testing of fracturing fluids. Waste should be tracked to ensure appropriate disposal.
- Prior notification of fracturing activity.
- Assessment of water supply for hydraulic fracturing in terms of volume in light of water supply, competing water uses and the environmental impacts of withdrawing water for fracturing. Use of alternative water sources and recycling of water should be encouraged.

In 2011, DENR invited STRONGER to assess North Carolina's existing regulatory structure against the STRONGER guidelines. The final STRONGER report on North Carolina was released on Feb. 28, 2012.<sup>552</sup> (The full report can be found in Appendix E: STRONGER Report.) The report identifies a number of gaps in the state's existing regulatory programs and makes three broad recommendations:

### ***1. Develop formal standards for natural gas exploration and development***

The review team found few environmental standards in place that expressly addressed oil and gas exploration and development. STRONGER expressed concern that attempting to apply general environmental standards to natural gas production on a case-by-case basis would be difficult if the volume of activity increased significantly. The report also notes that the potential operator, the public and state regulators all need to know with some certainty what the regulatory expectations are before starting into a permitting process. As a result, the STRONGER review team recommended that the state develop formal standards and technical criteria specifically for the industry based on STRONGER guidelines.

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<sup>552</sup> North Carolina State Report, STRONGER Inc., February 2012

## **2. Develop technical criteria for oil and gas activity**

North Carolina's environmental programs have not focused on regulating the impacts of oil and gas development because there has not been an active industry in the state. If natural gas development comes to the state, North Carolina will need technical criteria to address oil and gas related activities including administrative criteria and technical criteria related to waste management, stormwater, abandoned sites, naturally occurring radioactive materials and hydraulic fracturing. If the state develops an oil and gas regulatory program, the review team recommended use of the STRONGER Guidelines and a review of programs in other states to develop those technical criteria.

## **3. Use stakeholder groups to develop an oil and gas program**

The report notes that the Department of Environment and Natural Resources generally involves stakeholder groups early in discussions of proposed rules that involve major policy changes or are the subject of significant public interest. If North Carolina develops an oil and gas regulatory program, the review team recommended that the Department of Environment and Natural Resources continue to use independent scientific advisory groups, local advisory committees, groups of government, public and industry representatives, or other similar mechanisms, to obtain input and feedback in the development of the program.

## **C. State regulatory programs**

DENR has looked at the environmental standards applied to hydraulic fracturing in a number of oil and gas-producing states. It is not possible to create a simple matrix of state environmental standards for hydraulic fracturing because of the complexity of the individual state programs. To find all of the environmental regulations that apply in any state, it is necessary to look beyond rules implemented by an oil and gas permitting agency. Standards that play a significant role in managing the impacts of hydraulic fracturing can often be found in water quality, air quality and waste management rules. Regulations dealing with water use – such as permitting requirements for water withdrawals – are also generally found outside the oil and gas regulatory program, but can be critical approvals needed for hydraulic fracturing.

This report describes the types of regulations common to most (if not all) programs in the oil and gas-producing states and then focuses on three representative state regulatory programs (Oklahoma, Texas and Pennsylvania).<sup>553</sup> Although other water quality and air quality rules may apply, this section will focus on standards specific to natural gas exploration and development and water use regulations applicable to hydraulic fracturing. The state by state summaries should not be taken as a complete picture of the regulatory program in each state; the difficulty of navigating through any state's statutes and rules to find all of the provisions potentially applicable to oil and gas production made that impossible. Instead, these are only intended as a snapshot of some of the regulations frequently applied to these activities.

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<sup>553</sup> Thirty states are members of the Interstate Oil and Gas Compact Commission.

### ***Technical standards common to oil and gas states***

Although the standards and methods of enforcement vary from state to state, most of the oil and gas-producing states have adopted technical standards for waste and chemical storage, waste disposal, well closure, blow-out prevention and site restoration. Examples include:

- Design standards for pits to contain brine and other fluids:
- Standards for discharge of tophole or pit water, including standards for land application.
- Disposal of drill cuttings (in pits or by land application)
- Standards for land application of residual waste (including contaminated drill cuttings)
- Requirements for containment around storage tanks
- Standards for well closure and for site restoration after completion of drilling
- Installation of safety devices (such as blow-out preventers)
- Monitoring of inactive wells
- Standards for underground gas storage
- Standards for underground injection of drilling wastes

### **Oklahoma**

Since Oklahoma has had an oil and gas industry for many decades, the standards for hydraulic fracturing represent a combination of general standards for oil and gas development and more recent provisions to specifically address high pressure fracturing and horizontal drilling. Well permits for hydraulic fracturing are issued by the Oklahoma Corporation Commission, Oil and Gas Conservation Division (OCC). Rules applicable to natural gas exploration and development include:

**Identification of Chemicals Used in Fracturing.** The OCC has the authority to obtain information on chemical constituents used in hydraulic fracturing fluids from operators, service companies or other persons. The OCC has exercised the authority of this rule in the past to obtain information on the constituents of drilling fluids in the course of investigating a blowout or other release. Under the Federal Emergency Planning and Community Right-to-Know Act (EPCRA), 42 U.S.C.A Section 11043, health professionals may obtain information on chemical constituents of hydraulic fracturing fluids from the well owner or operator. The Oklahoma Hazardous Materials Emergency Response Commission (OHMERC) implements the requirements of EPCRA. Oklahoma has not required public disclosure of the constituents used in hydraulic fracturing.

**Well Construction Standards.** Oklahoma rules set very specific standards for well construction, casing and cementing. Oklahoma specifies the use of oil field grade steel casing for surface casing and other casing strings. The rules also set minimum footages for cement casing. The surface casing must extend at least 50 feet below the lowest layer of treatable groundwater; if the driller proposes to dispose of drilling fluids by annular injection, it must extend 200 feet

below treatable groundwater.<sup>554</sup> Compliance with well construction standards must be verified by witnessing and testing, so the operator must provide 24-hour notice to the state agency before cementing surface casing or other casing strings to allow the agency to be on site. Oklahoma also requires the driller to submit reports on a number of steps in the casing and cementing process.<sup>555</sup>

**Setbacks.** The basic spacing for horizontal wells of 2,500 feet or more in depth is 330 feet from the property (or lease) line and 600 feet from another producing well. Special construction standards apply in wellhead protection areas and other sensitive sites. Oklahoma prohibits drilling or seismic activity related to drilling within 500 feet of the boundary of any Superfund site designated under the Comprehensive Environmental Response Compensation and Liability Act or any active hazardous waste treatment, storage or disposal facility.<sup>556</sup> Pits for storage of drilling waste cannot be located in a floodplain, a wellhead protection area or within one mile of a public water supply well if no wellhead protection area has been designated.

**Management of Wastewater and Solid Wastes.**<sup>557</sup> Oklahoma has created a category of “deleterious substances” that covers many drilling wastes that fall under the RCRA hazardous waste exemption, but require special handling. The term covers “any chemical, salt water, oil field brine, waste oil, waste emulsified oil, basic sediment, mud, or injurious substance produced or used in the drilling, development, production, transportation, refining, and processing of oil, gas and/or brine mining.”<sup>558</sup>

Oklahoma rules allow disposal of drilling fluids by:

- (A) Evaporation/dewatering and leveling of the reserve pit.
- (B) Land application.
- (C) Recycling.
- (D) Commercial off-site earthen pit disposal.
- (E) Annular injection (injection in the space between the surface casing and well bore).
- (F) Hauling to a facility or location other than a commercial earthen pit.<sup>559</sup>

The application for a drilling permit must include information on the proposed method of disposal and Oklahoma rules include standards for each method. The rules set very specific construction and operation requirements for pits used to temporarily store or dispose of drilling fluids, including: liner specifications, freeboard requirements, secondary containment in areas subject to flooding, exclusion of stormwater runoff, vegetative stabilization to prevent

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<sup>554</sup> Annular injection involves injection into the space between the surface casing and the borewall or between different strings of casing within a borehole.

<sup>555</sup> Oklahoma Administrative Code (OAC) 165:10-3-4, July 11, 2010.

<sup>556</sup> OAC 165:10-7-15, July 11, 2010.

<sup>557</sup> Oklahoma’s rules for storage, transportation and disposal of drilling wastes are detailed and cannot be fully described here. This section can only provide a very broad overview.

<sup>558</sup> OAC 165:10-1-2, July 11, 2010.

<sup>559</sup> OAC 165:10-3-1(f), July 11, 2010.



erosion, and standards for pit closure. Pit bottoms must be separated by at least 25 feet from the groundwater. Pits cannot be located in a flood plain, wellhead protection area or within one mile of municipal water supply well if no wellhead protection area has been designated.<sup>560</sup>

Oklahoma also allows disposal of drilling fluids by underground injection or land application. A commercial disposal well operator must maintain a log that records the amount of waste received, the source and the operator and/or owner of the source of the waste. Oklahoma also has very detailed standards for land application of produced waters and other drilling fluids including: analysis for total suspended salts (or total dissolved solids), chlorides, pH, oil and grease; setbacks from property lines, streams and wells; and separation from the groundwater table.<sup>561</sup>

Trucks that haul “deleterious substances,” (including certain drilling wastes) must be licensed by the Transportation Division of the OCC. The haulers are required to maintain run tickets stating the amount and origin of the substance hauled.

**Water Use.** The Oklahoma Water Resources Board issues permits for the use of surface and groundwater. Household uses are exempt from the permitting requirement. Before a permit can be issued for a surface water withdrawal, four conditions must be satisfied:

- The requested amount of unappropriated water must be available.
- A present or future need for the water must exist and the intended use must be beneficial.
- The use of water must not interfere with domestic or existing appropriative uses.
- The use must not interfere with existing or proposed beneficial uses within the stream system, and the needs of the area's water users if the application is for the transportation of water for use outside the area where the water originates.

Groundwater use also requires a permit. Normally, the applicant must publish notice of the application in a newspaper in the county where the well is to be located and give notice by certified mail to landowners within a quarter mile of the proposed well location. The OWRB typically issues a temporary provisional permit for water use in oil and gas operations including hydraulic fracturing. Impacts on competing water uses are considered in the permitting process.

## Pennsylvania

Since 2005, Pennsylvania has experienced a boom in shale gas production by hydraulic fracturing. In response to specific problems experienced as a result of hydraulic fracturing, Pennsylvania has amended both state laws and rules in the last three years. The most recent state legislation<sup>562</sup> made changes in a number of regulatory requirements and authorized local governments to charge impact fees to recover the costs of maintenance and repair to local

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<sup>560</sup> OAC 165:10-7-16, July 11, 2010.

<sup>561</sup> OAC 165:10-7-17, July 11, 2010.

<sup>562</sup> House Bill 1950, February 2012.

infrastructure (such as roads). Even now, the state's regulatory appears to provide less detailed standards than those found in either Oklahoma or Texas, particularly with respect to well construction and methods for casing and cementing the well. Pennsylvania does not require prior state approval of casing/cementing plans (although state rules set some basic standards) or emergency response plans. Pennsylvania also does not require notice to the regulatory agency before a well is drilled or hydraulically fractured.

**Identification of Chemicals Used in Fracturing.** Recent legislation requires operators to publicly disclose chemical constituents of fracturing fluids on FracFocus.<sup>563</sup>

**Well Construction Standards.** State rules require the driller to have a casing and cementing plan, but do not require prior approval of the plan by DEP in most cases. The rules require that the surface casing extend 50 feet below the lowest level of groundwater. Pennsylvania's casing and cementing standards are not as detailed as those adopted by Texas and Oklahoma. Pennsylvania does not require the driller to provide notice to the regulatory agency before cementing.

**Setbacks.** House Bill 1950 (enacted in February 2012)<sup>564</sup> made several changes to setback requirements for wells used in hydraulic fracturing:

- Property owners within 3,000 of a well permit must be notified of the new permit (previously 1,000 feet).
- New wells must be drilled at least 500 feet away from existing buildings or water wells (previously 200 feet), and if it's a supply point for public water supplies, the setback must be 1,000 feet.
- New wells must be drilled at least 300 feet away from streams, springs, water bodies or wetlands greater than one acre (previously 100 feet).

The bill also directs DEP to consider the impact of a proposed well on public resources including:

- (1) Publicly owned parks, forests, game lands and wildlife areas.
- (2) National or State scenic rivers.
- (3) National natural landmarks.
- (4) Habitats of rare and endangered flora and fauna and other critical communities.
- (5) Historical and archaeological sites listed on the Federal or State list of historic places.
- (6) Sources used for public drinking supplies in accordance with subsection (b).

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<sup>563</sup> FracFocus is a website maintained jointly by the Groundwater Protection Council and the Interstate Oil and Gas Compact Commission: [www.fracfocus.com](http://www.fracfocus.com)

<sup>564</sup> Act of Feb. 14, 2012, P.L. 87, No. 13 (amending Title 58 of Pennsylvania Consolidated Statutes), <http://www.legis.state.pa.us/WU01/LI/LI/US/HTM/2012/0/0013..HTM>

**Management of Wastewater and Solid Waste.** Before generating any waste, the operator must have a plan for the control and disposal of fluids, residual waste and drill cuttings, including tophole water, brines, drilling fluids, additives, drilling muds, stimulation fluids, well servicing fluids, oil, production fluids and drill cuttings from the drilling, alteration, production, plugging or other activity associated with oil and gas wells. The plan must be consistent with Pennsylvania laws (including water quality and solid waste statutes), but does not require prior state review and approval.

State rules set standards for use of pits and tanks for both temporary storage and disposal of drilling wastes. Open pits can be used for temporary storage as long as the operator maintains two-feet of freeboard. A pit or tank that contains drill cuttings from below the casing seat, “pollutional substances,” wastes or fluids other than tophole water, fresh water and uncontaminated drill cuttings must have a synthetic liner. DEP establish additional technical standards for permitting of pits and tanks, including a requirement that any pit maintain 20 inches of separation between the bottom of the pit and the groundwater table.

Unless authorized under the rules for temporary storage, use of a pit to store brine and other fluids produced during operation, service or plugging of a well requires a permit under the Clean Streams Law.<sup>565</sup> DEP rules set standards for siting and constructing pits (including setbacks from streams). Tophole water and pit water can also be land-applied as long as no additives, drilling muds, pollutional materials or drilling fluids other than gases or fresh water have been added to or are contained in the water ( subject to exceptions approved by DEP). Drill cuttings from above the casing seat can be disposed of in a pit or by land-application on the drilling site as long as the drill cuttings are not contaminated with pollutional material, including brines, drilling muds, stimulation fluids, well servicing fluids, oil, production fluids or drilling fluids other than tophole water, fresh water or gases.

Contaminated drill cuttings and other residual wastes can also be disposed of on the drill site, but Pennsylvania has set more stringent standards for pits used in disposal of those wastes.

**Water Use.** Unlike the western oil and gas states, Pennsylvania lacks a statewide permitting program for water withdrawals. In parts of the state, water withdrawals require permits under rules adopted by the Susquehanna River Basin Commission. Some Pennsylvania counties that have experienced significant natural gas development (such as Bradford County) fall outside the jurisdiction of the Commission and have no water withdrawal permitting. After experiencing significant stream impacts as a result of large water withdrawals for hydraulic fracturing in low flow periods, DEP adopted rules requiring natural gas developers to submit a water management plan before the start of fracturing. There have been some questions about the legal effect of the plans, which are not permits and do not require notice to riparian property owners.

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<sup>565</sup> 35 P. S. § § 691.1—691.1001

## Texas

Like Oklahoma, Texas has a long history of oil and gas activity and the standards applied to hydraulic fracturing have grown out of a larger body of regulations applicable to oil and gas exploration and development generally. The Texas Railroad Commission has responsibility for permitting oil and gas activities.<sup>566</sup>

**Identification of Chemicals Used in Fracturing.** In 2011, Texas enacted legislation requiring operators to provide full public disclosure of the chemical composition of hydraulic fracturing fluids through the FracFocus website.

**Well Construction Standards.** The stated goal of the Texas rules is to ensure that “all usable-quality water zones be isolated and sealed off to effectively prevent contamination or harm, and all potentially productive zones be isolated and sealed off to prevent vertical migration of fluids or gases behind the casing.”<sup>567</sup> The surface casing (a steel pipe encased in cement) must extend from the surface to a point below the deepest usable groundwater. Since the extent of the “usable water quality zone” determines how the casing and cementing standards apply, an applicant for a gas well permit needs a letter from the Texas Commission on Environmental Quality (TCEQ) that identifies the depth to which fresh water must be protected. The rules set out specific casing and cementing standards, protocols for testing cement strength and a requirement that the operator must submit a report on completion of the cementing to verify compliance. Unlike Oklahoma, Texas does not require prior notice that cementing will occur to allow a regulator to be onsite.

**Setbacks.** A well cannot be drilled nearer than 1,200 feet to any well completed in or drilling to the same horizon on the same tract or farm. Wells must also be located at least 467 feet from any property line, lease line or subdivision line. (The Railroad Commission can grant exceptions from both the well and boundary setbacks under certain circumstances.)

The Texas Railroad Commission has no rules establishing setbacks from residences, but local governments retain some authority to establish setbacks. A city may enact an ordinance regarding the proximity of an oil or gas well to homes or other structures within the city limits. An old law in the Texas Municipal Code, Section 253.005(c), also provides: “A well may not be drilled in the thickly settled part of the municipality or within 200 feet of a private residence.” In counties with a population greater than 400,000 or a population greater than 140,000 and adjacent to a county with a population greater than 400,000, a residential developer can get Texas Railroad Commission approval of a subdivision plan that limits drilling activity to designated drill sites of at least two acres for every 80 acres in the subdivision (16 Texas Administrative Code (TAC) §3.76).

**Management of Wastewater and Solid Wastes.** Texas Railroad Commission rules set specific standards for storage and disposal of drilling wastes that have been exempted from regulation under the hazardous waste standards established under Subtitle C of the federal Resource

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<sup>566</sup> The Texas Railroad Commission website, <http://www.rrc.state.tx.us/>, provided much of the information on the Texas oil and gas program.

<sup>567</sup> Texas Administrative Code (TAC), Title 16 Part 1 Rule § 3.13 (a)(1).

Conservation and Recovery Act.) The state standards for storage and disposal of exempt drilling wastes can be found in Texas Administrative Code (TAC) Title 16, Chapter 3. The rules establish standards for construction and use of pits to store or dispose of wastes, including: saltwater disposal pits; emergency saltwater storage pits; collecting pits; skimming pits; brine pits; brine mining pits; drilling fluid storage pits (other than mud circulation pits); drilling fluid disposal pits (other than reserve pits or slush pits); washout pits; and gas plant evaporation/retention pits. A state permit is required for construction or use of a pit for storage/disposal of oil and gas wastes. The Texas Railroad Commission, in coordination with the U.S. Environmental Protection Agency, also issues permits for injection wells to be used for disposal of oil and gas wastes.

Oil and gas wastes taken off the drilling site for disposal must be hauled by a permitted hauler. The well operator is required to keep records identifying the hauler and the disposal site for any drilling wastes taken offsite for disposal. Those records must be maintained for three years.

Some drilling wastes can be disposed of without a permit. Freshwater condensate and inert materials (such as concrete, glass, wire and wood) can be disposed of without a permit so long as the materials are not deposited in surface waters. No permit is required to land-apply low chloride wastes (including drilling fluids with a chloride concentration of 3,000 milligrams per liter or less; drill cuttings, sands and silts produced by contact with low chloride drilling fluids; and pipe wash water) on the lease site by permission of the surface owner. Wastes with a higher concentration of chlorides can be dewatered and buried at the drill site without a permit.

Texas has also adopted specific standards for recycling of oil and gas waste<sup>568</sup> and for disposal of drilling wastes contaminated by naturally occurring radioactive materials.<sup>569</sup>

**Water Use.** An operator proposing to withdraw water from a river, lake or stream must obtain a permit from the Texas Commission on Environmental Quality (TCEQ). A permit may be granted only if:

- The applicant makes beneficial use of water;
- Water is available and its use does not impair vested water rights
- The applicant practices water conservation
- The use of water is not detrimental to public welfare.

Texas groundwater belongs to the owner of the land above it and may be used or sold as private property. A landowner has a right to take for use or sale all of the water that can be captured from beneath the land. The Texas Water Code authorizes the creation of water conservation districts and groundwater management areas with the purpose of preserving, protecting and conserving groundwater resources. These entities can regulate well spacing and enjoin wasteful water practices. Districts can also require permits for new wells.

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<sup>568</sup> TAC Subtitle 16, Chapter 4, Subchapter B.

<sup>569</sup> TAC Subtitle 16, Chapter 4, Subchapter F.

## D. Other sources of recommended standards

### 1. New York Supplemental Draft Generic Environmental Impact Statement

The state of New York has effectively had a moratorium on production of natural gas by hydraulic fracturing since December 2010 when outgoing Gov. David Paterson temporarily halted the practice by executive order. The New York Department of Environmental Conservation (N.Y. DEC) has prepared an environmental impact statement on the state oil, gas and mining program's ability to manage the impacts of hydraulic fracturing. N.Y. DEC issued a Revised Supplemental Draft Generic EIS in September 2011.<sup>570</sup> The 2011 Revised GEIS includes specific recommendations for new permitting standards to address hydraulic fracturing. The primary recommendations are described below.<sup>571</sup>

**Identifying fracturing chemicals.** The 2011 SGEIS identifies 322 chemicals proposed for use in New York and includes health hazard information for each category of chemicals as identified by the NYS Department of Health. Applicants must fully disclose to DEC all products and combinations used in the high-volume hydraulic fracturing process. In addition, applicants must agree to publicly identify the names of the additives, subject to exemptions where the applicant can prove that the exemption is necessary to protect confidential business information.

#### **Prohibitions on drilling in certain areas to protect water supplies; drilling would not be allowed:**

- Within 2,000 feet of public drinking water supply wells or reservoirs (this restriction will be reviewed in three years);
- On the state's 18 primary aquifers and within 500 feet of aquifer boundaries;
- Within 500 feet of a private water supply well or spring used for domestic water supply, unless waived by landowner;
- In the 100-year floodplain;
- On principal aquifers without site-specific reviews; or
- In the Syracuse and New York City watersheds. As the only unfiltered surface supplies of municipal water in the state, N.Y. DEC proposed to give these watersheds special protection. High-volume fracturing will be prohibited within the watersheds, within 4,000 feet of the watershed boundaries and within 1,000 feet of NYC's subsurface water supply infrastructure unless approval is granted after site-specific review.

N.Y. DEC estimated that more than 80 percent of the Marcellus Shale where gas extraction is viable would still be accessible for drilling under these recommendations.

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<sup>570</sup> New York Department of Environmental Conservation, Revised Draft SGEIS on the Oil, Gas and Solution Mining Regulatory Program, September 2011, <http://www.dec.ny.gov/energy/75370.html>

<sup>571</sup> New York DEC, 2011 Recommendations for Permitting High Volume Hydraulic Fracturing, <http://www.dec.ny.gov/energy/75664.html>, viewed March 7, 2012.

**Revised casing and cementing standards.** The Revised Draft SGEIS recommended modifying the oil and gas program's existing casing standards to require a third, cemented well casing around each well to prevent the migration of gas. The three required casings are the surface casing, the new intermediate casing and the production casing. The depths of both surface and intermediate casings will be determined by site-specific conditions.

**Spill control and wastewater management.** New guidelines will require that flowback water stored on-site be placed in watertight tanks within a secondary containment. No open containment will be allowed. Secondary containment will also be required for all fracturing additive containers, additive staging areas and flowback tanks to ensure any spills of wastewater or chemicals at the well pad do not migrate into water supplies.

N.Y. DEC noted that many drilling companies have started to recycle much of the flowback water, greatly reducing the need for disposal. The agency has proposed additional oversight for wastewater disposal:

- Applicants must have a DEC-approved plan for disposing of flowback water and production brine.
- DEC would institute a process to monitor disposal of flowback water, production brine, drill cuttings and other drilling waste streams that is similar to the handling of medical waste.
- DEC will require full analysis and approval under existing state and federal water laws and regulations before a water treatment facility could accept flowback water. This would include a treatment capacity analysis for any publicly operated treatment works facility (POTW) and a contingency plan if the primary disposal for wastewater is a POTW.

**Stormwater Control.** N.Y. DEC has proposed to issue a new general stormwater permit requiring strict stormwater control measures to prevent stormwater from contaminating water resources.

**Water Use.** Until recently, the state of New York lacked a statewide water withdrawal permitting program. The parts of the state under the jurisdiction of either the Delaware River Basin Commission or the Susquehanna River Basin Commission had water withdrawal permitting under the authority of the commissions. In 2010, New York enacted a new Water Resource Act that now requires a state permit for areas outside the jurisdiction of the river basin commission. A special permit will be required to withdraw large volumes of water for industrial and commercial purposes to ensure there are not adverse impacts. Permits issued under the law will be subject to limits to prevent impacts upon ecosystems and other water quantity requirements. The permit applicant will be required to identify the proposed water source and file an annual report on the aggregate amount of water withdrawn or purchased.

**Air Quality.** Requires enhanced air pollution controls on engines used at well pads. DEC will monitor local and regional air quality at well pads and surrounding areas. To reduce greenhouse gas emissions, requires use of existing pipelines when available rather than flaring gas.

**Conserving Habitat.** N.Y. DEC will require compliance with best management practices for land-disturbing activity on private forestlands of 150 acres or more and on privately owned grass lands of 30 acres or more.

## **2. American Petroleum Institute guidance**

The API has developed a set of standards, guidance documents, and recommended industry practices that address risk management associated with natural gas drilling and hydraulic fracturing. These five documents are:

- HF1 – Hydraulic Fracturing Operations – Well Construction and Integrity Guidelines
- HF2 – Water Management Associated with Hydraulic Fracturing
- HF3 – Practices for Mitigating Surface Impacts Associated with Hydraulic Fracturing
- Std. 65, Part 2 – Isolating Potential Flow Zones During Well Construction
- RP 51R – Environmental Protection for Onshore Oil and Gas Production Operations and Leases

The first guidance document provides useful technical guidance on well construction and integrity standards for wells to be hydraulically fractured.<sup>572</sup> The guidance addresses well design, cementing, casing, well logging and monitoring/testing requirements for steps in the well construction and fracturing process. The guidance often refers to previously adopted API standards generally applicable to the oil and gas industry, such as cement and casing specifications.

API's guidance on water management addresses both water sources for hydraulic fracturing and methods for disposing of waste waters.<sup>573</sup> The guidance document notes the importance of planning for surface water and groundwater withdrawals to avoid impacts to natural resources and to other water users. The guidance also identifies some innovative alternative sources of water, including cooling water discharges and inactive quarries.

API guidance documents generally focus on the technical aspects of gas production and hydraulic fracturing. API recognizes that state standards will vary even on relatively technical issues, such as casing and cementing standards, because of varying geologic and hydrologic conditions. The guidance documents are written as best management practice recommendations for use by the industry in the context of federal, state and local regulations. API guidance documents for hydraulic fracturing do not appear to address siting standards (such as setbacks and buffer requirements) or technical waste management, water quality and waste management standards.

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<sup>572</sup> American Petroleum Institute, Hydraulic Fracturing Operations – Well Construction and Integrity Guidelines, API Guidance Document HF 1, First Edition, October 2009.

<sup>573</sup> American Petroleum Institute, Water Management Associated with Hydraulic Fracturing, API Guidance Document HF2, First Edition (2010).



Some of the more general lessons taken from the API guidance on well construction:

- The quality of a cementing job and the integrity of a well casing can only be assured by review of supporting data collected as the well is constructed and tested. For cementing, the necessary information would include drilling reports, drilling fluid reports, cement design and related laboratory reports, open-hole logs and other information. API also recommends testing the effectiveness of a cement seal by using various hydraulic pressure tests to ensure well integrity.<sup>574</sup>
- Surface casing must be set at a depth adequate to protect groundwater supplies. State rules set the minimum depth of surface casing and most states require the casing to be set below the deepest groundwater aquifer. At a minimum, API recommends surface casing be set at least 100 feet below the deepest underground drinking water supply encountered while drilling the well. Surface casing should be cemented from bottom to top, completely isolating groundwater aquifers.<sup>575</sup>
- After selecting the well site and before drilling, API recommends that the driller take baseline water quality samples from nearby water sources and have the samples analyzed based on “applicable regulatory requirements.” (Presumably this refers to state water quality standards and established sampling and testing protocols.) API recommends that baseline testing should include rivers, creeks, lakes, ponds and water supply wells within an area based on the anticipated fracture length plus a safety factor. The purpose of collecting pre-drilling water quality data is to allow the operator to determine whether later water quality changes resulted from gas production.<sup>576</sup>

### **3. Report of the Secretary of Energy’s Advisory Board, Shale Gas Production Subcommittee**

In March 2011, the President charged the Secretary of Energy’s Advisory Board to recommend measures to improve the safety and environmental performance of hydraulic fracturing. The Board’s Shale Gas Subcommittee issued an initial 90-day report in August 2011 that made 20 recommendations, but did not set priorities or discuss implementation. A final report, issued Nov. 18, 2011, provided more detail on implementation of the recommendations by state and federal agencies.<sup>577</sup> Recommendations for federal action included:

- EPA should act to reduce emissions of air pollutants, including ozone precursors and methane
- Require disclosure of hydraulic fracturing fluid composition
- Eliminate use of diesel fuel in fracturing fluids<sup>578</sup>

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<sup>574</sup> Ibid, Section 6.4, page 10.

<sup>575</sup> Ibid, Section 7.3, page 11.

<sup>576</sup> Ibid, Section 10.2, page 20.

<sup>577</sup> Secretary of Energy Advisory Board, Shale Gas Production Subcommittee Second Ninety Day Report, November 18, 2011, [http://www.shalegas.energy.gov/resources/111011\\_90\\_day\\_report.pdf](http://www.shalegas.energy.gov/resources/111011_90_day_report.pdf)

<sup>578</sup> Ibid, pg.4

- The subcommittee also identified actions to be taken by state oil and gas programs:
- Measure and report makeup of process water and flow throughout the fracturing and cleanup process; track all transfers of process water.
- Adopt best practices for well construction, including casing, cementing and pressure management standards.
- Require background water quality testing to document conditions in water supply wells and surface waters prior to drilling.

#### **4. Guidance under development**

Several public and private agencies are developing guidelines for hydraulic fracturing. The Department of Interior's Bureau of Land Management is drafting rules for hydraulic fracturing on public lands. The draft rules have not yet been published in the Federal Register for comment; according to various news accounts and industry sources, a leaked copy of the draft rules included a requirement for disclosure of chemicals used in fracturing.

The U.S. Environmental Protection Agency started a study of the impacts of hydraulic fracturing on drinking water in 2011. The plan of study, released in November 2011, identifies five fundamental questions to be addressed in the study:

- Water Acquisition: What are the potential impacts of large volume water withdrawals from ground and surface waters on drinking water resources?
- Chemical Mixing: What are the possible impacts of surface spills on or near well pads of hydraulic fracturing fluids on drinking water resources?
- Well Injection: What are the possible impacts of the injection and fracturing process on drinking water resources?
- Flowback and Produced Water: What are the possible impacts of surface spills on or near well pads of flowback and produced water on drinking water resources?
- Wastewater Treatment and Waste Disposal: What are the possible impacts of inadequate treatment of hydraulic fracturing wastewaters on drinking water resources?<sup>579</sup>

The EPA study will be completed in 2014.

The Environmental Defense Fund is working with Southwestern Energy of Houston on a draft model regulatory framework for hydraulically fractured natural gas well. A working draft has been in limited circulation, but has not been officially released.

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<sup>579</sup> U.S.EPA, Plan to Study the Potential Impacts of Hydraulic Fracturing on Drinking Water Resources, EPA/600/R-11/122/November 2011/www.epa.gov/research, November 2011.

## E. State policies to guide decisions on hydraulic fracturing

A number of existing state environmental policies (reflected in both statutes and rules) could provide guidance for a regulatory program to address hydraulic fracturing for natural gas:

**Groundwater should be protected and managed as a potential drinking water supply.** Current statutes and rules reflect that policy direction in a number of ways. North Carolina has health-based groundwater standards and a stated goal of maintaining the quality necessary to allow use of groundwater resources for drinking water. The state's groundwater standards provide the baseline for many environmental permits – including permits for land application of waste. State law also restricts underground injection of waste as a measure to protect groundwater quality for future drinking water use.

**Surface water should be protected and managed for all its designated uses.** Current rules and statutes are designed to protect the designated uses of the state's surface waters through protective water quality standards. State regulations were established in accordance with the federal Clean Water Act. The standards were developed with consideration for each surface water's use and value for public water supplies, propagation of fish and wildlife, recreation and navigation.

State and federal regulators develop aquatic life and health-based surface water standards using relevant and scientifically valid toxicity data for chemicals. For a number of the chemicals described in this report as being components of hydraulic fracturing fluids, toxicity information is limited and may not be of sufficient quality to establish a surface water quality standard. Additional research at the national level will be required to develop state standards for these chemicals.

**Water supply planning is critical to maintaining an adequate water supply for industry, agriculture and drinking water needs.** State law requires development of state and local water supply plans. After experiencing severe droughts affecting large areas of the state (including major municipalities) in 2002 and 2007, the General Assembly strengthened the water supply planning laws to require development of water shortage response plans meeting minimum state standards and increase collection of data on water use.<sup>580</sup> In 2010, the General Assembly enacted legislation requiring DENR to develop river basin hydrologic models as a tool for water supply planning.<sup>581</sup>

**A person who causes groundwater contamination or other environmental degradation has the responsibility to assess and clean up the damage. Those responsibilities include providing an alternative water supply to anyone whose water supply well has been made unsafe for use.** This is a principle applied through all of the state laws addressing environmental contamination. Activities that have a high potential for groundwater contamination in particular typically require financial assurance in the form of environmental insurance, a bond or other instrument to ensure that the operator will have sufficient resources to reclaim the site and cleanup any contamination. Those types of financial assurance requirements currently

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<sup>580</sup> The Drought Response/ Water Management Act of 2008 (S.L. 2008-143)

<sup>581</sup> S.L. 2010-143

apply to landfill operators, mine operators, owners/operators of commercial petroleum underground storage tanks and operators of facilities handling hazardous waste.

## F. Recommended regulatory framework

**Statutory Framework and Organization.** The State's Oil and Gas Conservation Act creates a basic framework for issuance of well permits and gives the Secretary of Environment and Natural Resources the authority to adopt rules.<sup>582</sup> The Act itself needs to be modernized; most of the provisions in the Act date back to 1945 and some would be incompatible with a modern natural gas regulatory program. For example, the bonding requirement covers only well closure at the end of production and does not address site reclamation or cleanup of environmental contamination. The statute also gives DENR the authority to cap oil or gas production based on in-state demand, which is clearly incompatible with the interstate gas market. It would be possible, however, to update the statute to provide the framework for a modern oil and gas program.

The STRONGER report noted that having the oil and gas permitting program in DENR has the advantage of allowing easier coordination of permit reviews. DENR agrees that maintaining the oil and gas permitting program in DENR would be the most efficient way to deliver an oil and gas permitting program given the ability to use the existing statutory framework and coordinate with the environmental programs in the department. The statute currently gives the Secretary of Environment and Natural Resources rulemaking authority under the Oil and Gas Conservation Act. Another alternative would be to transfer the rulemaking authority to one of the regulatory commissions organized under the department, such as the Mining Commission or the Environmental Management Commission, to take advantage of a broader range of viewpoints in the rulemaking process.

**Development of regulations for natural gas exploration and development.** In developing a regulatory framework for natural gas exploration and production, it is important to think about the full range of activities involved that extend beyond construction of the well and fracturing the shale. Gas production begins with activities similar to those associated with any development: site clearing, grading, construction of access roads. The impacts of those activities are familiar; many are already addressed by existing state regulations under the Sedimentation Pollution Control Act.

Significant gaps are found in existing state environmental standards with respect to many other activities required for natural gas production. As noted in the STRONGER report, North Carolina has not developed regulations for the oil and gas industry because the industry has not had a presence in the state. Existing water quality, air quality, waste management and water use standards were not developed with the natural gas production industry in mind; as a result, standards may be inadequate or, in some case, nonexistent. Although the state has well construction standards, for example, the standards were developed for water supply wells;

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<sup>582</sup> N.C. General Statute 113-381, et seq.

those standards are inadequate for construction of wells that must withstand the high pressures of hydraulic fracturing.

Some state rules have been built on a foundation of federal requirements that do not apply to natural gas exploration and development activities. Natural gas exploration and production activities have been exempted from the Clean Water Act's construction stormwater permit requirement; underground injection control permitting under the Safe Drinking Water Act (for hydraulic fracturing); and federal hazardous waste regulations (as applied to oil and gas wastes). Since state rules implementing those federal programs are written to apply only to activities regulated under the federal statute, there are no applicable standards at the state level. In the area of waste management, in particular, existing state rules are inadequate to address the potential impacts of natural gas exploration and development. Unlike the oil and gas producing states, North Carolina has never considered the need for rules to manage transportation, storage and disposal of a waste stream has the characteristics of hazardous waste, but is exempt from regulation under RCRA.

STRONGER recommended development of environmental standards specific to activities associated with natural gas exploration and production to address those gaps and to provide greater consistency and predictability. DENR concurs in that recommendation. A comprehensive oil and gas regulatory program requires such a broad range of standards - many of them technical - that DENR cannot make specific recommendations on a full set of regulatory standards without further study. The STRONGER guidelines and a review of regulations in Oklahoma, Pennsylvania and Texas provide an outline of the types of standards needed:

- Standards for casing and cementing sufficient to handle highly pressurized injection of fluids into a well for purposes of fracturing bedrock and extracting gas.
- Siting standards for wells and other gas production infrastructure (such as storage pits and tanks), including any setbacks and prohibited areas.
- Identification of potential conduits for fluid migration; management of the extent of fracturing; and actions to be taken in response to operational or mechanical problems.
- Standards for dikes, pits and tanks, including contingency planning and spill risk management procedures.
- Waste characterization, including testing of fracturing fluids and tracking of waste to ensure appropriate disposal.
- Identification of allowed methods of disposal for both wastewater and solid waste from gas production and any necessary standards.
- Prior notification of cementing and fracturing activity.
- Assessment of water supply for hydraulic fracturing in terms of volume of water supply, competing water uses, and the environmental impacts of withdrawing water for fracturing. Use of alternative water sources and recycling of water should be encouraged.
- Well closure and site reclamation standards; post-closure monitoring.

- Safety equipment, including blowout preventers.
- Notice, record-keeping and reporting requirements.

With respect to these and other technical standards and compliance measures, DENR recommends adopting STRONGER's suggestion to develop oil and gas regulatory standards through a process that takes advantage of scientific/technical advisory groups and allows for broad public participation.

**Data Management.** DENR currently has no computer data management capabilities with respect to oil and gas regulatory activities. The STRONGER review noted this deficiency in North Carolina's programs. In order to effectively manage the large volumes of reporting information associated with baseline sampling, production, drilling logs, and hydraulic fracturing, North Carolina will need to make substantial investments in electronic databases and online reporting tools. A sound electronic data management system can benefit the interested public, the industry, and state regulatory agencies. For industry, a data management system with a strong public interface could make information collected by the N.C. Geological Survey more easily available for use in guiding future exploration and leasing decisions. If natural gas production comes to North Carolina, DENR would also expect a much greater demand from the public for information on leasing activities. Accurate and timely tracking of production activity also improves the state's ability to provide appropriate environmental oversight for drilling activity and collect revenue from severance taxes.

DENR is currently developing a database of groundwater data collected by a number of different programs in the department. This database, known as the Groundwater Decision Support System, could be used to manage reporting of baseline sampling of water supply wells as well as other groundwater and geological data reported to the state in association with oil or gas development. The current database development project would have to be expanded in order to fully develop these capabilities. Additionally, due to budget constraints, that database development project does not include a web interface where members of the public could query the database to stay informed about groundwater quality issues that might affect them.

**Role of Local Government.** If the state adopts rules for natural gas exploration and development, the General Assembly will need to clearly define the ongoing role of local governments in regulating these activities. At one end of the spectrum, the state could adopt a comprehensive state regulatory program and completely preempt local regulation. A number of states that have oil and gas regulatory programs, however, continue to allow local governments to exercise some authority with respect to siting. In these states, a common approach allows the local government to exercise local planning and zoning authority but prohibits the local government from completely excluding oil and gas development.

New York's Department of Environmental Control would actually require the applicant for a state oil and gas permit to certify that a proposed activity would be consistent with local land use and zoning laws.

In Texas, a city may enact an ordinance regarding the proximity of an oil or gas well to homes or other structures within the city limits. In counties with a population greater than 400,000 or a population greater than 140,000 and adjacent to a county with a population greater than

400,000, a residential developer can get Texas Railroad Commission approval of a subdivision plan that limits drilling activity to designated drill sites of at least two acres for every 80 acres in the subdivision.<sup>583</sup>

Pennsylvania has allowed local jurisdictions to maintain zoning/planning authority and the ability to control floodplain development, but under conditions that do not allow the local government to entirely exclude gas production.

Models exist in North Carolina law for striking a similar balance between a comprehensive state regulatory program and local government planning and zoning authority. For example, North Carolina has developed a comprehensive regulatory program for hazardous waste facilities, but allows local government to continue to exercise planning and zoning authority over those facilities within limits set by state law. A local ordinance that generally applies to development in a city or county (such as a stormwater ordinance) is presumed to legitimately apply to hazardous waste facilities. But the statute expressly prohibits a city or county from adopting ordinances to exclude hazardous waste facilities.<sup>584</sup>

## G. Conclusion

DENR can make immediate recommendations on some general standards and requirements for natural gas exploration and production. Some of these recommendations reflect an emerging consensus among state and federal regulators. Others address conditions specific to North Carolina and the need for additional information. DENR's initial recommendations for regulatory and legislative action can be found in the summary of recommendations at the end of this report.

The development of specific standards for gas production and hydraulic fracturing (such as siting criteria, waste management guidelines and well construction standards) will require a more detailed discussion of standards appropriate for North Carolina conditions. The process for developing those standards should include input from local governments, industry, technical experts, and the public.

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<sup>583</sup> 16 Texas Administrative Code (TAC) §3.76.

<sup>584</sup> N.C. General Statute 130A-293.