

APPENDIX E: STANDARDS AND BEST MANAGEMENT PRACTICES FOR SHALE OIL AND GAS DEVELOPMENT

This appendix provides a high-level overview of organizations that have developed or are developing standards or Best Management Practices (BMPs) for shale oil and gas development and its regulation. The included standards apply either to industry operations or to state regulations. They were developed by the following diverse organizations: the American Petroleum Institute, Appalachian Shale Recommended Practices Group, Center for Sustainable Shale Development, Environmental Defense Fund, Intermountain Oil and Gas Best Management Practices Project, Investor Environmental Health Network, Marcellus Shale Coalition, Pennsylvania Department of Environmental Protection, and State Review of Oil and Natural Gas Environmental Regulations. This list of organizations and their associated standards and BMPs is intended as a broad introduction; details can be accessed via the hyperlinks that accompany each program description. The standards cited within this survey have not been independently evaluated by the Shale Gas Roundtable – descriptions are for informational purposes only.

Specific information for each organization, if available, includes the organization’s mission, the titles/categories of the organization’s BMPs, how long the organization has been developing standards, the process used to develop standards, the intended audience, the geography covered, relevant hyperlinks, and an organizational point(s) of contact.

American Petroleum Institute

Established in 1919, the American Petroleum Institute (API) is a trade association that represents the oil and natural gas industry in America. Its members include producers, refiners, suppliers, pipeline operators, marine transporters, and the service and supply companies that support the industry.¹³¹ The mission of API is “to influence public policy in support of a strong, viable U.S. oil and natural gas industry essential to meet the energy needs of consumers in an efficient and environmentally responsible manner.”¹³² API publicly advocates for its members with state governments, the media, Congress, and the executive branch; negotiates with regulatory agencies; represents the industry in legal proceedings; and participates in coalitions and partnerships with other associations.¹³³ API also organizes seminars, workshops, and conferences about policy issues.¹³⁴

In addition to the above activities, API provides certification programs for various segments of the oil and gas industry. These certification programs, based on API operating standards, serve as BMPs for the

¹³¹ API. <http://www.api.org/globalitems/globalheaderpages/about-api/api-overview.aspx>.

¹³² API. <http://www.api.org/globalitems/globalheaderpages/about-api/~link.aspx?id=5A9331A13D0F4F31BC16E003555F123B&z=z>

¹³³ API. <http://www.api.org/globalitems/globalheaderpages/about-api/api-overview.aspx>.

¹³⁴ Ibid.

standardization of industry training. They are widely recognized and used throughout industry.¹³⁵ Certification programs include the following:

- *API Monogram Program*: This program, designed for manufacturers of production, drilling and refinery equipment, verifies that manufacturers are in compliance with industry standards.
<http://www.api.org/certification-programs/api-monogram-program-and-apiqr.aspx>
- *APIQR Program*: This program provides organizations with certifications for quality, environmental, and occupational health and safety management systems.
<http://www.api.org/certification-programs/api-monogram-program-and-apiqr.aspx>
- *Individual Certificate Programs*: Based on industry-developed standards, many of which have served as a model for various state and federal regulations, these programs help to evaluate the knowledge and experience of inspectors and to promote self-regulation, health and safety, improved inspection capabilities, and improved management control and environmental performance.
<http://www.api.org/certification-programs/individual-certification-program-icp.aspx>
- *Witness Programs*: These programs provide individuals with the opportunity to become knowledgeable and experienced witnesses who can observe material and equipment testing and provide verifications with objectivity and reliability.
<http://www.api.org/certification-programs/witnessing-programs.aspx>
- *Training Provider Certificate*: This third-party certification program is used to evaluate and certify industry training courses.
<http://www.api.org/certification-programs/training-provider-tpcp.aspx>

Point of Contact: Edwin Bailer, 202.682.8034, bailere@api.org

In addition to certification programs, API also produces numerous publications that contain various standards for the oil and gas industry. These standards, which API has been developing for more than 85 years, are designed through extensive research and represent the industry's collective viewpoints about industry best practices.¹³⁶ API currently maintains more than 600 standards and recommended practices that are used throughout the country.¹³⁷ The following are the general BMP categories that are regularly amended by API as well as the associated contact and hyperlink that provides details about specific standards within each BMP category.

- *Drilling and Production Operations*:
<http://www.api.org/publications-standards-and-statistics/annual-standards-plan/standards%20plan%20segments/drilling%20and%20production%20operations.aspx>

Point of Contact: Roland Goodman, Standards Department; goodmanr@api.org

¹³⁵ Ibid.

¹³⁶ Ibid.

¹³⁷ Ibid.

- *Exploration and Production/Oilfield Equipment and Materials:*
<http://www.api.org/publications-standards-and-statistics/annual-standards-plan/standards%20plan%20segments/exploration%20and%20production.aspx>

Point of Contact: Roland Goodman, Standards Department; goodmanr@api.org
- *Marketing:*
<http://www.api.org/publications-standards-and-statistics/annual-standards-plan/standards%20plan%20segments/marketing.aspx>

Point of Contact: Steve Crimaudo, Standards Department; crimaudos@api.org
- *Measurement:*
<http://www.api.org/publications-standards-and-statistics/annual-standards-plan/standards%20plan%20segments/measurement.aspx>;

Point of Contact: Paula Watkins, Standards Department; watkinsp@api.org
- *Pipelines:*
<http://www.api.org/publications-standards-and-statistics/annual-standards-plan/standards%20plan%20segments/pipeline.aspx>

Point of Contact: Ed Baniak, Standards Department; baniake@api.org
- *Process Safety:*
<http://www.api.org/publications-standards-and-statistics/annual-standards-plan/standards%20plan%20segments/process%20safety.aspx>

Point of Contact: Steve Crimaudo, Standards Department; crimaudos@api.org
- *Refining:*
<http://www.api.org/publications-standards-and-statistics/annual-standards-plan/standards%20plan%20segments/refining.aspx>

Point of Contact: Steve Crimaudo, Standards Department; crimaudos@api.org
- *Safety and Fire Inspection:*
<http://www.api.org/publications-standards-and-statistics/annual-standards-plan/standards%20plan%20segments/safety%20and%20fire%20protection.aspx>

Point of Contact: Steve Crimaudo, Standards Department; crimaudos@api.org
- *Security:*
<http://www.api.org/publications-standards-and-statistics/annual-standards-plan/standards%20plan%20segments/security.aspx>

Point of Contact: Steve Crimaudo, Standards Department; crimaudos@api.org

- *API Publications Store (Comprehensive Search for Standards Listed in API Publications):*
<http://www.techstreet.com/api/apigate.html>

Appalachian Shale Recommended Practices Group

The Appalachian Shale Recommended Practices Group (ASRPG) is a consortium of the 11 largest Appalachian Basin natural gas and oil producers.¹³⁸ Members are Anadarko Petroleum Corporation, Cabot Oil and Gas Corporation, Chesapeake Energy Corporation, Chevron, EQT Corporation, Seneca Resources Corporation, Shell Oil Company, Southwestern Energy Company, Talisman Energy Inc., WPX Energy, Inc., and XTO Energy, Inc.¹³⁹ ASRPG’s mission is “to identify and disseminate responsible standards and practices for effective environmental, health, and safety practices utilized in shale natural gas and oil development operations in the Appalachian Region.”¹⁴⁰

In April 2012, ASRPG released a BMP document that was developed to promote effective safety, environmental, and health practices that are consistent with key recommendations from the U.S. Secretary of Energy’s Advisory Board and the National Petroleum Council.

Recommended Standards and Practices for Exploration and Production of Natural Gas and Oil from Appalachian Shales, April 2012: These practices are derived from a consensus based approach that examined standards utilized by other industry and stakeholder organizations – though the best practices offered by ASRPG often differed from existing industry standards in order to account for the regional uniqueness of the Appalachian Basin. ASRPG provided the practices to state regulators and legislators within the Appalachian region, to the Interstate Oil and Gas Compact Commission, the State Review of Oil and Natural Gas Environmental Regulations, and important producer organizations. Recommendations in this report included standards related to the following categories:

- General Principles
- Pre-operational Planning
- Site Selection and Assessment
- Site Design and Construction
- Drilling Operations
- Completion/Stimulation Operations
- Flowback Water
- Production Operations
- Measurement and Metrics
- Landowner Relations

http://www.asrpg.org/pdf/ASRPG_standards_and_practices-April2012.pdf

Point of Contact: John Christiansen, 832.636.8736, john.christiansen@anadarko.com

¹³⁸ ASRPG. <http://www.asrpg.org/pdf/ASRPG%20Press%20release.pdf>

¹³⁹ Ibid.

¹⁴⁰ Ibid.

Center for Sustainable Shale Development

Publicly launched in March 2013, the Center for Sustainable Shale Development (CSSD) is an independent, collaborative organization that seeks “to support continuous improvement and innovative practices through performance standards and third-party certification.”¹⁴¹ CSSD’s focus is the Appalachian region. Its creation aligns with a recommendation by the National Petroleum Council and the U.S. Department of Energy’s Shale Gas Production Subcommittee for basin-scale centers of excellence.¹⁴² Funding for CSSD is provided by philanthropic foundations and participating energy companies. Current participants include Chevron, Citizens for Pennsylvania’s Future, Clean Air Task Force, CONSOL Energy, Environmental Defense Fund, EQT Corporation, Group Against Smog and Pollution, The Heinz Endowments, Pennsylvania Environmental Council, Shell, and the William Penn Foundation.¹⁴³

Similar to a LEED certification for environmentally friendly buildings, CSSD will encourage energy companies to apply for a third-party certification that represents a company’s compliance with CSSD’s standards. The current standards are associated with the protection of air quality, water resources, and climate, though CSSD anticipates the promulgation of additional standards over time.¹⁴⁴ The certification process will require companies to be evaluated by third-party auditors – consultant companies ICF International and DCV. The outcome of the audit will deem a company Certified, Certified with Conditions, or Not Certified. A Certified with Conditions ruling means that “only minor deviations from the standard are present and corrections must be made within 90 days.”¹⁴⁵

The 15 standards that CSSD released in March 2013 “apply to unconventional exploration, development, and gathering activities, including site construction, drilling, hydraulic fracturing and production in the Appalachian Basin.”¹⁴⁶ The standards consider “geology, topography, population density, infrastructure, surface water, ground water and other issues of particular concern in the Appalachian Basin.”¹⁴⁷

The standards include the following:

Air and Climate Standards

- Limitations on Flaring
- Use of Green Completions
- Reduced Engine Emissions
- Emissions Control on Storage Tanks

¹⁴¹ CSSD: <http://037186e.netsolhost.com/site/about>

¹⁴² Hopey, Don and Erich Schwartzel. “New Initiative Between Industry and Environmentalists Set Standards for Marcellus Shale Drilling.” *Pittsburgh Post-Gazette*. <http://pipeline.post-gazette.com/news/archives/25103-new-initiative-between-industry-and-environmentalists-sets-standards-for-marcellus-shale-drilling>

¹⁴³ Ibid.

¹⁴⁴ CSSD. <http://037186e.netsolhost.com/site/performance-standards>

¹⁴⁵ CSSD. <http://037186e.netsolhost.com/site/certification>

¹⁴⁶ CSSD. Performance Standards. <http://037186e.netsolhost.com/site/wp-content/uploads/2013/03/CSSD-Performance-Standards-3-13R.pdf>

¹⁴⁷ Ibid.

Surface and Ground Water Performance Standards

- Maximizing Water Recycling
- Development of Groundwater Protection Plan
- Closed Loop Drilling
- Well Casing Design
- Groundwater Monitoring
- Wastewater Disposal
- Impoundment Integrity
- Reduced Toxicity Fracturing Fluid¹⁴⁸

<http://sustainable shale.org>

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andrew.place@sustainable shale.org

Environmental Defense Fund

Founded in 1967, the Environmental Defense Fund (EDF) is an environmental advocacy group with a mission “to preserve the natural systems on which all life depends” and to “find practical and lasting solutions to the most serious environmental problems.”¹⁴⁹ EDF has four primary focus areas: climate and energy, oceans, ecosystems and health.¹⁵⁰ Within the focus area of climate and energy, the natural gas sub-component seeks to work with companies, organizations, and communities to ensure the safe development of natural gas through an examination of exposure to toxic chemicals and waste products, well construction and design, climate impacts, local and regional air quality, land use, and community impacts.¹⁵¹ EDF also is committed to ensuring the comprehensive disclosure of hydraulic fracturing chemicals, the modernization of rules for well construction and operation, systems-based management of wastes and water, state and national standards for improving air quality and reducing climate impacts, and the minimization of land use and community impacts from natural gas development.¹⁵²

EDF is committed to supporting best practices for shale related activities. In 2011, EDF President Fred Krupp was selected to serve on the Natural Gas Subcommittee of the U.S. Secretary of Energy’s Advisory Board. EDF supports the recommendations from this subcommittee, which can be found in the following report:

The Secretary of Energy’s Advisory Board Shale Gas Production Subcommittee 90 Day Report, August 11, 2011. This report provides 20 recommendations that are classified into three categories: recommendations ready for implementation, primarily by the federal agencies; recommendations ready for implementation, primarily by the states; and recommendations that require new partnerships and mechanisms for success. The purpose of the recommendations is

¹⁴⁸ Ibid.

¹⁴⁹ EDF. <http://www.edf.org/about/our-mission-and-history>.

¹⁵⁰ Ibid.

¹⁵¹ Ibid.

¹⁵² Ibid.

to help ensure that shale gas resources are developed in a manner that protects human health and the environment. Recommendations were derived with input from the subcommittee; an interagency working group; consultations with the DOE, EPA and DOI; and advice from industry, state and federal regulators, environmental groups, and other stakeholders.

http://www.shalegas.energy.gov/resources/111011_90_day_report.pdf

In addition to the above report, EDF is currently in the process of developing a model state regulatory framework for shale gas and oil development.

Model Regulatory Framework for Hydraulically Fractured Hydrocarbon Production Wells, Working Draft: While still a work in progress, EDF has worked with state regulators, environmental groups, scientists, and industry (although only Southwestern Energy has officially endorsed the draft¹⁵³) to assist state governments in implementing a regulatory standardization that governs subsurface aspects of the drilling, casing, cementing, hydraulic fracturing stimulation, completion, and production of onshore hydrocarbon exploration and production wells. Draft components of this framework include the following categories:

- *Well Planning (Permitting)*
- *Pre-Drilling Water Sampling*
- *Well Operations – Drilling, Casing, and Cementing*
- *Well Operations – Completing, Hydraulic Fracturing and Subsequent Well Operations*
- *Well Operations – Production and Well Monitoring*
- *Plugging and Well Abandonment*

Draft Framework:

http://portal.ncdenr.org/c/document_library/get_file?uuid=8356eb89-9c9f-4f8e-bb4d-4bb51b605575&groupId=8198095

Point of Contact: Scott Anderson, Senior Policy Advisor, 512.691.3437,

http://www.edf.org/email/154/field_email

Intermountain Oil and Gas Best Management Practices Project

Established at the Getches-Wilkinson Center for Natural Resources, Energy, and the Environment at the University of Colorado Law School, the Intermountain Oil and Gas Best Management Practices Project identifies and categorizes mandatory and voluntary BMPs within a searchable database. The BMPs, as outlined by the Intermountain Oil and Gas BMP Project, are “state-of-the-art mitigation measures applied to areas being developed for oil and gas to promote energy development in an environmentally responsible manner.”¹⁵⁴ The BMP database is not intended to represent a consensus on BMPs, nor is it intended to provide advice about current legal requirements. Instead, the database describes specific BMPs used by or recommended for Colorado, Montana, New Mexico, and Wyoming; provides a source for and link to the BMP; and offers, when possible, supplemental information that includes construction

¹⁵³ Behr, Peter. “Authors of Model Fracking Regulation Find it’s Lonely in the Middle.” *Midwest Energy News*. <http://www.midwestenergynews.com/2012/10/04/authors-of-model-f-regulation-find-its-lonely-in-the-middle/>

¹⁵⁴ Intermountain Oil and Gas Best Management Practices Project. <http://www.oilandgasbmps.org/>

specifications, illustrations, pictures, maps, monitoring reports, and evaluations of the potential of the practice for mitigating impacts of development.¹⁵⁵ The database seeks to help stakeholders specifically “identify appropriate practices for minimizing impacts to surface resources during planning, design, construction, drilling, operations, reclamation, and monitoring.”¹⁵⁶

The following categories are addressed in the BMP database¹⁵⁷:

- Air Quality and Emissions
- Aquatic and Riparian Values
- Community
- Cultural/Historic
- Grazing and Agriculture
- Human Health and Safety
- Land Surface Disturbance
- Noise
- Other
- Soils (Conservation, Pollution, Reclamation)
- Vegetation
- Visual Aesthetics
- Water Quality and Pollution
- Water Quantity and Rights
- Wildlife

<http://www.oilandgasbmps.org/mainsearch.php>

Point of Contact: Kathryn Mutz, Project Manager, 303-492-1293, kathryn.mutz@colorado.edu

Investor Environmental Health Network

Founded in 2004, the Investor Environmental Health Network (IEHN) is a collaborative partnership of investment managers that is “concerned about the financial and public health risks associated with corporate toxic chemicals policies.”¹⁵⁸ Advised by nongovernmental groups, IEHN uses dialogue and shareholder resolutions to encourage companies “to adopt policies to continually and systematically reduce and eliminate toxic chemicals in their products and activities.”¹⁵⁹ The members of IEHN, who include foundations, investment management organizations, and health systems¹⁶⁰, manage approximately \$35 billion in assets.¹⁶¹ Specific areas of focus for IEHN include toxic hazards in the marketplace, opportunities in safer materials, and natural gas hydraulic fracturing.¹⁶² Within the natural

¹⁵⁵ Ibid.

¹⁵⁶ University of Colorado. <http://outreach.colorado.edu/programs/details/id/359>

¹⁵⁷ Intermountain Oil and Gas Best Management Practices Project.

¹⁵⁸ IEHN. <http://www.iehn.org/about.whatwedo.php>

¹⁵⁹ Ibid.

¹⁶⁰ IEHN. <http://www.iehn.org/about.members.php>

¹⁶¹ IEHN. <http://www.iehn.org/about.whatwedo.php>

¹⁶² IEHN. <http://www.iehn.org/overview.toxic.php>

gas area, IEHN seeks “to promote improved disclosure by natural gas companies about the business and environmental risks of hydraulic fracturing.”¹⁶³

In order to help investors determine which companies best manage the risks associated with hydraulic fracturing, IEHN produced an investor guide that recommends 12 key management goals that companies should adopt.

Extracting the Facts: An Investor Guide to Disclosing Risks from Hydraulic Fracturing Operations, December 2011. After an eighteen month dialogue with investors about risks, management practices, and disclosure; a review by industry experts of the draft practices and indicators; and input from staff at IEHN and the Interfaith Center on Corporate Responsibility, an investor guide to management goals for natural gas operations was created. This guide is based on the principle that Corporate Core Management Goals, Best Management Practices, and Key Performance Indicators can drive operational efficiencies; provide insurance in case of accident or natural disaster; reduce air emissions and water impacts that trigger violations of environmental standards; and protect and enhance companies’ social license to operate by increasing the odds of positive community response to the best-managed, most transparent companies addressing community needs and concerns.¹⁶⁴ A detailed list of BMPs and how they can be used to secure the above outcomes is linked to and outlined within each of the guide’s key management goals. These goals include the following:

- *Ensure Best in Class Contractor Performance*
- *Ensure Well Integrity*
- *Disclose Fines, Penalties, and Litigations*
- *Manage Risks Transparently and at Board Level*
- *Minimize and Disclose Air Emissions*
- *Prevent Contamination from Solid Waste and Sludge Residuals*
- *Prevent Contamination from Wastewater*
- *Protect Water Quality by Rigorous Monitoring*
- *Reduce and Disclose All Toxic Chemicals*
- *Reduce Surface Footprint*
- *Secure Community Consent*

<http://www.iehn.org/documents/frackguidance.pdf>

In addition to this guide, IEHN provides a comprehensive list of BMPs and Guiding Principles Reports that have been developed by various agencies and organizations - state governments, federal governmental agencies, environmental organizations, exploratory and production companies, etc.

<http://www.iehn.org/overview.naturalgashydraulicfracturing.php>

Point of Contact: Richard Liroff, Executive Director, 703.532.2929, info@iehn.org

¹⁶³ IEHN. <http://www.iehn.org/overview.naturalgashydraulicfracturing.php>

¹⁶⁴ IEHN. “Extracting the Facts: An Investor Guide to Disclosing Risks from Hydraulic Fracturing Operations.” December, 2011.

Marcellus Shale Coalition

Established in 2008, the Marcellus Shale Coalition (MSC) is a membership-driven organization that “works with exploration and production, midstream and supply chain partners in the Appalachian Basin and across the country to address issues regarding the production of clean, job-creating, natural gas from the Marcellus and Utica Shale plays.”¹⁶⁵ The coalition’s guiding principles, established in October 2010, provide the foundation for its development of BMPs: to provide the safest possible workplace for employees and in the communities in which companies operate; to implement state-of-the-art environmental protection across operations; to continuously improve practices and seek transparency in operations; to attract and retain a talented and engaged workforce; to commit to being responsible members of the community; to encourage spirited public-dialogue and fact-based education about responsible shale gas development; and to conduct business in a manner that will provide sustainable and broad-based economic and energy security benefits.¹⁶⁶

Since April 2012, the Marcellus Shale Coalition has produced a series of recommended practices, which are briefly described below. These documents are designed to serve as a reference for industry to improve their effectiveness; they are not intended to establish or impose binding requirements.

Site Planning, Development and Restoration, April 26, 2012: Through research, stakeholder outreach, and collaboration among MSC members, this document was developed to provide guidance for site planning, development, and restoration. A table about the major steps involved in site planning, development, and restoration as well as a discussion about the pertinent health and safety practices are provided.

<http://marcelluscoalition.org/wp-content/uploads/2012/04/Site-Planning-Development-and-Restoration.pdf>

Pre-Drill Water Supply Surveys, August 28, 2012: These practices structure a common approach for operators to conduct a pre-drill water survey on identified water supply sources within a given area of a well-pad surface location in order to establish a baseline of water conditions that existed before drilling. The document provides details about the practices of initial surveying, water sampling, and reporting.

http://marcelluscoalition.org/wp-content/uploads/2012/08/Pre_Drill_Water_Supply_Surveys_8.28.12.pdf

Responding to Stray Gas Incidents, October 16, 2012: Provides considerations and guidelines about how to respond to stray gas incidents in oil and natural exploration and development areas. A definition of stray incidents is provided as well as how to perform initial responses, action plans, corrective actions, documentation, and reporting.

<http://marcelluscoalition.org/wp-content/uploads/2012/10/RP-Stray-Gas-Oct-2012.pdf>

¹⁶⁵ MSC. <http://marcelluscoalition.org/about>

¹⁶⁶ MSC. <http://marcelluscoalition.org/about/guiding-principles>

Motor Vehicle Safety, December 4, 2012: Designed to assist industry professionals -- companies and contractors -- improve their motor vehicle safety related to transportation activities on both public and private roads and company premises. Transportation activities include personnel and freight movements and mobile plant activities.

http://marcelluscoalition.org/wp-content/uploads/2012/12/RP_MVS_Final.pdf

Supply Chain, January 24, 2013: Provides considerations and guidelines about how to engage small, diverse, and local businesses in the supply chain. Specific strategies also are offered about how to comply with Pennsylvania's Act 13, Section 216.

http://marcelluscoalition.org/wp-content/uploads/2013/01/Supply_Chain_RP_UPDATE1.pdf

Water Pipelines, January 31, 2013: General guidelines about water pipe placement, route selection, pipe materials, operational considerations, and pipe deactivation are provided.

http://marcelluscoalition.org/wp-content/uploads/2013/01/Water_Pipeline_RP.pdf

Point of Contact: Andrew Paterson, Vice President, Technical and Regulatory Affairs, 412.706.5160, apaterson@marcelluscoalition.org

Pennsylvania Department of Environmental Protection

The Pennsylvania Department of Environmental Protection (DEP) has a mission "to protect Pennsylvania's air, land and water from pollution and to provide for the health and safety of its citizens through a cleaner environment."¹⁶⁷ Within DEP, the Office of Oil and Natural Gas "develops policy and programs for the regulation of oil and gas development and production pursuant to the Oil and Gas Act, the Coal and Gas Resource Coordination Act, and the Oil and Gas Conservation Law; oversees the oil and gas permitting and inspection programs; develops statewide regulation and standards; conducts training programs for industry; and works with the Interstate Oil and Gas Compact Commission and the Technical Advisory Board."¹⁶⁸

Various DEP offices, including the Office of Oil and Natural Gas, develop BMP guides that help regulated parties to minimize or eliminate potential environmental impacts.¹⁶⁹ These BMPs are extensively reviewed by multiple stakeholders and encapsulated in guidance manuals. In the development of BMPs, the department considers cost effectiveness, environmental protection, and safety. Two example manuals are the following:

Oil and Gas Operators Manual, Commonwealth of Pennsylvania, DEP, Guidance No. 550-0300-001, October 2001 as amended and updated: This manual provides a detailed list of the BMPs that are available to industry. Intertwined with these BMPs are enforceable DEP regulations. This manual is expected to be updated after the adoption of Chapter 78 revisions (in turn based on Act 13). The BMPs (and intertwined regulations) provided in this manual are listed in the following categories:

¹⁶⁷ DEP. http://www.depweb.state.pa.us/portal/server.pt/community/about_dep/13464

¹⁶⁸ DEP. http://www.depweb.state.pa.us/portal/server.pt/community/oil_and_gas/6003

¹⁶⁹ DEP. "Oil and Gas Operators Manual, Commonwealth of Pennsylvania, DEP, Guidance No. 550-0300-001." October 2001 as amended and updated.

- *Drilling, Altering and Completing a Well*
- *Guidelines for a Preparedness, Prevention and Contingency Plan for Oil and Gas Development Pollution Prevention Practices*
- *Inactive Status and Well Plugging*
- *Reports Required of Oil and Gas Operators*
- *Site Planning and Erosion and Sediment Control*
- *Underground Gas Storage*
- *Waste Management During Drilling, Operating, and Plugging a Well*
- *Well Operation*
- *Well Site Restoration*

<http://www.elibrary.dep.state.pa.us/dsweb/Get/Document-48243/chap4.pdf>

Erosion and Sediment Pollution Control Program Manual, PA, DEP, Guidance No. 363-2134-008, March 2012, as amended and updated: This manual outlines a variety of BMPs that are intertwined with enforceable DEP regulations. BMPs “are expected to achieve the regulatory standard of minimizing the potential for accelerated erosion and sedimentation, and at the same time to protect, maintain, reclaim and restore water quality and existing and designated uses of surface waters.”¹⁷⁰ Examples of BMP categories include the following:

- *Minimizing Earth Disturbances*
- *Silt Fence*
- *Diversion Ditches*
- *Sediment Traps*
- *Sediment Basins*
- *The Establishment of Grasses for Permanent Stabilization*

<http://www.elibrary.dep.state.pa.us/dsweb/Get/Document-88925/363-2134-008.pdf>

Point of Contact: Scott Perry, Deputy Secretary of Oil and Gas,
Department of Environmental Protection

State Review of Oil and Natural Gas Environmental Regulations

The State Review of Oil and Natural Gas Environmental Regulations (STRONGER) is a non-profit organization that was founded in 1999 with the goal of invigorating and advancing the state review process that was begun in 1988 by the U.S. Environmental Protection Agency (EPA) and the Interstate Oil and Gas Compact Commission (IOGCC).¹⁷¹ The current mission of STRONGER is “to educate and provide services for the continuous improvement of regulatory programs and industry practices in order to enhance human health and the environment.”¹⁷² A multi-stakeholder organization that includes states, industry and environmental organizations, STRONGER provides benchmarks for state regulatory

¹⁷⁰ DEP. “Erosion and Sediment Pollution Control Program Manual, PA, DEP, Guidance No. 363-2134-008.” March 2012, as amended and updated.

¹⁷¹ STRONGER. <http://www.strongerinc.org/who-we-are>

¹⁷² STRONGER. <http://www.strongerinc.org/our-mission>

programs, develops recommended state program guidelines, and implements a review process to evaluate state regulatory programs against its guidelines.¹⁷³

Approximately 22 state regulatory programs have been reviewed by STRONGER, a total of states which represent more than 94% of domestic onshore and gas production.¹⁷⁴ A state review process is conducted by stakeholder teams and includes a completed questionnaire by state volunteers; in-state interviews; an initial draft report that includes findings and recommendations; a second draft report that includes comments; and lastly, a final report that has obtained approval from the board to be published.¹⁷⁵ The guidelines used in the state review process “do not establish specific criteria or prescriptive regulatory standards for the state.”¹⁷⁶ Instead, the guidelines “outline key elements of state oil and gas environmental regulatory programs and establish environmental goals or objectives for these programs.”¹⁷⁷ Guideline categories include: general criteria, administrative criteria, technical criteria, abandoned sites, naturally occurring radioactive materials, stormwater management, and hydraulic fracturing.¹⁷⁸

The *Hydraulic Fracturing Review Guidelines* were drafted in 2010 by the Hydraulic Fracturing Work Group.

Hydraulic Fracturing Review Guidelines, 2010. Hydraulic fracturing reviews have been conducted in six states, including Ohio and Pennsylvania. The following are the list of guideline categories within the *Hydraulic Fracturing Review Guidelines*¹⁷⁹:

- *General (Standards, Reporting, Staffing and Training, Public Information)*
- *Water and Waste Management*

A work group has been convened to consider revisions to these guidelines. The STRONGER website notes that the *Hydraulic Fracturing Review Guidelines* “should be updated to include groundwater protection and pressure monitoring measures.”¹⁸⁰ STRONGER also notes that applicable guidelines should be developed to monitor conflicts that are created when drilling occurs in urban areas, such as the creation of local ordinances that conflict with state requirements.¹⁸¹

<http://67.20.79.30/sites/all/themes/stronger02/downloads/HF%20Guideline%20Web%20posting.pdf>

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¹⁷³ STRONGER. “The State Review Process.”

<http://67.20.79.30/sites/all/themes/stronger02/downloads/STRONGER%20Presentation%20-%2006022012.pdf>

¹⁷⁴ Ibid.

¹⁷⁵ Ibid.

¹⁷⁶ STRONGER. “Hydraulic Fracturing Review Guidelines.” 2010.

<http://67.20.79.30/sites/all/themes/stronger02/downloads/HF%20Guideline%20Web%20posting.pdf>

¹⁷⁷ Ibid.

¹⁷⁸ STRONGER. “The State Review Process.”

¹⁷⁹ STRONGER. “Hydraulic Fracturing Review Guidelines.” 2010.

¹⁸⁰ STRONGER. <http://www.strongerinc.org/process>.

¹⁸¹ Ibid.