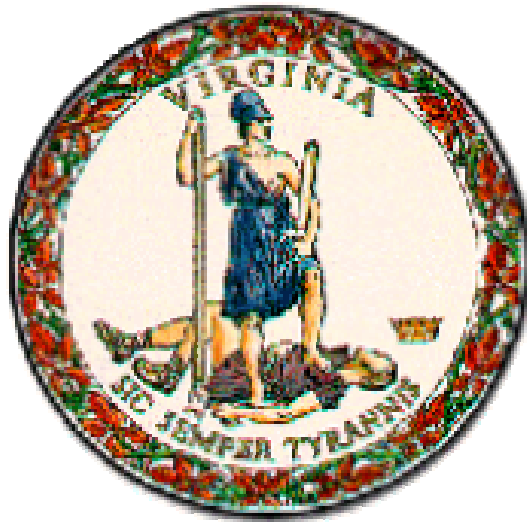


VIRGINIA STATE REVIEW



**State Review of Oil and Natural Gas
Environmental Regulations, Inc.**

April 2004

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STRONGER VIRGINIA STATE REVIEW

INTRODUCTION

In 1990, the Interstate Oil Compact Commission (IOCC) and the U.S. Environmental Protection Agency (EPA) jointly published a Study of State Regulation of Oil and Gas Exploration and Production Waste, which contained guidelines for the regulation of oil and gas exploration and production wastes by the IOCC member states. The published guidelines provided the basis for the State Review Program, a multi-stakeholder process by which state exploration and production (E&P) waste management programs are reviewed against the guidelines. The purposes of the State Review Process are to document the successes of states in regulating E&P wastes and to offer recommendations for program improvement. In 1994, the guidelines were updated and revised by the IOCC, now named the Interstate Oil and Gas Compact Commission (IOGCC). In 1999, administration of the State Review Program devolved to a non-profit, multi-stakeholder organization named State Review of Oil and Natural Gas Environmental Regulations, Inc. (STRONGER). STRONGER again revised, expanded and updated the Guidelines, which were accepted by the IOGCC and published in June 2000 as Guidelines for the Review of State Oil and Natural Gas Environmental Regulatory Programs (the "2000 Guidelines").

In September, 2003 a six-person team appointed by STRONGER conducted a review to evaluate the adequacy of the Virginia program compared to the 2000 Guidelines. The six-person team consisted of three team members and three observers. Leslie Savage, Railroad Commission of Texas; Don Garvin, Trout Unlimited; and Frank Henderson, Appalachian Energy, Inc. served as team members. Mark Carl, IOGCC; Jim Erb, Pennsylvania Department of Environmental Protection; and Jim Kaiser, Wilhoit & Kaiser participated as observers.

The process began with a questionnaire that was sent to the Division of Gas and Oil (DGO) of the Virginia Department of Mines, Minerals, and Energy (DMME). The questionnaire had been prepared by the STRONGER Board. STRONGER intended the questionnaire to capture the status of the Virginia program relative to the 2000 Guidelines. The DGO prepared a response to the questionnaire which was then sent to the review team. Virginia's response to the questionnaire is provided in Appendix B.

The review team conducted its first meeting, the in-state portion of the review, in Abingdon, Virginia. at the DGO offices on September 22nd through 23rd, 2003. Mr. Bob Wilson of the DGO responded to questions from the team and observers. Following the interviews and review of the written materials and backup documentation provided by the state, the review team compiled this review report.

This is the report of the review of the Virginia Division of Gas and Oil programs against the standards of the 2000 Guidelines. This report consists of six main sections according to the structure of the 2000 Guidelines: General Criteria, Administrative Criteria, Technical Criteria, Abandoned Sites, Naturally Occurring Radioactive Materials (NORM), and Performance Measures. Appendix A is a glossary of all acronyms used in the report. Appendix B contains Virginia DGO's written response to the STRONGER questionnaire.

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EXECUTIVE SUMMARY

A multi-stakeholder Review Team has completed a comprehensive review of the Virginia oil and gas environmental regulatory program. Environmental regulation of the gas and oil industry is the responsibility of the Virginia Division of Gas and Oil (DGO), which is in the Department of Mines, Minerals, and Energy (DMME). The Virginia program is well-managed and several aspects of Virginia's program are exemplary and may offer ideas for other state programs. The Review Team also made recommendations in some areas that the Team believes will help Virginia strengthen its program.

Program Strengths

The Review Team identified strengths of the Virginia program, which also are noted in several of the report's findings. The following offer an overview of some of the strengths of the Virginia program.

General:

The Review Team finds that the Commonwealth of Virginia has in place a significant E&P regulatory program that contains the basic elements required under the Guidelines, in spite of the fact that oil and gas activity in Virginia is relatively recent and small in scope (Finding 4.1).

Communication:

The Review Team commends the DGO for maintaining open lines of communication with industry regarding the regulatory program, and for its work with stakeholder groups, including the public, on the development of policy and rule making (Finding 4.2.2.3).

Strategic Planning:

The DMME and the DGO have an effective process in place for strategic plan development and assessment (Finding 4.2.3.). The DGO has a clear statement of the program's goals and objectives, which include protecting human health and the environment from the mismanagement of E&P wastes, while maintaining an economically viable oil and gas industry (2000 Guideline Section 3.2).

Waste Tracking.

The Review Team commends the DGO for its exemplary waste tracking efforts. The DGO tracks all liquid wastes to their point of final disposal (Finding 4.2.6.a).

Data Management.

The Review Team commends the DGO for what it has accomplished with its electronic data management system with such limited resources (Finding 4.2.8.2).

Personnel.

The Review Team commends the DGO for what it has accomplished with its relatively small staff and how it allocates staff time and resources (Finding 4.3.1), the high quality, background, education, and knowledge of its field personnel (Finding 4.3.1.4); and the training it provides its employees with the limited resources available (Finding 4.3.1.5).

Pits. The Review Team commends the DGO for requiring that all pits be lined (Finding 5.5.3).

Abandoned Sites. The Review Team commends the DGO for having an overall effective program in place to address both abandoned and orphaned oil and gas well sites. At the present time there are no abandoned wells that constitute a threat to public health, safety, or the environment (Finding 6.1).

Program Recommendations

The Review Team also made recommendations for improvement in some areas. The following major findings and recommendations serve to complete the summary of the report.

Funding.

Although the DGO's current budget is generally adequate, it will very likely need additional resources in the near future to perform its duties at current levels given the increases in coalbed methane gas activity and its increased responsibilities with respect to worker safety and NPDES stormwater discharge permitting (Finding 3.1). The Review Team recommends that the Commonwealth of Virginia evaluate mechanisms for providing the DGO with the additional resources that will be necessary in the near future (Recommendation 3.1), to provide all the essential elements of an effective E&P waste regulatory program; and additional funding for updating the DGO's electronic data management system (Recommendation 4.2.8.2).

Enforcement.

The Review Team recommends that the DGO obtain the statutory or regulatory authority to refuse to issue or reissue permits or authorizations if the applicant has outstanding, finally determined violations or unpaid penalties, or if a history of past violations demonstrates the applicant's unwillingness or inability to comply with permit requirements (Recommendation 4.1.1). The Review Team also recommends that the DGO evaluate the need for statutory or regulatory authority to assess administrative penalties (Recommendation 4.1.3.1.). And, finally, the Review Team recommends that the DGO pursue regulatory changes that contain criteria for the size or amount of a spill requiring reporting, so that the regulations are meaningful and not overly burdensome (Recommendation 4.2.1.2).

Public Outreach

The Review Team recommends the DGO consider developing a simple, basic brochure – a citizens' guide to the Virginia oil and gas industry and the Virginia oil and gas regulatory program – for use in public education and outreach (Recommendation 4.2.2.2).

Waste Tracking

The Review Team recommends that the DGO amend its rules to establish a record retention period for waste tracking records (Recommendation 4.2.6).

Technical Guidelines

The Review Team recommends that the DGO consider whether or not its program would benefit by requiring the use of certified laboratories for analysis (Recommendation 5.2.3).

Although the DGO prefers that operators close and reclaim the pits within six months of cessation of the activity for which the pit was used, the Review Team recommends that the DGO consider establishing a specific time limit for pit closure in its rules or in permits (Recommendation 5.5.5.b). The Review Team also recommends that the DGO evaluate the feasibility of developing standards for roadspraying of produced fluids for beneficial uses that would be protective of human health and the environment (Recommendation 5.8). The Review Team further recommends that the Commonwealth and the DGO evaluate the effect of the lack of commercial disposal facilities for brine and determine whether DGO regulations and/or state law should be amended to facilitate future commercial disposal capacity (Recommendation 5.10).

Abandoned Sites

The Review Team recommends that the DGO classify orphaned wells as plugged, converted, or unplugged. (Recommendation 6.2). The Review Team also recommends that DGO consider developing and implementing definitions and criteria for the temporary inactive status of wells (Recommendation 6.2.). The Review Team further recommends that the DGO consider

publishing a report that lists abandoned sites and orphaned wells and make this report available to the public (Recommendation 6.7). The DGO has expressed concern with the adequacy of the Commonwealth's funds to plug wells that might be left to the Commonwealth to plug (Finding 4.2.4.). The Review Team recommends that the DGO continue to assess the adequacy of its bonding program and make changes as necessary (Recommendation 4.2.4). The DGO Director expressed concern that approximately 300 wells, which are bonded and have been inactive for two years or more, have the potential to become a liability to the Commonwealth (Finding 6.8.). The Review Team recommends that the DGO evaluate methods to prevent inactive wells that are under bond from becoming the plugging responsibility of the state, and consider working with industry to develop criteria for temporary inactive status for those inactive wells with a "bona fide future use" (Recommendation 6.8).

NORM

The Review Team recommends that the DGO verify that there is no need for a NORM program (Recommendation 7.2).

Performance Measures

The Review Team recommends that the DGO consider using additional environmental indicators as a basis for performance measurement. (Recommendation 8.1 and 8.2).

The Virginia program also covers several areas that are beyond the scope of the current guidelines, but which the DGO and the Review Team believes are worthy of note in this report.

Erosion and Sedimentation Prevention Program; Control of Stormwater

Because of the topography of the area of Virginia with gas and oil activity, the DGO identified erosion and sedimentation as one of the two most critical environmental issues. The DGO uses the Virginia Conservation and Recreation Commission's Virginia Erosion and Sediment Control Manual/Handbook, which is a comprehensive manual for all types of construction in Virginia.

Gathering Lines Permitting

The Virginia E&P program also requires permitting of gathering pipelines to incorporate specified standards relating to permitting, buffer zones, reporting, technical standards, tanks, stormwater management, erosion and sediment control, activity in hydrogen sulfide areas, disposal of wastes, abandonment, release of bond, inspection, and maintenance of integrity.

Fresh Water Replacement

The Commonwealth of Virginia's statutes include provisions for replacement of fresh water impacted by coalbed methane activities (Article 4).

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PROGRAM OVERVIEW

History

The first hydrocarbon well was drilled in Virginia in approximately 1896. No oil was found in this well. Between 1890 and 1950, 130 wells were drilled in 20 counties in Virginia. Of those 130 wells, 70 were drilled in one county (Lee County). The first commercial gas was discovered in 1931 and the first commercial oil was discovered in 1942.

A steady increase in drilling activity occurred between 1950 and 1985. Gas production increased to 8.9 billion cubic feet per year and oil production increased to a maximum of 65,443 barrels in one year (1983). Coalbed methane (CBM) development began in 1988 and production trends show a dramatic increase in coalbed methane production throughout the 1990's (from 0.8 BCF in 1990 to 58.6 BCF in 2002).

2002 Production Information:

- Production comes exclusively from 7 counties in southwestern Virginia
- Total conventional gas production 18.0 BCF
- Conventional gas production declining slightly since 1991 (dry gas, with no hydrocarbon component)
- Total CBM production was 58.6 BCF (a 7.7% increase from 2001 and 76% of total gas production)
- Total of 2,235 CBM wells producing at year end (figures fluctuate yearly, 2002 figures are low)
- Total gas production (conventional and CBM) 76.9 BCF with 3,429 wells producing at year-end.
- Virginia residential gas consumption 77 BCF, production 76.9 BCF
- Oil production 25,110 barrels
- 11 oil wells and 11 gas/oil wells producing at year end
- 22 operators extracting gas and oil in 2002
- Three major companies (Pocahontas, Equitable, and Consol) are responsible for 91% of gas production.

Virginia began requiring permits for oil and gas operations in 1950 through the Division of Mines. The state also began requiring submission of well records and production information. In 1985, the Virginia Legislature created the Department of Mines, Minerals, and Energy (DMME) to consolidate all energy and mineral regulation under one agency. The Virginia Gas and Oil Act of 1990 created the Virginia Gas and Oil Board, allowed for compulsory pooling of unleased owners, and mandated creation of escrow accounts for conflicting CBM claims and unlocated owners.

Environmental regulation of the oil and gas industry is the responsibility of the Virginia Division of Gas and Oil (DGO) under DMME. The latest environmental standards and regulations are contained in the Virginia Gas and Oil Regulation of 1991. The DGO also permits gathering and production pipelines up to the first point of sale. Field inspectors are in charge of inspecting both wells and pipelines. Recently Virginia legislation has required that the DGO conduct inspections for worker safety.

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GENERAL CRITERIA (2000 Guidelines Section 3)

The DGO, which has permitting and regulatory responsibility for all drilling, completion, production and gathering operations in the Commonwealth, is one of seven divisions of the DMME. The DMME is an Executive Branch agency under the auspices of the Secretariat of Commerce and Trade.

FINDING 3.0: *The Review Team found that, the Virginia program meets all the General Criteria of the 2000 Guidelines, Section 3, except where otherwise noted.*

3.1 General

The Virginia Gas and Oil Act of 1990 (the Act), as amended (Chapter 22.1, § 45.1-361.1 et. seq. of the Code of Virginia), provides statutory authority and direction for regulatory control of gas and oil operations in Virginia. The Act requires promulgation and enforcement of "...rules, regulations and orders necessary to ensure the safe and efficient development and production of gas and oil resources...". The Act mandates that regulations promulgated under it consider, among other things, prevention of pollution of state waters, protection against off-site disturbances, restoration of sites, control of wastes, and protection of the public safety and general welfare.

Included in the Act are provisions for collection of fees, which are to be used only for support of the gas and oil program. The DGO's budget, which the Director states is adequate at this time considering current state budgetary constraints, may need to be supplemented in the near future due to additional duties of the Division and increased activity associated with coalbed methane production.

Section 45.1-361.3 (relating to Construction) of the Act requires that the Act be liberally construed to (1) foster, encourage and promote the safe and efficient exploration for and development, production, utilization and conservation of the Commonwealth's gas and oil resources; (2) provide a method of gas and oil conservation for maximizing exploration, development, production and utilization of gas and oil resources; (3) recognize and protect the rights of persons owning interests in gas or oil resources contained within a pool; (4) ensure the safe recovery of coal and other minerals; (5) maximize the production and recovery of coal without substantially affecting the right of a gas or oil owner proposing to drill a gas or oil well to explore for and produce gas or oil; (6) protect the citizens and the environment of the Commonwealth from the public safety and environmental risks associated with the development and production of gas or oil; and (7) recognize that use of the surface for gas or oil development shall be only that which is reasonably necessary to obtain the gas or oil.

Section 45.1-361.4 of the Act further defines the duties and responsibilities of the Director of the DGO. The Director has the jurisdiction and authority necessary to enforce the Act and the power and duty to regulate gas, oil, or geophysical operations, collect fees, and perform other responsibilities as may be prescribed in regulations promulgated by the DMME or the Gas and Oil Board.

The Virginia Gas and Oil Regulation (the Regulation) (4 VAC 25-150) was promulgated in 1991. The Regulation and all subsequent modifications were developed according to provisions of the Administrative Processes Act (§9-6.14: et. seq.), which requires public participation. Specific requirements detailed in the Regulation include those for waste management, erosion and sediment control, stormwater management, drilling fluids, casing programs and well plugging. Definitions of terms are included in both the Act and the Regulation. The Regulation contains provisions for Director-approved variances for such items as reclamation standards, stormwater management, drilling fluids and plugging methods. Likewise, the Act provides the Director with the ability to issue emergency orders without advance notice or hearing due to actual or threatened imminent danger to the public safety or to the environment (4 VAC 25-150-110(A)(2)).

The DGO currently has six inspectors, two administrative/clerical positions and the Director. With the expansion of the DGO's program into the areas of National Pollutant Discharge and Elimination System (NPDES) permitting and worker safety associated with gas and oil production, as well as the increased coalbed methane gas activity and additional office staff responsibilities, the DGO could well need additional qualified personnel, or, at the very least, may be forced to re-assess its regulatory priorities.

The Act (§45.1-361.15, Code of Virginia) created the Virginia Gas and Oil Board (the Board). The Board issues orders and hears appeals. The Board generally meets once a month to consider matters brought before it. All such meetings are open to the public and proper published notice is required (§45.1-361.19 of the Code of Virginia). Applicants in each matter to be considered by the Board must provide notice to prescribed interested parties. (See 4 VAC 25-160-30, relating to Administrative provisions, and 4 VAC 25-160-40, relating to Notice of hearings.)

The DGO may call informal meetings to gather information in preparation of rulemaking. In addition, all rulemaking is subject to the Administrative Process Act (Title 2.2. Administration of Government, Chapter 40. Administrative Process Act). Upon proposing new rules or amendments to existing rules, the DGO must publish a Notice of Intended Regulatory Action and provide for a minimum 30-day comment period. The DGO may hold a public hearing on rulemaking and must hold a public hearing on the rulemaking at the call of the Governor or at the request of at least 25 persons. In any instance, the DGO must provide public notice of the hearing. In addition, any person may petition the DGO to request that the agency develop a new regulation or amend an existing one.

Furthermore, periodically each agency of the Commonwealth is required to review all regulations promulgated by that agency to determine whether new regulations should be adopted and old regulations amended or repealed (§2.2-4017, relating to Periodic review of regulations.) The DGO is scheduled for such a review in the Spring of 2004, and plans to use the results of this report to help it identify areas where changes may be warranted.

The DGO has statutory authority that details its powers and duties, including the authority to promulgate and enforce appropriate rules and regulations, and the Commonwealth's statutes and the DGO's rules define necessary terminology (2000 guidelines 3.1).

The Commonwealth of Virginia's statutes and regulations include technical criteria for E&P waste management practices. These criteria are discussed more fully in Section V of this report relating to Technical Criteria (2000 guidelines 3.1).

FINDING 3.1: *Although the DGO's current budget is generally adequate, it will very likely need additional resources in the near future to perform its duties at current levels given the increases in coalbed methane gas activity and its increased responsibilities with respect to worker safety and NPDES stormwater discharge permitting.*

RECOMMENDATION 3.1: *The Review Team recommends that the Commonwealth of Virginia evaluate mechanisms for providing the DGO with the additional resources that will be necessary in the near future (2000 Guideline Section 3.1).*

3.2 Goals

The goals and focus of DMME are expressed in its mission statement and values. The DMME mission is to “enhance the development and conservation of energy and mineral resources in a safe and environmentally sound manner to support a more productive economy.” DMME values include “operating with a high sense of ethics, honesty, and integrity, demonstrating fairness, respect, responsiveness, straightforwardness, and deliberateness in our actions and communications; functioning in a competent and knowledgeable manner, which emphasizes such principles as: consistency in service provision; attentiveness to customer’s needs and their organizational and operational requirements; and being firm, yet flexible, in delivering services which focus on safety, energy, the environment, and economic development; and operating in a seamless manner to deliver quality customer services.” Staff expressed a strong commitment to the location and production of natural resources and a personal dedication to protection of human health and the environment and does not believe that the two are mutually exclusive.

The DGO has a clear statement of the program’s goals and objectives, which include protecting human health and the environment from the mismanagement of E&P wastes, while maintaining an economically viable oil and gas industry (2000 Guideline Section 3.2).

3.3 State/Regional Variations in Criteria

Virginia’s program accommodates individual differences in operations and locations by requiring a review of each operational location on a site-by-site basis. For each permit application, adjustments may be made as necessary for unusual circumstances, new technology or methods, topography, and/or waste types. The Regulation includes language with respect to issuance of variances that states that the Director may waive or modify any of the requirements of this section that are deemed inappropriate or too restrictive for site conditions. A permittee requesting a variance must submit written documentation of the need for the variance and a description of the alternate measures or practices to be used. Specific variances allowed by the Director become part of the operations plan. The Act and the Regulation require that the Director consider variance requests “judiciously,” keeping in mind both the need of the applicant to maximize cost effectiveness and the need to protect off-site properties and resources from damage.

The Act and the Regulation include specific language with respect to the Tidewater area of Virginia, which is defined to include counties bordering, or near to, the Chesapeake Bay. The Virginia Legislature enacted legislation in response to public concern about the protection of the bay. Although currently there is no drilling in the Tidewater area of Virginia, the statutes and regulations contain special requirements, which recognize the special sensitive environment of the area.

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ADMINISTRATIVE CRITERIA

(2000 Guidelines Section 4)

FINDING 4.0: *The Review Team found that the Virginia program meets all the Administrative criteria of the 2000 Guidelines, Section 4, except where otherwise noted.*

4.1 Basic Requirements

The 2000 Guidelines recommend that state programs for the regulation of waste resulting from the exploration for and production of oil and gas (E&P wastes) should, at a minimum, include provisions for permitting, compliance evaluation, and enforcement. (2000 Guidelines, Section 4.1).

FINDING 4.1: *The Review Team finds that the Commonwealth of Virginia has in place a significant E&P regulatory program that contains the basic elements required under the Guidelines, in spite of the fact that oil and gas activity in Virginia is relatively recent (only 130 wells were drilled prior to 1950) and small in scope (currently only 4,200 active wells and 22 active operators (2000 Guidelines, Section 4.1)).*

4.1.1 Permitting

In Virginia, the well permitting program is all-inclusive and encompasses all aspects of siting and construction (including roads, pits, pipeline rights-of-way, and access roads), operation, waste management, production gathering lines, and plugging and closure. DGO field inspectors conduct pre-permit inspections for each well, using a set checklist of criteria that can be tracked electronically. The inspector has the option and ability to “condition” each permit according to the specific needs or demands of each individual site. Permit modifications are required for any significant field changes to the original permit. The DGO requires in its permit application an operation plan in which the applicant must indicate how it plans to address risks to the site, adjacent lands, public safety, and the environment.

Regulations require a 15-day public notice period before a permit can be issued. Notices are published in local newspapers and sent directly to county administrations. Notice to the surface, coal and mineral owners must be provided by certified mail, and the operator must provide proof of notice with return receipts. Regulations also allow for waiver of the notice period, but only if all affected parties sign-off. However, even with a waiver, the field inspector still must conduct the pre-permit inspection. The average time for issuing a well permit is 15-30 days.

Drilling permits are issued for two-year periods, unless operations are commenced or the permit application is renewed. Once operations are commenced, the permit is active for the life of the well.

Virginia statute and DGO regulations both provide that the permit does not relieve the operator of the obligation to comply with federal, local, or other state permits or regulatory requirements.

The DGO does not have the authority to withhold permits based on an applicant’s history of compliance or financial instability as an operator. However, the DGO can “condition” a permit and can deny transfer of an existing permit if there are existing permit violations or insufficient financial assurance.

FINDING 4.1.1: *The DGO does not have the authority to withhold permits based on an applicant’s history of compliance or financial instability.*

RECOMMENDATION 4.1.1: *The Review Team recommends that the DGO obtain the statutory or regulatory authority to refuse to issue or reissue permits or authorizations if the applicant has outstanding, finally determined violations or unpaid penalties, or if a history of past violations*

demonstrates the applicant's unwillingness or inability to comply with permit requirements (2000 Guidelines, Section 4.1.1).

4.1.2 Compliance Evaluation

DGO inspectors have the authority to go on any permitted property at any time to conduct inspections, examine any operator records, reports or written materials, and investigate reported complaints. Inspections are unannounced and are conducted according to a prescribed system of priorities defined by written policy. DGO inspectors use an automated electronic inspection document system which tracks frequency of inspection and the results of each individual inspection. All inspectors are equipped with laptop computers that contain the complete DGO database (permit information, drilling and completion data, maps, etc.) for quick reference and data entry in the field. Complaints received from the public are investigated in accordance with written DGO policy, and complainants are notified of results of the investigations.

4.1.3 Enforcement

DGO inspectors have full statutory authority to enforce the provisions of the Virginia Gas and Oil Act and all DGO regulations. The DGO has the authority to use various enforcement mechanisms including warnings, notices of violations, closure orders, and show cause and restraining orders issued in circuit court (2000 Guidelines, Section 4.1.3.1).

All enforcement actions are recorded and tracked in the DGO electronic database for each permit.

DGO policy gives inspectors a free hand to deal with immediate situations on the site. DGO inspectors have the discretion while in the field to decide how to address a problem. Under DGO policy, if a violation is an off-site problem, a notice of violation (NOV) is issued immediately. However, if the violation is still on-site, the inspector has the discretion to work with the operator to fix the problem first. The DGO's stated policy is that "bad actors" or repeat offenders would not be given the courtesy of a "warning."

Failure to comply with DGO orders may result in monetary penalties assessed to the operator through the Virginia Gas and Oil Board, but only if the operator agrees to go before the Board. The Board can assess "civil charges" if it rules in favor of the DGO. Any civil charges assessed by the Board are paid to the county where the violation occurred, not to the DGO. The operator must supply the DGO with proof that the county has been paid. According to the DGO, no operator has ever appealed a ruling of the Board or refused to pay the "civil charges" assessed by the Board.

If the operator is unwilling to go before the Board (or in the event of a serious violation that the DGO prefers to handle directly through the judicial system), the office of Attorney General can bring suit in appropriate Circuit Court where civil penalties up to \$10,000 per day may be assessed. In such cases, failure to comply with DGO orders would be considered as criminal cases and classified as Class 1 Misdemeanors. However, the DGO states that it has never pursued a criminal case against an operator.

Although the DGO has the authority to revoke permits and forfeit the well bonds in cases of severe violation, the DGO does not have the authority to assess administrative penalties, which the Director acknowledges would be a useful enforcement tool.

Civil penalty procedures and amounts are defined in policy documents issued by the Virginia Gas and Oil Board (2000 Guidelines, Section 4.1.3.2).

The DGO first attempts to resolve objections involving permit issuance in an informal conference between the affected parties. If no agreement can be reached, then the DGO Director makes a decision, which can be appealed to the Virginia Gas and Oil Board and then to Circuit Court. Generally, DGO decisions may be appealed to the Virginia Gas and Oil Board, and ultimately to the judicial system through the Circuit Courts (2000 Guidelines, Section 4.1.3.3).

FINDING 4.1.3.1: *The DGO does not have the authority to assess administrative penalties. The DGO has the authority to revoke permits and forfeit the well bonds in cases of severe violation.*

RECOMMENDATION 4.1.3.1: *The Review Team recommends that the DGO evaluate the need for statutory or regulatory authority to assess administrative penalties (2000 Guidelines, Section 4.1.3.1.g).*

4.2. Additional Program Requirements

Virginia has a formal, written contingency plan to deal with hazardous waste spills and incidents. The plan is administered through the Department of Emergency Services (2000 Guidelines, Section 4.2.1.1.)

4.2.1.2 Requirements for Operator Responses to Spills and Releases

The DGO has requirements for Operator responses to spills and releases (2000 Guidelines, Section 4.2.1.2.). However, under current regulations, any spillage or other unauthorized discharge of fluids must be reported to the DGO.

FINDING 4.2.1.2: *Current regulations do not contain criteria for the amount of a spill to be reported, resulting in the reporting of spills of insignificant amounts*

RECOMMENDATION 4.2.1.2: *The Review Team recommends that the DGO pursue regulatory changes that contain criteria for the size or amount of a spill requiring reporting, so that the regulations are meaningful and not overly burdensome (2000 Guidelines, Section 4.2.1.2).*

4.2.2 Public Participation

Virginia statute and DGO regulations require public notification during every stage of the permit process (see Section 4.1.1 on permitting above). All DGO records, except those which meet the statutory requirements for confidentiality, are made readily available for public review. Agency well records are maintained indefinitely.

The DGO communicates information regarding its regulatory program both to industry and the public through a variety of forums. However, the DGO does not have simple, basic, written program information or materials for public education.

The Virginia Administrative Processes Act spells out the legal requirements for public involvement in the development and implementation of state laws and regulations. Final drafts of any rule or regulation are also available for public comments. In addition, the DGO relied on a workgroup of stakeholders comprised of industry, regulators, citizens, and other agencies when drafting its latest regulations. Further effort to involve the public was made through advertisement and invitation to the public to attend the workgroup sessions. In addition, membership on the Virginia Gas and Oil Board, as defined in statute, is also stakeholder based having one representative from DMME, one from the oil and gas industry, one from the coal industry, and the remaining four as public representatives.

FINDING 4.2.2.2: *The DGO does not have simple, basic, written program information or materials for public education.*

RECOMMENDATION 4.2.2.2: *The Review Team recommends the DGO consider developing a simple, basic brochure – a sort of citizens guide to the Virginia gas and oil industry and the Virginia gas and oil regulatory program – for use in public education and outreach (2000 Guidelines, Section 4.2.2.2).*

FINDING 4.2.2.3: *The Review Team commends the DGO for maintaining open lines of communication with industry regarding the regulatory program, and for its work with stakeholder groups, including the public, on the development of policy and rule making (2000 Guidelines, Section 4.2.2.3).*

4.2.3 Program Planning and Development

At the Virginia DGO, all inspectors work out of the same office and are in constant contact. So, unofficially at least, short-term planning begins each morning when staff arrives for work. This is particularly true for field issues such as consistency in permitting and enforcement. Staff members also have the ability to call a more formal meeting whenever they feel it is needed.

More long-term planning is accomplished through the DMME Strategic Plan, a one-year plan that coincides with the state's fiscal year (July to June). Each division also develops an Operational Plan as part of the official strategic planning process. The director and one or more additional representative of each division participate in the strategic planning process. The entire DGO staff participates in the development of the Operational Plan. This is basically a two-day process with an outside consultant to facilitate the meetings.

The DGO submits internal DMME quarterly reports covering progress made on its Operational Plan. The DMME directors meet each quarter to review both the Strategic and Operational Plans. Other DMME departmental meetings are held as required. The Operational Plan can be changed or updated throughout the year as needed. Neither the DMME nor the DGO budgets are tied specifically to the Strategic Plan, although these agencies are subject to performance based budgeting.

An internal auditor provides an additional assessment of DGO program operations approximately every three years.

FINDING 4.2.3: *The DMME and the DGO have an effective process in place for strategic plan development and assessment*

4.2.4 Financial Assurance

Every operator in Virginia must provide some type of financial assurance in order to obtain a permit to drill and operate a well, and all active wells must be permitted. Virginia uses three forms of financial assurance instruments: cash bonds, CDs, or surety bonds. The amounts of coverage range from \$10,000 for single well bonds, with blanket bonds extending from \$25,000 to \$100,000 for an unlimited number of wells. These financial assurance instruments are used to provide resources to the state to close or remediate a site should an operator fail to meet its obligations under the law. In Virginia, if abandonment costs exceed the amount of the bond, the excess is considered debt to the state and the operator is subject to legal action by the state to recoup the difference. Virginia has an additional tool called the Gas and Oil Plugging and Restoration Fund, which is maintained at a minimum of \$100,000 as a supplement to bonds that do not cover the entire cost of reclamation. This mechanism has only been used once.

FINDING 4.2.4: *The DGO Director has expressed concern with the adequacy of the states funds to plug wells that might be left to the Commonwealth to plug (see additional discussion under Section 6, Abandoned Sites).*

RECOMMENDATION 4.2.4: *The Review Team recommends that the DGO continue to assess the adequacy of its bonding program and make changes as necessary (2000 Guidelines, Section 4.2.4).*

4.2.5 Waste Hauler Certification

Most E&P waste is handled by contracted haulers, which are trained and certified by the Virginia Department of Transportation (2000 Guidelines, Section 4.2.5).

4.2.6 Waste Tracking

The DGO tracks all liquid wastes to their point of final disposal. This includes the tracking of liquid wastes during drilling, when liquids might be taken out of one pit and moved to another pit with storage capacity for future disposal. Records must be maintained by the operator and must be made available to the DGO at any time for inspection or investigation.

Solid waste is not tracked if hauled off-site. However, most solid waste at well sites in Virginia consists of drill cuttings and is disposed of on-site. On-site disposal is permitted by the DGO through the permit's operational plan, and the operator is responsible for tracking it.

FINDING 4.2.6.a: *The Review Team commends the DGO for its exemplary waste tracking efforts. The DGO has identified produced fluids (particularly brine produced as a result of coalbed methane wells) as one of its top two E&P waste environmental issues. The DGO tracks all liquid wastes to their point of final disposal.*

FINDING 4.2.6.b: *Currently DGO regulations do not place a time limit on how long operators must maintain waste hauling records. Essentially, operators must now keep these "hard copy" receipts forever. As time goes on, this is becoming something of a record keeping "nightmare" for operators.*

RECOMMENDATION 4.2.6.b: *The Review Team recommends that the DGO amend its rules to establish a record retention period for waste tracking records, with a provision that the record retention period be automatically extended for any person who is the subject of an unresolved enforcement action regarding the regulated activity from the date such person receives notice of the enforcement action until it is resolved. A three year record retention program is recommended by the Guidelines (2000 Guidelines, Sections 4.2.6 and 5.10.2.3).*

4.2.8 Data Management

The Virginia DGO has developed an electronic data management system for use by both office and field staff to manage permitting, operating, and monitoring information. The laptop computers used by field staff are networked with the office system. Inspection reports are filed electronically as are production reports and the DGO has begun a project to allow electronic submission of various reports by operators. Much of this information is available to industry and the public on the DGO website (<http://www.dmme.state.va.us/dgo/default.htm>), including permit issuance statistics and Virginia Gas and Oil Board proceedings and results.

While the DGO electronic data management system was "state of the art" when it was developed, the agency has experienced recent budget problems and has been unable to update the system to its satisfaction. Currently the DGO does not have an electronic well database or pipeline database, nor does the DGO have the ability to add production information or maps to its website. The DGO says this is a database problem rather than a hardware problem.

While the DMME has some personnel with electronic technologies (ET) and information technologies (IT) expertise, budget priorities have prevented their use by the DGO. The DGO does have one inspector with ET and IT expertise, but this inspector can only devote part-time to electronic data management issues.

FINDING 4.2.8.2: *The Review Team commends the DGO for what it has accomplished with its electronic data management system with such limited resources.*

RECOMMENDATION 4.2.8.2: *The Review Team recommends that the Commonwealth of Virginia provide the DGO with additional funding for updating the DGO's electronic data management system (2000 Guidelines, Section 4.2.8.2).*

4.3.1 Personnel

The Division of Gas and Oil has a full-time staff of nine, including two office technicians/clerical employees, six inspectors and the Director. These employees are responsible for permitting and inspection of all gas and oil operations, including gathering pipelines to the first point of sale; handling all drilling, completion and production information; enforcing provisions of state law and regulation; and functioning as staff of the Virginia Gas and Oil Board. In addition, the DGO was recently delegated the responsibility of administering a worker safety program and will soon be implementing oil and gas stormwater discharge permitting to satisfy requirements of NPDES Phase II.

The DGO currently regulates over 4,200 active wells and in excess of 1,500 miles of gathering pipeline. It conducts approximately 500 on-site inspections each month, and issues approximately 350 new well permits each year. Field staff currently witnesses on-site 50-60% of all surface casing and plugging operations.

Virginia has seen a recent increase in the exploration for and production of coalbed methane gas. The DGO is anticipating even a further increase in such activity. The agency has already noticed a slight decrease in inspection frequency due to this increased activity and the additional responsibilities of administering the worker safety program. The DGO currently is reassessing its allocation of staff time and resources in order to address adequately these new demands.

Legal assistance is provided to the DGO by Virginia's Office of the Attorney General (AG). The DGO Director states that the DGO has had an excellent relationship with the AG's office until recently when statewide budget problems resulted in less experienced legal personnel being assigned to work with the DGO. The DGO Director feels that the situation will improve over time. Little else can be done until the state improves its budget situation (2000 Guidelines, Section 4.3.1.2).

DGO staff states that adequate backup technical support available to the DGO, if needed, from other agencies areas within DMME (2000 Guidelines, Section 4.3.1.3).

The DGO has stressed training for a number of years and it is part of the DMME Strategic Plan. Training occurs through DMME University -- a system for tracking the training performed by each individual staff person. The Strategic Plan formerly required that each employee undergo a minimum of 40 hours of training each year. The requirement was recently changed, again due to budget shortfalls, to "suggest" that employees receive 40 hours of training annually. All DGO employees have met the suggested 40 hours of training so far. Training topics include computer functions and software, oil spill management (OSM) training from Beckley WV., training in erosion and sediment control, reclamation, Office of Safety and Health Administration (OSHA) training, electrical safety, sample collecting, etc. (2000 Guidelines, Section 4.3.1.5).

FINDING 4.3.1: *The Review Team commends the DGO for what it has accomplished with its relatively small staff and how it allocates staff time and resources (2000 Guidelines, Section 4.3.1).*

FINDING 4.3.1.4: *The Review Team commends the DGO for the high quality, background, education, and knowledge of its field personnel. The field staff is made up of six inspectors— four have degrees in geology, one with a degree in forestry, and one with an associates degree in mining engineering (2000 Guidelines, Section 4.3.1.4).*

FINDING 4.3.1.5: *The Review Team commends the DGO for the training it provides its employees with the limited resources available (2000 Guidelines, Section 4.3.1.5).*

4.3.2 Funding

The annual budget for the DGO is just under \$1million. Each year the DGO develops its own proposed budget, which it submits to the DMME. The DMME then makes revisions and submits a unified Department budget proposal to the Secretary of Commerce. All DGO permit fees are applied to the DGO program. The DGO recently increased permit fees due to budget cuts by the legislature. Industry was supportive of this increase. Currently the DGO charges a fee of \$310 for each permit -- \$260 for the permit plus \$50 for the Orphan Well Fund. These fees are set by statute. Any enforcement action fees and all mineral severance taxes go to the counties.

The DGO is facing increased activity in the drilling of coalbed methane wells, and indicators suggest that such activity will continue to increase in the future. The increased activity already is stressing the demands placed on staff time and agency resources. The agency already is unable to meet its total funding needs for critical program elements, such as updating its electronic data system (see Section 4.2.8 above). In addition, new program elements, such as the worker safety program, have been delegated to the agency by the legislature without any additional funding.

FINDING 4.3.2: *The Review Team concludes that the DGO is facing increased demands on its current resources without the prospect for increased funding.*

RECOMMENDATION 4.3.2: *The review team recommends that the DGO continue to seek the additional funding necessary to provide all the essential elements of an effective E&P waste regulatory program. The DMME, the Secretary of Commerce, and the state legislature should take a hard look at the impacts that inadequate funding of state regulatory programs can have on human health and the environment, as well as a prosperous industry (2000 Guidelines, Section 4.3.2).*

4.4 Coordination Among Agencies

The DGO has accomplished interagency coordination through memorandum of understanding (MOUs), through the involvement of other agencies in the development of DGO regulations, and through frequent interagency communication. (2000 Guidelines, Section 4.4) The DGO works with other agencies in two different arenas:

Within DMME: Because of the important safety issues involved when coal mining and drilling for oil and gas occur in the same area, there is a lot of coordination between the Division of Mines, Division of Mined Land Reclamation and the DGO. The DGO is part of a standing committee within DMME to discuss gas operations in mine territory. The committee meets twice a year and as needed in between. There is significant interaction within DMME between all agencies.

Outside of DMME: The Virginia DEQ will always call on the DGO when oil and gas issues arise. The DEQ has input in the development of DGO regulations. The DGO currently is developing an MOU

with DEQ to handle anything regarding NPDES permits. The MOU would give the DGO full NPDES authority for activities associated with E&P. The DGO also has an MOU on worker safety with the Department of Labor and Industry, and coordinates with the Virginia Department of Emergency Services on a regular basis.

TECHNICAL CRITERIA

(2000 Guidelines Section 5)

FINDING 5.0: *The Review Team found that the Virginia program meets all the Technical Criteria of the 2000 Guidelines, Section 5, except where otherwise noted.*

5.1 General

The DGO issues a permit for all aspects of a particular drilling/well site, including production and gathering pipelines and considers site-specific conditions when determining additional technical criteria for siting, construction, and operation. Virginia's program includes technical criteria for E&P waste management practices that address general waste characterization, pits, land application, and tanks. The DGO has established specific performance standards and design specifications based on site-specific or regional differences in geology, hydrology, climate, and waste characteristics. The Regulation requires that facilities and sites used for storage or disposal of E&P wastes are operated and managed at all times to prevent contamination of groundwater and surface water, soil and air, protect public health, safety and the environment, and prevent property damage.

The Regulation requires that an operator handle all fluids from a well, pipeline, or corehole in a "properly constructed pit tank or other type of container" approved by the Director. The Regulation requires that the operator submit an application for either on-site or off-site permanent disposal of fluids.

No fluids may be disposed of without Director approval of the operator's plan for permanent disposal of the fluids. The application must be accompanied by maps and a narrative describing the method to be used for permanent disposal of fluids if the permittee proposes to land apply any fluids on the permitted site. The application, maps, and narrative become part of the permittee's operations plan. (4 VAC 25-150-420. Disposal of pit and produced fluids.)

The DGO requires that any waste other than cuttings and liquid to go to a disposal facility certified to accept that kind of waste. Used lubricating oil usually goes to an oil recycler permitted by the US EPA and such items as casing thread protectors are collected and recycled. General trash is taken to a landfill authorized to accept that type of waste. For waste disposed of off-site, the DGO requires the applicant to submit a copy of a valid permit for the disposal facility to be used and documentation that the facility will accept the waste (4 VAC 25-150-420. E, relating to off-site disposal of fluids).

Siting Criteria

The Commonwealth's statutes and the DGO's regulations incorporate siting requirements for pits, landspreading, and burial. Individual permits for well sites may include additional siting restrictions as deemed appropriate by the Director. All aspects of the location are considered during permit application review, including depth to and quality of groundwater, wetlands, floodplains, topography, proximity to existing drinking water supplies and wells, geology, geologic hazards, and other environmentally sensitive areas. The Regulation prohibits the DGO from issuing a permit for any well to be drilled closer than 200 feet from any inhabited building, unless site conditions as approved by the director warrant the permission of a lesser distance, and there exists a lease or agreement between the operator and the owner of the inhabited building. (4 VAC 25-150-520 and 4 VAC 25-150-600, Code of Virginia, relating to setback restrictions.)

The statutes and the regulations of the Commonwealth of Virginia include siting restrictions for gas and oil facilities. (2000 Guidelines, Section 5.1.e).

5.2 Waste Characterization

The Regulation requires that operators characterize wastes. Prior to commencing drilling and before the water-protection casing string is set, permit applicants must provide documentation that the water to be used in drilling is from a water well or a spring, or is of equal or better quality than the groundwater within 500 feet of the drilling location or meets constituent limits in the Department of Environmental Quality's "Water Quality Criteria for Groundwater," (9 VAC 25-260-230 et seq), for chlorides, total dissolved solids, hardness, iron; manganese, pH; sodium; and sulfate. The DGO regulations require applicants to submit information on any additives to be used in the drilling program and to identify actions to be taken to ensure use of the additives will not cause a lessening of groundwater quality.

The DGO regulations prohibit a permittee from using an oil-based drilling fluid or other fluid that has the potential to cause "acute or chronic adverse health effects on living organisms" unless a variance has been approved by the Director. Permittees must explain the need to use such materials and provide the material safety data sheets. In reviewing any request for a variance, the Director considers the concentration of the material, the measures to be taken to control the risks, and the need to use the material. (4 VAC 25-150-340. relating to Drilling fluids.)

The EPA also requires characterization of waste that will be injected into a permitted, Class II Underground Injection Well and does an annual analysis.

Sampling and Analysis

The DGO requires waste characterization, including sampling and testing, of E&P wastes prior to disposal by landspreading or burial without a cap for such characteristics as organic content, pH, salinity, and sulfur compounds, including H₂S content, as appropriate for the type of waste, method of disposal, and the potential for adverse health and environmental effects. The applicant must also provide to the DGO a general description of the additives and muds to be used in all stages of drilling. (4 VAC 25-150-340. Drilling fluids.)

Quality Control

The DGO regulations do not include requirements for specific sampling protocols and testing methods, nor do they require analysis by certified laboratories; however, the DGO stated that the labs typically collect the samples and are responsible for sample preservation protocol and use of appropriate methods. The DGO receives copies of the analyses to review before authorizing disposal for landspreading and reviews quality assurance/quality control information at that time to determine whether the test methods used produce data that are valid for the purpose intended.

The DGO regulations require characterization of E&P wastes when appropriate. (2000 Guidelines, Section 5.2).

FINDING 5.2.3: *The DGO has no requirement for using certified laboratories for testing samples.*

RECOMMENDATION 5.2.3: *The Review Team recommends that the DGO consider whether or not its program would benefit by requiring the use of certified laboratories for analysis (2000 Guidelines, Section 5.2.3).*

5.3 Waste Management Hierarchy

The DGO has not incorporated the waste management hierarchy, because all wastes other than produced water are of low volume. However, the DGO has sufficient regulatory flexibility to provide for opportunities for recycling and reuse of produced fluids.

The DGO requires that every waste disposed of on-site be permitted in an operational plan. The DGO has developed quantitative limits for certain waste constituents that have been determined to be the controlling constituents for waste management. The DGO has adopted the DEQ's criteria for protection of groundwater. See the subsection on Technical Criteria for Burial and Landfilling (Section 5.7) for additional information on the DGO's numerical criteria for waste disposal methods. The DGO strictly regulates what can be put into a drilling pit (2000 Guidelines, Section 5.4).

5.5 Technical Criteria for Pits

Permitting

Pits are permitted through well site permitting process. All aspects of pits, including siting, construction, operation, and closure, are addressed in the individual well site permitting process. In the Commonwealth, all pits are to be temporary structures associated with specific drilling, completion or plugging operations, and are to be properly drained and closed when those operations are complete. Pits must be lined according to specifications and must be of sufficient size to maintain a two-foot freeboard. Solid waste other than cuttings are not to be placed in pits, and any oil in pits is to be collected and properly disposed. If a pit is found to be leaking, the operator is required to shut down operations until the problem is rectified, and must report the leak to the DGO. Upon closure, all free fluids must be removed from the pit, any solids (cuttings) are to be covered by liner and/or low-permeability soil, and the site is to be drained, sloped and vegetated. Operational pits may not be used as drainage or erosion control structures. (4 VAC 25-150-80 Application for a permit)

Pits must be reclaimed to standards contained in the Act. The DGO regulations for ground application of pit fluids include setback requirements for surface water and wells. The DGO does not issue surface water discharge permits for produced fluids.

In an emergency, the DGO has the authority to allow fluid to be moved from one pit to another; however, the DGO requires that this movement be tracked. (4 VAC 25-150-100 Operations plans.)

The DGO has technical criteria for siting, construction, and operation of well sites and have provisions to consider site specific or regional conditions during permitting. The entire drilling and production operation is approved as a package at time of permitting (pit location, operating plan, roads, etc.). The DGO has provisions for approval of pits in emergency situations.

Construction

The DGO regulations state that pits are to be temporary in nature and are to be reclaimed when the operations using the pit are completed. The rules also prohibit the use of pits as erosion and sediment control structures or stormwater management structures, and surface drainage may not be directed into a pit.

The DGO regulations require that pits be constructed of sufficient size and shape to contain all fluids and maintain the required freeboard. The Regulations further require that all pits have a properly installed and maintained liner or liners made of 10 mil or thicker high-density polyethylene or its equivalent. The

majority of operators use 20 mm liners. Many of the pits are cut into very rough ground, so the operators sometimes pad the pit bottoms with straw before installing the liner to cushion them from the rock. If only liquids and no solids are to be disposed of in the pit, the permittee may request a variance to the liner specifications; however, the DGO Director indicated that no operator has requested such a variance (4 VAC 25-150-300, relating to technical requirements for pits).

Virginia does not have specific regulations for fencing, netting, and caging, or any other method to secure a pit, as necessary, to protect the public, domestic animals, and/or wildlife; however, the only pits that are allowed are temporary pits, which are used during high activity periods. All other storage must be in closed tanks.

FINDING 5.5.3: *The Review Team commends the DGO for requiring that all pits be lined (2000 Guidelines, Section 5.5.3).*

Operational Requirements

The DGO's regulations concerning operational requirements for pits are found in 4 VAC 25-150-300(c), relating to Operational requirements. These regulations require that the integrity of lined pits be maintained until the pits are reclaimed or otherwise closed. If the pit liner fails, the regulations require that the permittee notify the Division by the quickest available means and that the operation be shut down until the liner and pit are repaired or rebuilt. The regulations require that motor oil and, to the extent practicable, crude oil be kept out of the pit and that any oil collected be disposed of properly. Litter and other solid waste must be collected and disposed of properly and not thrown into the pit.

Operators may move fluid from one pit to another to maintain the required freeboard, or dig another pit to store the fluid; however, this action requires Director approval and may require a permit modification.

The DGO regulations require that lined pits be operated in a manner that ensures liner integrity by requiring operators to divert flow-back to a tank and then to the pit. The DGO inspectors visit active sites on a frequent basis "to ensure that pits meet all operating and structural integrity requirements and to ensure that pit contents do not adversely impact groundwater or surface water." The DGO regulations require that hydrocarbons that accumulate in a reserve pit be skimmed off and properly disposed.

Closure

The DGO regulations require that, at the conclusion of drilling and completion operations or after a dry hole, well or corehole has been plugged, the pit must be drained in a controlled manner and the fluids disposed of in accordance with 4 VAC 25-150-420. The regulations require that fluids be removed from the pit to the extent practical so as to leave no free fluids (4 VAC 25-150-420, relating to Disposal of pit and produced fluids).

If the pit is to be used for disposal of solids, the operator must meet the standards for disposal of solids (4 VAC 25-150-430) and (4 VAC 25-150-300(c), relating to Operational requirements). The DGO regulations allow on-site disposal of drill cuttings and solids in an approved pit without testing of the material, provided the drill cuttings and solids are covered with a liner meeting the standards of 4 VAC 25-150-300, or a low-permeability clay cap, and covered by soil. The combination of soil and liner or cap must be at least four feet thick, capable of shielding the cuttings and solids remaining in the pit, suitable for supporting vegetation, and sloped to prevent ponding. All other solid waste from gas, oil or geophysical operations must be disposed of in a facility permitted to accept that type of waste. Each operator is required to submit a description of how drill cuttings and solids will be disposed of in the

operations plan. The DGO maintains records of all pit locations and these records are available to the public (4 VAC 25-150-430).

The DGO regulations do not include a time limit for closure of pits; however, the DGO requires that the pits be closed as soon as work is complete, but as long as the freeboard and the liner are maintained the DGO works with the operator. Generally, the DGO prefers to see pits closed within six (6) months of completion of work.

For the most part, the DGO closure requirements for pits relating to how they are capped, compacted, contoured, and vegetated meet the Guidelines (2000 Guidelines, Section 5.5.5).

FINDING 5.5.5.b: *The DGO regulations do not require that pits be closed and reclaimed within a set time limit; however, the DGO prefers that operators close and reclaim the pits within six months of cessation of the activity for which the pit was used.*

RECOMMENDATION 5.5.5.b: *The Review Team recommends that the DGO consider establishing a specific time limit for pit closure in its rules or in permits (2000 Guidelines, Section 5.5.5.b).*

5.6 Technical Criteria for Landspreading

The DGO requires a permit for landspreading of drilling fluids. The DGO's regulations allow disposal of pit liquids and produced fluids by landspreading only after the fluids are tested and found to fall within prescribed criteria, and after approval of the disposal plan by the DGO. Land disposal is restricted to permitted areas. In Virginia, produced waters generally have chloride contents in excess of the 5,000 parts per million allowed for landspreading, so, for all practical purposes, the practice is limited to drilling pit waters. The regulation defines buffer zones and weather conditions that limit land application. The permittee is required to monitor vegetation in the disposal area for adverse effects, and may be required to monitor groundwater.

Form DGO-GO-16, Application for Disposal of Pit or Produced Fluids, requires a description of the application area, including soil type, soil permeability, depth to bedrock, depth to water table, nearest water supply, nearest surface water courses, nearest occupied dwelling, total acreage of proposed application area, average slope of the proposed area, and a map showing the location and delineating buffer zones. The DGO also requires a narrative description of the method by which the applicant plans to landspread the pit fluids or produced water. The applicant also must submit a copy of the volume, and analysis of the pit fluids for acidity, alkalinity, chlorides, iron, manganese, oil and grease, pH, and sodium balance (SAR) to provide evidence that the fluid meets the landspreading criteria. The permittee must take into account site conditions such as slope, soils and vegetation when determining the rate and volume of land application on each site. As part of the application narrative, the permittee must show the calculations used to determine the maximum rate of application for each site.

All applications are reviewed and records maintained by the DGO. These records are available to the public.

DGO regulations include standards for on-site landspreading of fluids. These standards require that the fluids to be landspread meet set criteria (the DEQ's "Water Quality Criteria for Groundwater" at 9 VAC 25-260-230 et seq.), that the fluids be confined to the permitted area, and that the fluids be applied in a manner that will not cause erosion or runoff. The regulation also contains requirements for buffer zones between the area to be landspread and highways, property lines, surface water, including wetlands, natural rock outcrops, sinkholes, water supply wells or springs, unless a variance has been granted by the Director: The permittee must monitor vegetation for two years after the last fluid has been applied to a site. If any adverse effects are found, the permittee must report the adverse effects in writing to the

division. The director may require monitoring of groundwater quality on sites used for land application of fluids to determine if the groundwater has been degraded.

The Regulation does not address land application (landfarming) of cuttings, but does allow variances to prescribed disposal methods. The DGO has developed a landfarming policy that allows disposal of cuttings in soil after testing and DGO approval, and, in some cases, approval of the landowner. Cuttings must be tilled into the native soil, the site must be monitored for adverse effects, and the soil zone must be re-tested before site release. The DGO requires sampling of pit liquids to ensure that they meet specific technical criteria for land application.

5.7 Technical Criteria for Burial and Landfilling

Regulatory Requirements

Under DGO regulations, drill cuttings are the only wastes that are allowed to be directly buried on permitted areas. The cuttings must be contained in a lined drilling pit, all free fluids are to be removed, and the cuttings covered with a liner and/or a low-permeability clay cap. The land over the pit area must be contoured so as to have positive drainage and must be vegetated for stability.

The DGO's general standards for burial are included in 4 VAC 25-150-430, relating to disposal of solids, which allows disposal of drill cuttings and solids in the on-site pit provided the operator has submitted with the operator's operations plan a description of how drill cuttings and solids will be disposed of in the operations plan. The DGO does not require testing of the material to be disposed of in the on-site pit; however, the regulations require that the applicant provided the DGO with information concerning the type of drilling fluid and any additives the operator plans to use, along with the material safety data sheets for such additives. The regulations require that the drill cuttings and solids be covered with a liner meeting the standards of 4 VAC 25-150-300, or a low-permeability clay cap, and be covered by soil. The combination of soil and liner or cap must be at least four feet thick, capable of shielding the cuttings and solids remaining in the pit, suitable for supporting vegetation, and sloped to prevent ponding. All other solid waste from gas, oil or geophysical operations must be disposed of in a facility permitted to accept that type of waste. The DGO's records of burial are permanently maintained.

5.8 Technical Criteria for Roadspreading

Roadspreading of waste fluids is allowed only under conditions and requirements identical to the DGO's landspreading requirements. The roads must be under DGO permit (i.e., well or pipeline access roads), and disposal is subject to the same testing, buffer zone and other requirements.

FINDING 5.8: *The DGO currently does not allow roadspreading of produced fluids; however, the DGO's authority and rules are broad enough to allow a case-by-case review of such a proposal and approval of such a proposal provided the roadspreading could be performed in a manner that would protect human health and the environment.*

RECOMMENDATION 5.8: *The Review Team recommends that the DGO evaluate the feasibility of developing standards for roadspreading of produced fluids for beneficial uses such as dust suppression and de-icing in a manner that would still protective of human health and the environment (2000 Guidelines, Section 5.8).*

5.9 Technical Criteria for Tanks

The DGO regulations require tank storage for any E&P waste that is generated on a continuous basis and has information in each permit file as to the location and use of all tanks. Tanks are subject to construction, spill-prevention, preventive maintenance and inspection requirements.

The DGO regulates tanks through Section 4 VAC 25-150-310, which requires tanks installed on or after September 25, 1991, to be designed and constructed to contain the fluids to be stored in the tanks and prevent unauthorized discharge of fluids. The rule also requires all tanks to be maintained in good condition and repaired as needed to ensure the structural integrity of the tank. Every permanent tank or battery of tanks must have secondary containment - be surrounded by a containment dike or firewall with a capacity of 1½ times the volume of the single tank or largest tank in a battery of tanks. Dikes and firewalls shall be maintained in good condition, and the reservoir be kept free from brush, water, oil or other fluids. Permittees must inspect the structural integrity of tanks and tank installations, at a minimum, annually, and maintain the inspection report for a minimum of three years, to be submitted to the director upon request.

All permanent tanks must be surrounded by secondary containment having a capacity of at least 1 ½ times that of the tank or the largest tank in a battery. All dikes must be kept free of brush, water or other fluids. Tanks, along with any other surface equipment not needed to monitor the site, must be removed when the site is abandoned.

Although the Commonwealth's statutes and the DGO's rules do not specifically require tanks to be covered or closed, operators use such tanks to prevent overtopping and spills because of the rainfall in the area.

Closed tanks are used for produced water containment, with secondary containment. The DGO regulations include requirements for inspection of tanks and maintenance of inspection records. The DGO regulations require removal of tanks and above ground equipment upon cessation of production (2000 Guidelines, Section 5.9.4).

5.10 Technical Criteria for Commercial and Centralized Disposal Facilities

Virginia has no commercial or centralized disposal facilities and its statutes and regulations do not specifically address commercial or centralized sites. The six underground injection control (UIC) wells are all operated by large companies; smaller companies must haul produced fluids out of state to commercial disposal facilities at a cost of as much as \$10 per barrel of produced fluid. Further complicating the lack of commercial disposal capacity is the fact that several of the counties in the Commonwealth have passed ordinances prohibiting operators from hauling brine from one county to another for disposal, even if the brine and the disposal well is owned by the same company. The U.S. Environmental Protection Agency, which permits the Class II wells in Virginia, requires that waste injected into the Class II UIC wells is characterized and performs an annual analysis

FINDING 5.10: *There are currently no commercial Class II UIC wells in Virginia. Disposal facilities for small operators are all out of state and the transportation costs are extremely high. Considering the high volumes of produced water associated with, and the increasing activity in, coalbed methane gas production, the lack of disposal capacity could hamper gas development in Virginia. Although the DGO has the authority to permit a commercial disposal well, it has not received a permit application for such a well. The DGO staff indicates that any potential applicant most likely has been stymied by county ordinances prohibiting transport of produced water from one county to another in Virginia.*

RECOMMENDATION 5.10: *The Review Team recommends that the Commonwealth and the DGO evaluate the effect of the lack of commercial disposal facilities for brine and determine whether DGO regulations and/or state law should be amended to facilitate future commercial disposal capacity (2000 Guidelines, Section 5.10).*

Waste Tracking Requirements

Virginia currently has no commercial or centralized disposal facilities; however, some wastes are trucked to commercial facilities out of state. As part of the permit application for well operations, the DGO requires submittal of a waste management plan and any deviation from an approved plan must be reported to, and approved by, the DGO. In addition, for off-site disposal of pit or produced fluids, the generator must submit to the DGO an application for disposal of pit or produced fluids (Form DGO-GO-16), on which the applicant must provide the waste volume, the permit number of the disposal facility and proof that the facility's permit allows acceptance of fluid waste from the gas and oil operations.

The DGO's regulations require each permittee using an off-site facility for disposal of fluids to "use a waste-tracking system to document the movement of fluids off of a permitted site to their final disposition" and to maintain the records and make them available for inspection upon request. All records must be maintained in perpetuity. (4 VAC 25-150-420.)

Furthermore, the Regulations require all coalbed methane gas well operators report monthly the total produced waters withdrawn from coalbed methane gas wells, in barrels, on a well-by-well basis. The report must also indicate cumulative produced water withdrawals. (4 VAC 25-150-630.)

FINDING 5.11: *Virginia has s no requirement that the hauler attest to no illegal dumping; however, all operators must advise the DGO of the waste it plans to generate, the disposition of that waste, and a statement that the facility is authorized to accept that waste.*

ABANDONED SITES (2000 Guidelines Section 6)

The DGO has developed and implemented a program to inventory abandoned gas and oil wells, prioritize plugging operations and remediate sites as necessary. “Abandonment of a well” or “cessation of well operations” means the time at which (i) a gas or oil operator has ceased operation of a well and has not properly plugged the well and reclaimed the site as required by this chapter, (ii) the time at which a gas or oil operator has allowed the well to become incapable of production or conversion to another well type, or (iii) the time at which the Director revokes a permit or forfeits a bond covering a gas or oil operation.

There are two classifications of abandoned sites in Virginia—orphaned wells and bond forfeiture wells:

“Orphaned well” is defined in Section 45.1-361.1 of the Virginia Gas and Oil Act of 1990 (the Act) as any well abandoned prior to July 1, 1950 or for which no records exist concerning its drilling, plugging, or abandonment. An exclusive plugging fund for orphaned wells has been established by Section 45.1-361.40 of the Act.

A “bond forfeiture well” is one that was drilled after July 1, 1950, has been abandoned, its bond attached by the state, and requires plugging. Plugging and reclamation of such a well is funded by bond forfeiture and, if necessary, supplemented by the Gas and Oil Plugging and Restoration Fund established under Section 45.1-361-32 of the Act. All wells drilled after 1950 are bonded.

There are currently 130 known orphaned wells and fewer than 100 require DGO attention. An amount of \$50 of every new permit fee is paid into the Orphaned Well Fund.

FINDING 6.0: *The Review Team found that, the Virginia program meets all the Abandoned Sites criteria of the 2000 Guidelines, Section 6, except where otherwise noted.*

FINDING 6.1: *The Review Team commends the DGO for having an overall effective program in place to address both abandoned and orphaned oil and gas well sites. At the present time there are no abandoned wells that constitute a threat to public health, safety, or the environment (2000 Guidelines, Section 6.1).*

FINDING 6.2.b: *There is no classification system in place that makes a distinction between orphaned wells that are plugged, wells that are converted to water wells or other uses, or those that are not plugged.*

RECOMMENDATION 6.2.b: *The Review Team recommends that the DGO classify orphaned wells as plugged, converted, or unplugged. (2000 Guidelines, Sections 6.2 and 6.3).*

6.2 Definition of “Oil and Gas Site” and “Abandoned Site”

The DGO has defined “Oil Well,” “Gas Well” and “Abandonment” and has an adequate program to monitor well status and to remediate abandoned sites. Section 45.1-361.34 of the Act defines “Abandonment or cessation of well or corehole operation; plugging required” as follows: “Upon the abandonment or cessation of the operation of any well or corehole, the gas, oil, or geophysical operator shall immediately fill and plug the well or corehole in a manner required by regulations in force at the time of abandonment or the operation’s cessation.”

6.3 Identification of Abandoned Sites

The DGO has a procedure for identifying abandoned sites that may constitute a threat to public health or the environment and for determining whether a responsible party exists. An inventory of known orphaned wells, as required by 45.1-361.40 part B has been compiled.

There are currently no orphan wells that are leaking or present a threat to public health and the environment. Historically, the DGO has plugged orphaned wells that posed imminent danger to public health, safety, and the environment.

FINDING 6.3: *Virginia has no current statute or rule that defines conditions of temporary abandonment or inactivity. Section 4 VAC 25-150-390 defines a shut-in well: “If a well is shut-in or not produced for a period of 12 consecutive months the permittee shall measure the shut-in pressure on the production string or strings.”*

RECOMMENDATION 6.3: *The Review Team recommends that DGO consider developing and implementing definitions and criteria for the temporary inactive status of wells. (2000 Guidelines, Sections 6.2 and 6.3).*

6.4 Funding for Abandoned Site Remediation

The Commonwealth of Virginia has multiple sources of funding available to provide for the assessment, plugging, closure, and/or remediation of abandoned sites. These include: Section 45.1-361.40 of the Act, relating to the Orphaned Well Fund; Bonding and financial security requirements under Section 45.1-361.31 of the Act; and the Gas and Oil Plugging and Restoration Fund under Section 45.1-361.32 of the Act.

The Gas and Oil Plugging and Restoration Fund authorizes the DGO to ... “supplement bond proceeds for the full cost of plugging and restoration in the event of a blanket bond forfeiture.” An Orphaned Well Fund is available for the exclusive “purposes of restoration and plugging of orphaned wells,” (Section 45.1-361.40 of the Act). In addition, the Director is authorized to collect any debts including collection and legal fees, attributed to plugging from the operator of the well.

6.5 Criteria for Prioritizing Remediation

The DGO field staff inspect each abandoned site every 1-2 years to determine if the site constitutes a threat to public health, safety or the environment. The DGO inspection report (Form DGO-IR-S) documents any deficiencies and problem wells are prioritized for remediation. In addition, all known orphaned wells have been photographed and evaluated on an informal orphan well inventory form. The DGO abandoned site inspections include specific criteria to evaluate site conditions, well conditions, soil and erosion, and site contamination.

While there is no formal prioritization or ranking of relative risk of orphaned wells, the DGO plans to adopt a system in the future, however no specific deadline has been set.

Goal for Remediation.

The DGO has the following goals for remediation of abandoned sites; (1) the primary goal has been to plug any leaking well or a well that poses imminent danger to the public health or the environment, (2) the secondary goal is to cost effectively continue plugging orphaned wells beginning with wells located in watershed areas, and the third goal of the DGO is to prevent the future abandonment of inactive bonded wells.

Liability for Remediation.

The DGO has an established system for plugging and remediation liability, which requires operators to maintain financial security. Orphaned wells that have no known or locatable operator are the liability of the Commonwealth of Virginia.

6.6 Standards for Remediation

The Virginia Gas and Oil regulations provide for specific criteria for plugging operations as defined in 4 VAC 25-15-440. Plugging for abandonment or plug back operations; 4 VAC-150-450. Identification, plugging and control of wells or coreholes in which radioactive source tools have been abandoned; and 4 VAC 25-150-460. Identifying plugged wells and coreholes; plugging affidavit. The operator is required to complete the Technical Data Sheet for Permit Modification to Plug or Replug (Form DGO-GO-11) and the Plugging Affidavit Form (DGO-GO-18). Site remediation standards concerning erosion, sediment control and reclamation are defined in 4 VAC 25-150-260. The DGO must follow the same standards for plugging and site remediation of abandoned and orphaned wells as those defined above and expected of operators.

Record of Remediation

The DGO maintains all records of remediation for abandoned wells at the Abingdon, VA office. The files for orphaned and bond forfeiture wells include all pertinent plugging data, photographs, invoices, etc., and these records are available for public inspection.

6.7 Public Participation

Any abandoned well or site that is of public concern is promptly evaluated by DGO staff and prioritized accordingly. In the event that an abandoned well is scheduled to be plugged, the DGO will contact the surface owner to obtain written permission (Form DGO-GO-24) and notice the public in the local newspaper. Right of entry provisions for orphaned wells are addressed in 4 VAC 25-150-480.

FINDING 6.7: *The DGO program provides for limited public participation regarding abandoned sites. Abandoned site and orphaned well information, which is not subject to confidentiality, is available to the public. However, there is no published report listing abandoned site, orphaned wells, and their plugging or remediation priority.*

RECOMMENDATION 6.7: *The Review Team recommends that the DGO consider publishing a report that lists abandoned sites and orphaned wells and make this report available to the public. (2000 Guidelines, Section 6.7).*

6.8 Avoid Future Abandoned Site Problems

The DGO has a system in place to prevent the growth in number of abandoned oil and gas sites in the Commonwealth. In general, the DGO's program, its implementation, and enforcement of the program is consistent with the Guidelines and maintains sufficient regulatory strength. (See further discussion under the Administrative Criteria section on Financial Assurance, Section 4.2.4).

FINDING 6.8: *The DGO Director expressed concern that approximately 300 wells, which are bonded and have been inactive for two years or more, have the potential to become a liability to the Commonwealth.*

RECOMMENDATION 6.8: *The Review Team recommends that the DGO evaluate methods to prevent inactive wells that are under bond from becoming the plugging responsibility of the Commonwealth, and consider working with industry to develop criteria for temporary inactive status for those inactive wells with a “bona fide future use.” (2000 Guidelines, Section 6.8)*

NATURALLY OCCURRING RADIOACTIVE MATERIAL (2000 Guidelines Section 7)

The DGO evaluated whether or not naturally occurring radioactive material (NORM) associated with E&P activities existed in Virginia by collecting information on NORM. The DGO stated that the regional geology has given the DGO no reason to expect that NORM would be a concern and, therefore, the DGO has adopted no NORM regulations. However, the DGO has performed no survey to evaluate whether or not NORM exists at levels of concern in association with E&P activities in Virginia.

FINDING 7.0: *The Review Team found that, the Virginia program meets all the NORM criteria of the 2000 Guidelines, Section 7, except where otherwise noted.*

FINDING 7.2: *The DGO considered the NORM issue by looking at the geology of the region and other information available to them (youth of program, etc.), but has performed no official study or survey to verify whether NORM is an issue.*

RECOMMENDATION 7.2: *The Review Team recommends that the DGO verify that there is no need for a NORM program. (2000 Guidelines, Section 7.2).*

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PERFORMANCE MEASURES

(2000 Guidelines Section 8)

FINDING 8.0: *The Review Team found that the Virginia program meets all the Performance Measurement criteria of the 2000 Guidelines, Section 8, except where otherwise noted.*

8.1 General

The Guidelines state, “Beyond the general, technical and administrative criteria set forth elsewhere in this guidance document, an effective program for the regulation of E&P waste should periodically evaluate whether the program is meeting the goal of protecting human health and the environment in accordance with section 3.2” (2000 Guidelines, *Section 8*).

The DGO has identified their major environmental issues as sedimentation and erosion, and the production and disposal of produced fluids, particularly brine from coalbed methane wells.

As a result, the DGO has established a goal of “zero defects” -- no off-site occurrences of sedimentation and erosion or discharge of produced fluids. The DGO feels this provides the agency with immediate feedback, a sort of “instant” performance measurement: if an incident occurs, steps need to be taken to prevent such an incident from occurring in the future. The DGO also tracks the number of off-site impacts as a direct indication of program performance. The agency uses its electronic data system to record data in the field for tracking off-site occurrences, and now, after some minor glitches in the system were corrected, has achieved a 100% follow-up record.

The DGO tracks numerous other output measures to evaluate the efficiency and effectiveness of its program. Examples of such output measures include the number of field inspections they perform (500 inspections per month), and the number of violations issued (approximately 45 NOV's per quarter).

The DGO has tried using a watershed approach based on water quality parameters as a measurement of off-site impact improvement, but found they were unable to assess adequately the portion of water quality degradation due solely to oil and gas activities.

Because their current regulations are relatively recent (1991), the DGO uses their latest set of program regulations as a benchmark that is measured against past performance. For example, under current regulations pits have been replaced with tanks – this has eliminated pit problems and the DGO marks this as a major program improvement. Another example is produced fluids: at one time the DGO allowed all produced water to be dumped, but current regulations now require that it is contained and disposed of properly.

Finally, approximately every three years DMME provides an internal Department auditor who monitors and assesses program operations and performance and makes recommendations for program improvement.

FINDING 8.1: *The DGO tracks incidents, analyzes them, tracks trends, and considers this data in revisions to its program regulations. The agency has a better handle on tracking outputs rather than actual performance indicators relating to the protection of human health and the environment, it does, however, have a benchmark for the number of off-site impacts, and this relates directly to their most critical environmental issues -- sediment and erosion and produced fluids. The Review Team finds that the DGO has a system of performance measures in place that includes input and output analysis and evaluation of off-site impacts.*

RECOMMENDATION 8.1: *The Review Team recommends that the DGO consider using additional environmental indicators as a basis for performance measurement. Examples might include the Clean Water Act 305b list of impaired streams, reporting data required under the UIC program for protection of groundwater, confirmed water supply contamination incident trends, and formal tracking and graphic representation of performance data/measures to support trend line analysis. (2000 Guidelines, Sections 8.1 and 8.2).*

PROGRAM ELEMENTS BEYOND THE GUIDELINES

The Virginia E&P program covers areas that are beyond the scope of the current guidelines. The Virginia DGO and the review team believe the following such areas are worthy of note in this report.

Underground Injection Control

Although within the scope of the 2000 Guidelines, the Commonwealth of Virginia does not have primacy for the federal Class II Underground Injection Control program—the US EPA directly implements the program in Virginia. The first Class II well permitted in Virginia was permitted in 1991. Currently, six injection wells have been permitted in Virginia (one is not yet drilled). Three of these wells are injecting into subsurface formations. There are two sites where fluid is “poured” into old production wells which communicate with abandoned and sealed deep mines. Basically the brine is put back into the formation from which it was taken. There is no enhanced recovery in Virginia and there are currently no commercial disposal wells.

The DGO’s function with respect to the Class II UIC wells is that the DGO permits the wells as it would any other well in the Commonwealth: from construction, operation, maintenance, and plugging. Part II of Chapter 25 sets forth requirements unique to conventional gas and oil wells classified as Class II injection wells by the EPA under 40 CFR 146, Section 146.5. Permittees must comply with the standards of general applicability in Part I of the chapter and with the standards for conventional gas and oil and Class II injection wells, except that whenever the EPA imposes a requirement under the UIC that governs an activity also governed by this chapter, the EPA requirement shall control and become part of the permit. An operator may not inject fluids into a waste disposal well permitted by DGO until after an EPA permit for the well has been issued.

The DGO regulates all actions relating to the well, except the actual act of injection. The DGO’s main focus with respect to injection wells is inspecting the transfer of fluids from one well to another. As noted previously, the DGO requires that all wastes be tracked from their origin to their final disposition.

The DGO and the EPA maintain regular communication with respect to the UIC wells. The EPA notifies the DGO of any permit applications or proposed modifications and provides the DGO with an opportunity to comment. Field-work for EPA is performed by a consultant. The EPA notifies the DGO when a new well is being permitted and also notifies the DGO prior to the performance of any mechanical integrity tests. In turn, the DGO notifies the EPA of any UIC issue that may be noted during a DGO inspection.

As noted previously, there are currently no commercial Class II UIC wells in Virginia. Disposal facilities for small operators are all out of state and the transportation costs are extremely high. Considering the high volumes of produced water associated with, and the increasing activity in, coalbed methane gas production, the lack of disposal capacity could hamper gas development in Virginia. Although the DGO has the authority to permit a commercial disposal well, it has not received a permit application for such a well. As with any Class II well, an EPA permit would be required prior to commencement of injection. The DGO staff indicates that any potential applicant most likely has been stymied by county ordinances and public opposition in Virginia.

Erosion and Sedimentation Prevention Program; Control of Stormwater

Because of the topography of the area of Virginia with gas and oil activity, the DGO identified erosion and sedimentation as one of the two most critical environmental issues. The Virginia Department of Conservation and Recreation (DCR) developed and published the [Virginia Erosion and Sediment Control Manual/Handbook](#), which is a comprehensive manual for all types of construction in the commonwealth

of Virginia. The DGO coordinated with DCR during the development of the DGO's erosion and sediment control regulations found at 4 VAC 25-150-270. This section applies whenever an applicant or permittee must complete an erosion and sediment control plan under 4 VAC 25-150-260. The erosion and sediment control plan must also describe how stormwater runoff will be managed in accordance with the standards of this section. The regulations require protection of areas downstream from the permitted sites from sediment disposition, erosion and damage due to increases in volume, velocity and peak flow rates of stormwater runoff for the stated frequency storm of 24-hour duration. Increased volumes of sheet flows or concentrated flows that may cause erosion and sedimentation on adjacent property must be diverted to a stable outlet, adequate channel or a sediment control, detention or retention facility.

All permittees must meet the erosion and sediment control standards and the land reclamation standards in 4 VAC 25-150-260, whenever ground is disturbed for gas, oil, or geophysical operations. This section requires submission and approval of an erosion and sediment control plan as part of their operations plan.

The plan must meet the standards for the following: clearing and disposition of brush and vegetation; construction of sediment control, such as basins, traps, berms, or sediment barriers (brush barriers, soil fences, or straw bales) to slow the velocity of increased runoff in addition to filtering the water; segregation, stockpiling, and stabilization of topsoil sufficient to provide a suitable growth medium for permanent stabilization with vegetation; and stabilization of the soil and slopes within 30 days of completion of site construction. The regulations require that water and runoff be controlled in ditch lines that go off the site with functioning inlet and outlet protection. A sediment barrier is required for each diversion structure the permittee proposes to construct. All runoff must be filtered. The DGO requires that the slopes at a drill site be stabilized upon completion of construction and maintained for the duration of activity at the site (until final closure and stabilization). Any water seepage from hillside or cut must be treated as stormwater runoff.

Inspecting erosion and sedimentation control is one of the DGO's main inspection activities. The DGO's goal is to reduce downstream erosion and sedimentation from increased runoff. Any accumulation of sediment off-site is considered a violation. The inspector responsible for the area visits the site before construction to ensure that the sediment control plan is adequate. The inspector also inspects the site during construction to ensure that the site erosion and sediment control plan is being implemented as proposed and approved and that the plan is effective. The DGO monitors each site for erosion and sedimentation prevention from construction of the site to final closure.

The DGO regulations no longer require that all cuts and fills be certified by an engineer; however, many of the reclamation plans submitted with the permit application are stamped by an engineer. The DGO removed this requirement when the industry demonstrated to the satisfaction of the group working on the DGO's erosion and sediment control regulations that the certification was an unnecessary cost. The DGO has not experienced an increase in incidents after this change in regulation.

The DGO regulations with respect to erosion and sediment control also cover road construction and maintenance as well as construction of gathering pipelines and maintenance of gathering pipeline rights-of-way.

The DGO regulations further contain standards and requirements for final reclamation of sites. The regulations require removal from the site of all equipment, structures or other facilities not required for monitoring the site or permanently marking an abandoned well or corehole, unless otherwise approved by the director, disconnection of each pipeline abandoned in place from all sources of natural gas or produced fluids and purged, water bars across access roads or pipeline right-of-ways (ROWS) if final stabilization measures are being applied to access roads or ground-disturbed pipeline rights-of-way, or if the rights-of-way will not be redisturbed for a period of 30 days. And the regulations require notice to the DGO when the site has been graded and seeded for final reclamation. The vegetative cover must be

successfully maintained for a period of two years after notice has been given before the site is eligible for bond release.

The DGO will soon take responsibility for the Phase I and II NPDES programs for gas and oil activities. An MOU with DEQ is being prepared. Stormwater runoff which has been contaminated by or come into contact with overburden, raw material, intermediate products, finished products, byproducts or wastes from gas, oil or geophysical operations located on the permitted site must be managed in accordance with a plan approved by the director.

Gathering Lines Permitting

The DGO also permits gathering pipelines. These pipelines are regulated under 4 VAC 25-150-720 et seq, which sets forth requirements unique to gathering pipelines, as well as other specified standards in the Regulation relating to permitting, buffer zones, reporting, technical standards, tanks, stormwater management, erosion and sediment control, activity in H₂S areas, disposal of wastes, plugging and abandonment, and release of bond.

The DGO requires a permit for installation and operation of every gathering pipeline and associated structures for the movement of gas or oil production from the wellhead to a previously permitted gathering line, a transmission or other line regulated by the United States Department of Transportation or the State Corporation Commission, to the first point of sale, or for oil, to a temporary storage facility for future transportation by a method other than a gathering pipeline. Each gathering pipeline or gathering pipeline system may be permitted separately from gas or oil wells or may be included in the permit for the well being served by the pipeline. The regulations require that the operator submit an operations plan to the director that describes how risks to the public safety or to the site and adjacent lands are to be managed (4 VAC 25-150-740. relating to Operations plans).

The DGO regulations require that materials used in gathering pipelines be capable of withstanding anticipated conditions, and, at a minimum, include fused connections for all plastic gathering pipeline. The operator must have the ability to detect all buried gathering pipelines by magnetic or other remote means from the surface and must test all new gathering pipelines for integrity prior to placing the lines in service. The regulations further require that the operator maintain all gathering pipelines in good operating condition at all times. The regulations require that the operator perform annual visual inspections of gathering pipelines and maintain for a minimum of three years the results of each annual inspection, which must be submitted to the Director upon request. (4 VAC 25-150-750.).

Fresh Water Replacement

The Commonwealth of Virginia's statutes include provisions for replacement of fresh water impacted by coalbed methane activities. (Article 4.) Within 750 ft of a CBM well, if there is damage to a domestic water supply that can be shown to have been damaged by the operation, the operator is required to replace the damaged water with water equal to or better than the water damaged and in the volume of the water damaged.

A landowner who believes his or her water has been damaged by coalbed methane operations must complete a series of forms and have them notarized. These forms request general information concerning the previous use of the fresh water. This previous use must have been for a domestic purpose. After verifying that the water source is within a 750 ft radius from a coalbed methane gas well, the DGO staff initiates an investigation. The inspector inspects the area and interviews the landowner. The DGO then transmits the results of its investigation to the operator of the coalbed methane gas well with a request for a response to the allegation. In most cases the operator has already performed post-drilling analyses, the results of which the operator will submit to the DGO. If at no point along the process, the landowner

withdraws the complaint, nor the operator accepts responsibility, the DGO must make a decision as to whether it believes that the coalbed methane operator is responsible for the damage. The DGO then issues an informal opinion. Article 4 is not appealable to the Gas and Oil Board.

Although the landowner does not have to prove his or her claim through technical information and assessment, the landowner must be able to provide to the DGO basic information to enable the DGO to make a determination.

There have been instances of documented impacts to freshwater, but the operators in each of those cases voluntarily addressed the issue of water replacement before the DGO would have been required to invoke its authority under the statutes to require water replacement. However, to date in all cases where a landowner and an operator have been unable to resolve a water replacement issue and the landowner has filed a complaint with DGO, the DGO's decision has never favored water replacement. The DGO's reasons for its decision in those cases were varied. In some cases, the landowner either did not or was not able to provide the basic information requested on the form. In other cases, the complaints were submitted to the DGO several years after the coalbed methane wells were drilled and the DGO has insufficient information after this length of time to tie the complaint to the coalbed methane activity. In some cases, the DGO determined that the fresh water wells went dry because of insufficient precipitation in the area. The DGO investigates every complaint that comes in and requires the operator to respond to the allegation by providing documentation. The DGO believes that, although freshwater contamination is possible, its casing standards and other requirements typically prevent contamination.

If the DGO determines that there is an impact to a freshwater well, it can close the coalbed methane gas operation until the problem is corrected or require that the operator show cause why its permit should not be suspended, modified, or terminated.

Article 4 is only for CBM. If an oil well were to contaminate water, the DGO cannot require that the water be replaced under Article 4. The DGO can, however, provide its opinion, which could then be used as evidence in a civil case between the landowner and the operator.

APPENDIX A
GLOSSARY OF ACRONYMS

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GLOSSARY OF ACRONYMS

DGO	Virginia Department of Gas and Oil
VAC	Virginia Administrative Code
BCF	Billion cubic feet
E&P	Exploration and production
EPA	United States Environmental Protection Agency
CBM	Coalbed methane
NOV	Notice of violation
ET	Electronic Technologies
IT	Information Technologies
OSM	Oil spill management
OSHA	Office of Safety and Health Administration
H ₂ S	Hydrogen sulfide
DEQ	Department of Environmental Quality
IOCC	Interstate Oil Compact Commission
IOGCC	Interstate Oil and Gas Compact Commission
MOU	Memorandum of understanding
NORM	Naturally occurring radioactive material
STRONGER	State Review of Oil and Natural Gas Environmental Regulations
NPDES	National Pollutant Discharge and Elimination System

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APPENDIX B

**COMPLETED VIRGINIA QUESTIONNAIRE
AND SELECTED ATTACHMENTS**

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{PRIVATE }

**INFORMATION FOR THE REVIEW OF STATE OIL AND GAS
ENVIRONMENTAL REGULATORY PROGRAMS
IN STATES WITH A SMALL NUMBER OF WELLS**

State Virginia

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INSTRUCTIONS: The primary basis for this review is the document, Guidelines for State Review of Oil and Natural Gas Environmental Regulatory Programs (June 2000). Please provide the information requested herein and be prepared to describe and discuss the additional information as requested. However, avoid providing background information, data, regulations or statutes that do not address issues in the Guidelines or are not related to the state's oil and gas environmental programs. (For example, regulation of underground fuel storage tanks is not addressed in this review.) Terms used in this questionnaire have meanings consistent with those contained in the Guidelines. Citations appearing in brackets (e.g., [5.3.]) refer to the applicable section or sections of the Guidelines.

At your request, a computer disk containing the questionnaire in Word 97 or Wordperfect 8.0 will be provided to facilitate your preparation of the document.

REQUESTED BACKGROUND INFORMATION

1. If readily available, please provide a brief history or other description of the oil and gas industry in your state, its regulation by state agencies, and recent E&P trends.
2. Please also include a copy of the following:
 - A. Organization chart(s) showing the structure of all agencies responsible for the management and disposal of exploration and production (E&P) wastes, abandoned oil and gas sites, and oil-field NORM (naturally occurring radioactive materials).
 - B. Statutes, rules, regulations and orders applicable to the management and disposal of oil and gas E&P waste, abandoned oil and gas sites, and NORM from oil and gas production.
 - C. Any memoranda of understanding or similar agreements between state agencies or between the state and any other governmental entities (BLM, EPA, Indian Tribes, local jurisdictions) pertaining to the management and disposal of E&P wastes, abandoned sites, and NORM from oil and gas production.
 - D. Any written mission statement(s), goals, objectives and policies applicable to oil and gas E&P waste management and disposal activities, abandoned sites, and NORM from oil and gas production.
3. Also, please include on a separate page any other relevant practices, program measures, guidelines or controls applicable to your state.
4. The next pages contain a matrix to be used to summarize E&P waste management practices. It is recognized that further explanation will likely be necessary. Don't try to capture everything or give precise numbers if not readily available - give only the big picture in the matrix.

E&P Waste Management Matrix

{PRIVATE }Waste Management Practices	Number of Facilities	Volume Managed Annually	Basis for Volume Determination
Pits:			
Drilling	Up to 40 at any instance	300,000 Barrels	Average number of wells drilled times estimated volume of fluids generated per well
Production	0		
Special Use	0		
Landspreading		150,000 Barrels	Very rough estimate - this is a portion of (not an addition to) the drilling pit fluids mentioned above.
Roadspreading		75,000 Barrels	As above
Tanks	OVER 3,000	NO ESTIMATE AVAILABLE	
Commercial Facilities:			
Multipractice	0		
Landfarms	0		
Tank Bottom Reclaimers	0		
UIC Surface Facilities	0		
Oil-Field NORM	0		
Centralized Facilities (non-NORM)	0		
Oil-Field NORM	0		
Municipal Landfills	0		
Accepting E&P Waste	0		
Underground Injection Surface Facilities	6	NO ESTIMATE AVAILABLE	
Abandoned Sites	70	DEPENDANT ON ACCUMULATED FUNDS	
Other			



E&P Waste Management Matrix (cont.)

{PRIVATE }Waste Management Practice	Principal Agency	Primary Statute	Primary Rules, Regulations, or Orders	Applicable Guidelines
Pits:				
Drilling	DMME/DGO	45.1-361.27.A(6)	4 VAC 25-150-420	FORM DGO-GO-16
Production				
Special Use				
Landspreading	DMME/DGO	45.1-361.27.A(6)	4 VAC 25-150-420	FORM DGO-GO-16
Roadspreading	DMME/DGO	45.1-361.27.A(6)	4 VAC 25-150-420	
Tanks	DMME/DGO	45.1-361.27.A	4 VAC 25 150 310 4 VAC 25-150-420	
Commercial Facilities:				
Multipractice				
Landfarms				
Tank Bottom Reclaimers				
UIC Surface Facilities				
Oil-Field NORM	NO REGULATION - NO KNOWN OCCURRENCE			
Centralized Facilities (non-NORM)				
Oil-Field NORM				
Municipal Landfills Accepting E&P Waste				
Underground Injection	DMME/DGO	45.1-361.29		
Surface Facilities				
Abandoned Sites	DMME/DGO	45.1-361.40	4 VAC 25-150-480	
Other				

During the in-state review, please be prepared to describe and discuss the following if they are applicable in your state: Please reference the Guidelines in preparing for the discussion.

I. GENERAL CRITERIA - A general description of your E&P regulatory program, including funding and staffing, coordination with other agencies, and goals and program objectives. [3]

II. ADMINISTRATIVE CRITERIA - Administrative activities, including permitting, compliance evaluation, enforcement, contingency planning, public participation, regulatory development, financial assurance, data management, legal support, training, and program planning and performance review. [4]

III. TECHNICAL CRITERIA

A – GENERAL - Any general design or performance standards and variances or waivers, general siting criteria and waste characterization requirements. [5.1 - 5.2]

B – PITS - Technical criteria for permitting, constructing, protecting, monitoring, and closing and reclaiming pits. [5.5]

C - LANDSPREADING (Non-Commercial) - Technical criteria for landspreading of E&P wastes. [5.6]

D - BURIAL AND LANDFILLING (Non-Commercial) - Any requirements for burial or landfilling of E&P wastes. [5.7]

E – ROADSPREADING - Any requirements for roadspreading of E&P wastes. [5.8]

F – TANKS - Any requirements pertaining to the location, use, capacity, construction, operation, closure and removal of E&P waste tanks. [5.9]

G - COMMERCIAL AND CENTRALIZED DISPOSAL FACILITIES - A description of any program regulating commercial and centralized E&P waste disposal facilities, including permitting, siting, construction, operating and closure requirements and waste hauling and waste tracking program elements. [5.10]

IV. ABANDONED SITES - Any state program to inventory, prioritize and remediate abandoned oil and gas sites, and a description of prioritization, funding and surface remediation activities supporting the program. [6]

V. NATURALLY OCCURRING RADIOACTIVE MATERIAL - Any activities the state has undertaken to determine the occurrence and need for regulation of NORM, and any program elements applicable to the NORM regulatory program. [7]