

# TENNESSEE STATE REVIEW



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

**September, 2007**

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## INTRODUCTION

In 1990, the Interstate Oil Compact Commission (IOCC) and the U.S. Environmental Protection Agency (USEPA) 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 “1990 Guidelines”). The 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 Program 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 (the “1994 Guidelines”) 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 2005, STRONGER once again proposed revised, expanded and updated guidelines which, at the time of this Tennessee review, had not been accepted by the IOGCC.

In June, 2007 a five-person team appointed by STRONGER conducted a review to evaluate the adequacy of the Tennessee program compared to the 2000 Guidelines. The review was conducted in the conference facilities of the Department of Environment and Conservation, and included staff from the Division of Water Pollution Control in which the Oil and Gas Section is located. The review team consisted of three team members and two observers. Bob Wilson, Virginia Department of Mines, Minerals and Energy, Division of Oil and Gas; Kathy Martin, Sierra Club; and John Johnston, Steptoe & Johnson PLLC participated as Review Team members. Scott Gilbert, Tennessee Oil and Gas Association; and Bonnie Robinson, U.S. Environmental Protection Agency participated as observers. Rick Bender, STRONGER Board member, also observed the review.

The process began with a short questionnaire that was sent to the Tennessee Division of Water Pollution Control, Oil and Gas Section. The questionnaire had been prepared by the STRONGER Board. STRONGER intended the questionnaire to briefly characterize the Tennessee program relative to the 2000 Guidelines. At Tennessee’s request, material in the proposed revised, expanded and updated Guidelines not yet accepted by the IOGCC, was prepared and sent to the Division. The Section prepared a response to the questionnaire which was then sent to the Review Team. Tennessee’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 Nashville, Tennessee on June 3-6, 2007. Mr. Paul Schmierbach and Mr. Don Owens of the Division of Water Pollution Control, and Mr. Mike Burton and Mr. Jeff Laxton of the Oil and Gas Section presented the program and responded to questions from the team

and observers. Following the interviews and review of the written materials and backup documentation provided by the Division, the Review Team compiled this review report.

This is the report of the review of the Tennessee program against the standards of the 2000 Guidelines and the proposed revised, expanded and updated sections not yet accepted by the IOGCC, as requested by Tennessee. This report consists of six main sections according to the structure of the proposed revisions to the 2000 Guidelines: I. General Criteria, II. Administrative Criteria, III. Technical Criteria, IV. Abandoned Sites, V. Naturally Occurring Radioactive Materials (NORM) and VI. Stormwater. Appendix A is a glossary of acronyms used in the report. Appendix B contains Tennessee's written response to the STRONGER questionnaire.

## EXECUTIVE SUMMARY

A comprehensive review of the Tennessee oil and gas environmental regulatory program has been completed by a multi-stakeholder Review Team that has concluded that the Tennessee program is underfunded and understaffed, but is well managed considering the limited resources at their disposal. The Review Team also made numerous findings and recommendations for improvements to the program. Some of the significant findings and recommendations are as follows.

### **Program Strengths**

#### **Finding II.12.**

The Review Team finds that the state does provide the public an opportunity to comment on the rules developed by the Tennessee Oil and Gas Board. The state also has an open records act which allows the public to obtain information.

#### **Finding II.16.**

The Review Team finds that the state requires bonding of wells by Rule 1040-2-1.01, "Amount of Bond." Single well bonds are in the amount of \$2,000 and multiple well bonds can be \$10,000 for up to ten wells. The state also requires reclamation bonds in the amount of \$1,500 by Rule 1040-2-1.03, "Reclamation Bond." \$500 of the \$1,500 is refunded pending completion of certain reclamation requirements.

The state has a well plugging fund where revenues from bond forfeitures are used for plugging certain abandoned wells when an operator cannot be located.

#### **Finding IV.15.**

The program finds that the bonds have been successful as one mechanism the State uses to prevent new wells from being added to the Inventory. In particular the reclamation bond that went into effect in 1988 has caused operators to keep their wells in operating condition because they have more financial risk associated with the well.

#### **Finding IV.16.**

The Review Team commends the program for working with the federal government during the development of scoping documents for site remediation of the abandoned wells located in the Big South Fork National River and Recreation Area.

## **Finding VI.1.**

The Review Team finds that the state is doing a good job in developing a stormwater management program.

## **Program Recommendations**

### **Recommendation I.2.**

The Review Team recommends that the state work with industry and within their statutory framework to clearly define a dedicated source of funding and increase the size of the staff. Increasing the size of the staff would alleviate a number of concerns that were expressed during the review. Sufficient staff and funding would allow the staff to adequately operate the program and help encourage the economic health of the industry. (2000 Guidelines, Section 3.1.d.)

### **Recommendation I.4.**

The Review Team recommends that the program develop technical criteria for E&P waste management practices. (2000 Guidelines, Section 3.1.f.)

### **Recommendation I.5.**

The Review Team recommends that the oil and gas program draft written goals and objectives which state, at a minimum, that their goal is to protect human health and the environment during the management of E&P waste while simultaneously recognizing a need for an economically viable oil and gas industry. These goals and objectives should be clearly written in order to provide direction to staff and a means of measurement of those objectives. (2000 Guidelines, Section 3.2.)

### **Recommendation I.6.**

The Review Team recommends that the program develop written criteria, such as a list of suggested Best Management Practices (BMPs), to provide guidance and help promote uniformity and consistency of the program across the state. Variations such as topographical variations that necessitate placing rock on oil and gas access roads in certain areas should be in writing. (2000 Guidelines, Section 3.3.)

### **Recommendation II.2.**

The Review Team recommends that, in order to prevent a backlog of permit applications, adequate resources be provided to conduct the pre-drilling inspections and also allow inspections to occur at any time during the drilling

activity. Again, this increase will allow staff to have additional time to attend to other program activities. (2000 Guidelines, Section 4.1.1.)

#### **Recommendation II.4.**

Conducting compliance evaluations is an important facet of an oil and gas regulatory program and can assist in managing an effective program. Therefore the Review Team recommends that the state increase the number of staff, provide industry-specific training to the staff, and develop or purchase a database system, such as RBDMS, in order to conduct compliance evaluations. (2000 Guidelines, Section 4.1.2.)

#### **Recommendation II.6.**

The Review Team finds that the program is understaffed for enforcement matters. Currently, they do not have adequate staff in order to conduct unannounced inspections or follow up on enforcement actions. The office was only able to bring three enforcement actions last year and assessed about \$3,500 in penalties.

The Review Team recommends that the state increase the number of staff, provide industry specific training and utilize an effective data base in order to enforce the existing regulatory program. Both of these administrative changes could free up staff time for more productive functions. (2000 Guidelines, Section 4.1.3.1.)

#### **Recommendation II.8.**

The Review Team recommends that the oil and gas program develop a spill response program by developing a written procedure to work with The Tennessee Oil and Gas Association, and for calling FEMA and the Emergency Response Center. A Memorandum of Understanding with the Water Division for utilization and spill enforcement authority in that program would also be beneficial. (2000 Guidelines, Section 4.2.1.)

#### **Recommendation II.14.**

The Review Team recommends that the program develop specific written goals and objectives for administering the oil and gas program. For example, the state does not have a permit for the discharge of waters contained in pits, but the Review Team understands that the state is currently developing and drafting a general permit for the discharge of pit water. The Review Team encourages the state to finalize and implement this general permit. (2000 Guidelines, Section 4.2.3.1.)

### **Recommendation II.15.**

The Review Team recommends that the program develop numerical criteria by which the program can be evaluated. These criteria could follow from the goals and objectives and include, for example, the number of permits processed, the amount of permit fees received, the time of issuance of permits, the number of inspections, the number of notices of violations issued, the number of enforcement actions, and the number of penalties issued and collected, the number of wells plugged and so forth, - all data necessary for managing the oil and gas program. A good database management program could be of assistance in collecting, assessing and using management data. See the Guidelines for greater details and examples. (2000 Guidelines, Section 4.2.3.2.)

### **Recommendation II.19.**

The Review Team recommends that the program either develop or purchase a commercially available software management program such as RBDMS in order to electronically manage data. Benefits would accrue to many oil and gas program functions including, permitting and enforcement, as well as help provide public access to data. (2000 Guidelines, Section 4.2.7.2.)

### **Recommendation II.20.**

The Review Team finds that the staff is insufficient to properly administer the program and recommends the state provide adequate funding to the program. Funding is necessary in order to hire and train staff with the expertise and training to properly administer a technical program. The staff is working hard and is well intentioned but because of staffing and funding limitations, is only able to work on permitting issues. The size of the staff is insufficient to develop written policies which would aid in the administration of the other program elements such as compliance and enforcement and training. Currently, the staff can only undertake limited compliance and inspection and enforcement actions in order to ensure the proper administration and handling of E&P wastes.

The state did undertake a study which indicated that a staff of six to nine individuals could effectively operate the program. The Review Team recommends that the state increase the level of funding and support to the program. Increasing the number of staff and the training can help assure a properly and adequately administered oil and gas program. An increase in the effectiveness of the program would benefit the state of Tennessee. Adequately administering the program would help assure the protection of the environment of the citizens, and in addition, would help promote a viable oil and gas industry. (2000 Guidelines, Section 4.3.1.1.)

### **Recommendation II.25.**

The Review Team recommends that the state fund the oil and gas program to a sufficient level to fund training for the staff. Training opportunities could be accomplished, in part, by the State of Tennessee becoming a member of the Interstate Oil and Gas Compact Commission (“IOGCC”) in order to take advantage of training opportunities underwritten by the IOGCC. In addition, the state may be able to leverage funding opportunities for well plugging and orphan sites for which the IOGCC is currently seeking on a national level. Well service companies, trade organizations and other industry related entities sponsor training which the program could attend. (2000 Guidelines, Section 4.3.1.5.)

### **Recommendation III.7.**

The Review Team recommends that the Oil and Gas Board develop and promulgate rules for pit construction to include such aspects as berm construction, slope stability, etc. The requirements should include minimum liner specifications. (2000 Guidelines, Section 5.5.3.1.)

### **Recommendation IV.2.**

The Review Team recommends that the oil and gas program develop a written policy or procedure for updating the inventory that could include such concepts as notification of the last known responsible party, providing legal notice, and dedication of staff time for improving the database contents and descriptors, as well as tracking those sites that have been remediated. (2000 Guidelines, Section 6.3.)

### **Recommendation IV.3.**

The Review Team recommends that Board develop a regulatory program that allows for a classification of temporary abandonment of both oil and gas wells to address this type of situation, including the concept of bona-fide future use. (2000 Guidelines, Section 6.3.)

### **Recommendation IV.5.**

The Review Team recommends that the oil and gas program develop additional funding method(s), such as a production fee, that may be a more reliable or constant source and that will accumulate more money to the plugging fund. (2000 Guidelines, Section 6.4.)

### **Recommendation V.1.**

The Review Team recommends that the program develop a state-wide assessment of the potential for NORM related issues, especially with respect to

those wells that may be developed in the future that are water-driven, enhanced, or otherwise encounters formations known to have radioactive materials that could accumulate in surface equipment and piping and determine if an oil field NORM regulatory program is warranted. (2000 Guidelines, Section 7.2.)

## HISTORY

The earliest successful borings in Tennessee for petroleum occurred on Spring Creek in Overton County near the Putnam County line. From 1859 to 1870 several wells were drilled in this area. From a letter written in April of 1869 by Charles Irvin to Dr. J. M. Safford much valuable information pertaining to the Spring Creek Field was obtained. From a depth of only 19 feet, about 2,000 barrels of oil were pumped from the Newman No. 1 well, drilled in 1866.

Another significant early discovery of oil in Tennessee was the Husdon well on Jones Creek, in Dickson County drilled in 1867. This well initially produced oil from a depth of 132 feet, but was later deepened to at least 340 feet.

In 1891, drilling in Scott County yielded oil in several wells from depths greater than 1,000 feet. There, wells were drilled just west of Glenmary, roughly centered in the present day oil patch of Tennessee. The Scott County wells were some of the earliest wells to produce hydrocarbons from relatively deep holes.

Another interesting occurrence of hydrocarbons in Tennessee is the area of gas seeps on an island several miles north of Memphis. These gas seepages have been known since the 1880's and possibly earlier. In 1909 an organized attempt was made to test the potential of the oil and gas on Old Hen Island, where the majority of the gas seeps were located. Four wells were drilled eventually, yielding only non-commercial amounts of oil and gas. A number of additional wells were later drilled in the Memphis area as water wells, but no trace of oil or gas was ever reported from any of them.

Eventually, as drilling information and methods improved, the search for oil and gas spread throughout most of Tennessee. Although there were numerous wells drilled between 1900 and 1960, a large percentage were dry.

The Tennessee Oil and Gas Board came into existence and began permitting wells in 1969. In the 1970's most of the activity in the state took place in Morgan and Scott Counties. Many wells were drilled to shallow depths of approximately 1,500 to 2,000 feet. Few wells in the early days were drilled below 2,000 feet. As wells were drilled deeper, new regulations regarding their depth and spacing were adopted. The rules for spacing and depth are in the current form due to a lack of porosity found in most geologic formations in this state. The spacing requirements are driven by fractures and permeability of the formation. These spacing rules have been in effect since 1974.

Drilling for oil and gas wells peaked in 1982 when 1,000 wells were drilled. In the mid 1980's, the bust in the oil and gas industry occurred and the permitting of oil and gas wells in the state dropped to below 100 permits per year in the early and mid 1990s. Since 1996 the number of permits has risen from 85 to 386 permits in 2006.

At the height of oil and gas permitting in the early 1980's, the Tennessee Oil and Gas Board had three clerks, the Supervisor of the Oil and Gas Board, and four inspectors. In 1991 the program was moved from the Division of Geology to the Division of Water Supply. At that time there was no clerical help and the program was reduced to two inspectors and an Assistant Oil and Gas Supervisor. By the late 1990s to 2000 the Oil and Gas Board staff was reduced to an Assistant Oil and Gas Supervisor and one inspector, and the oil and gas program was moved back to the Division of Geology in 1997. In 2000 one inspector was added to the program to fill a vacancy. The staffing situation remained that way until the program was moved from the Division of Geology to the Division of Water Pollution Control in 2005. It was at that time the program received an ASA3 for clerical help and an additional inspector in the field. Currently, the program has a Supervisor of the Oil and Gas Board, ASA3, and three inspectors in the field.

The bonding of oil and gas wells has changed throughout the history of the oil and gas industry in the state. For example, operators were required to have just a one thousand dollar (\$1,000) bond for plugging when permitting was initiated. In the mid 1970s this was changed to a two thousand dollar bond for a single well for plugging and a ten thousand dollar blanket bond for as many wells desired for plugging only. The ten thousand dollar blanket bond was later limited to ten wells. This particular issue of a ten thousand dollar blanket for more than ten wells is a major problem for the Oil and Gas Board today because of a lack of funds for the plugging of abandoned wells. In 1988 the need arose for a reclamation bond for all wells drilled in the state. Currently, a reclamation bond of fifteen hundred dollars (\$1,500) is required for each well permitted after January 1, 1988. This came about due to erosion and pit problems left behind by some operators at oil and gas sites. Today, an operator is required to have either a single well plugging bond (\$2,000) or \$10,000 for ten wells for plugging and a \$1,500 reclamation bond for each site. Also, each permit is required to have a one hundred and fifty (\$150) non-refundable permit fee.

Today, drilling for oil and gas has shifted from using cable tools to air rotary rigs. All operators are required to have a blowout preventer in working order while drilling.

As mentioned earlier, oil and gas drilling began in earnest in Morgan, Fentress and Scott Counties in the 1970s. Since that time, drilling has expanded off the Cumberland Plateau to Overton, Pickett and Clay Counties. Today, Overton county has the most wells drilled annually in the state. In addition, drilling has moved further east to Anderson, Hancock, Claiborne, Scott and Campbell Counties. Oil and gas wells are being drilled deeper in these areas in search of increased gas production. These wells are being drilled to depths of 3,500 feet to almost 7,000 feet. Today, many people are inquiring about other parts of the state such as the West Tennessee area and East Tennessee between Knoxville and the Tri-Cities area. Currently, there is mineral leasing taking place in these regions.

Today, the development of the oil and gas resources in Tennessee is expanding. Citizens Gas of Helenwood Tennessee buys gas directly from the well and pays the

operator for the production. In addition, the State of Tennessee has three approved gas storage fields. The Lick Branch and Indian Creek fields are currently in operation and the West Oneida field has just recently been approved by the Tennessee Oil and Gas Board. Transmission lines are being constructed, thus increasing the Tennessee producer capacity for the sale of their product. Produced oil is currently being transported to refineries in Kentucky by truck.

Currently within the state, there are six injection wells for the disposal of salt water. These wells are located in Morgan, Scott, Fentress, and Overton Counties. Also, there is one approved landfill in Scott County for the disposal of oil sludge and contaminated soil. Generally, the State of Tennessee has not had a large number of crude oil spills.

Note: The above historical information was excerpted from a paper written by Marvin Berwick in 1986 and from information provided by the Oil and Gas Section.

## **I. General Criteria (2000 Guidelines Section 3)**

Tennessee has the statutory authority, through Code Section 60-1-101 et seq., “Production of Oil and Gas,” of the Tennessee Code, to regulate oil and gas activity in the state. Tennessee has the statutory authority to promulgate appropriate rules to regulate oil and gas activity in the state. Tennessee has oil and gas terminology defined in Code Section 60-1-101 and Rule 1040-1-1-.01.

### **Finding I.1.**

Some of the oil and gas terminology defined in Code Section 60-1-101 and Rule 1040-1-1-.01 is not consistent with terminology used by the oil and gas industry.

### **Recommendation I.1.**

The Review Team recommends that the state redefine certain terms such as “waste” and “abandoned well.” Certain terms are used throughout the industry, but are not defined in the current regulations and code. “Waste” could include waste products from oil and gas exploration and development in addition to the traditional meaning of “wasting gas.” “Abandoned well” could be defined in order to help more clearly define and regulate activities associated with non-productive wells. (2000 Guidelines, Section 3.1.c.)

### **Finding I.2.**

The Review Team finds that the program is seriously under-funded and understaffed. The Oil and Gas Section as currently configured is dependant on the Division of Water for funding. During the review, the program staff noted that a prior internal study had recommended a staff of six to nine individuals for the oil and gas program. The inability to conduct enforcement actions, maintain an adequate database, and write goals and objectives were cited as problems.

### **Recommendation I.2.**

The Review Team recommends that the state work with industry and within their statutory framework to clearly define a dedicated source of funding and increase the size of the staff. Increasing the size of the staff would alleviate a number of concerns that were expressed during the review. Sufficient staff and funding would allow the staff to adequately operate the program and help encourage the economic health of the industry. (2000 Guidelines, Section 3.1.d.)

**Finding I.3.**

The Review Team finds that the oil and gas program does not have any Memoranda of Understanding or other formal mechanisms with the public for focus groups, other state programs for radiation protection, or the industry to conduct spill clean-up work.

**Recommendation I.3.**

The Review Team recommends that the program draft and execute written Memorandums of Understanding or other formal agreements with other parties with whom they work. An informal arrangement currently exists with the industry for spill clean ups, and this arrangement can be formalized to define all the party's responsibilities. (2000 Guidelines, Section 3.1.e.)

**Finding I.4.**

The Review Team finds that the oil and gas program does not have technical criteria for E&P waste management practices.

**Recommendation I.4.**

The Review Team recommends that the program develop technical criteria for E&P waste management practices. (2000 Guidelines, Section 3.1.f.)

**Finding I.5.**

The Review Team finds that the oil and gas program does not have any clearly written goals or objectives.

**Recommendation I.5.**

The Review Team recommends that the oil and gas program draft written goals and objectives which state, at a minimum, that their goal is to protect human health and the environment during the management of E&P waste while simultaneously recognizing a need for an economically viable oil and gas industry. These goals and objectives should be clearly written in order to provide direction to staff and a means of measurement of those objectives. (2000 Guidelines, Section 3.2.)

**Finding I.6.**

The Review Team finds that the oil and gas program has no written formal variations in criteria across the state, but that informally, variations across the state are recognized.

**Recommendation I.6.**

The Review Team recommends that the program develop written criteria, such as a list of suggested Best Management Practices (BMPs), to provide guidance and help promote uniformity and consistency of the program across the state. Variations such as topographical variations that necessitate placing rock on oil and gas access roads in certain areas should be in writing. (2000 Guidelines, Section 3.3.)

## **II. ADMINISTRATIVE CRITERIA (2000 Guidelines Sections 4 & 8)**

### **Permitting**

State statutory authority to require and issue permits is found under Code Section 60-1-101 and Rule 1040-2-2.01. The permit fee is \$150.00 and that fee is deposited into the state's general revenue fund. The state does have written instructions to guide an applicant through the permitting process, and a sample completed permit application is included with the instructions. New operators must submit an organizational report. Permit applications, which tend to be ten to twenty pages in length, include an action plan which is not a standard form, a reclamation form, a notice to surface owners to be sent via certified mail and a surface owner's waiver for drilling within fifteen days. Permit applications are processed in Nashville by the Oil and Gas Supervisor and his assistant. A copy of the permit is then sent to the field inspector who coordinates with the operator's site coordinator a time to inspect the site prior to drilling. A drilling permit is only valid for 90 days, but the permit can be extended. When a permit is extended, a new permit number is issued and fees must be paid. The casing program is focused on groundwater protection. The state issues about 350 to 400 permits per year and about thirty days are required to administratively process and issue a permit. Oftentimes, permits can be issued in less than thirty days. An operator can prepare a site before receiving a drilling permit, however drilling cannot be initiated until the site is inspected and approved by the field inspector. If a drilling permit is not issued, the site must still be reclaimed. A reclamation bond is required as part of the application. The state does have the regulatory authority to deny permits for noncompliance with regulations. Permits do not state that an operator is responsible for all other state and federal regulations. Permits can be withheld if an operator is in violation of any water pollution control regulation. Prior to issuance of a permit, a bond is required in the amount of \$2,000 per well, or \$10,000 for a blanket bond for a maximum of ten wells. A reclamation bond is also required in the amount of \$1,500 per well site. Upon satisfactory completion of regrading and revegetation of the disturbed areas, one third of the reclamation bond is returned. Spacing requirements are set forth in Rule 1040-2-4-.01.

The Tennessee Oil & Gas Board is authorized under Code Section 60-1-201 and is composed of six people. Three of members are appointed by the Governor. One of them is the Commissioner of Environment and Conservation, one is the Director of the State Energy Office, and one is the Chair of the Conservation Commission. There is one Oil and Gas Industry Representative, one Owner of Oil and Gas Property, and one Mineral Industry Representative. All members serve staggered terms. The Board is responsible for adopting regulations, conducting hearings and enforcement actions. There have only been two Board Hearings in the past four years. The board uses an administrative law judge in contested cases.

### **Finding II.1.**

The Review Team finds that the state does have the statutory ability to require and issue permits under Code Section 60-1-101 and Rule 1040-2-2.01. The core of oil and gas exploration in Tennessee, and consequently the regulated community and interested public, is located around Knoxville, but well permits are issued from and records maintained in Nashville.

### **Recommendation II.1.**

The Review Team recommends that permits, as issued, should clearly state that the operator must comply with any other state, federal or local requirements in addition to the permit requirements as stated. Other permit related issues, such as adequacy of bonding, will be addressed at various points throughout this report. The Review Team recommends that the state consider making filings and records currently located in Nashville also available to people in the Knoxville area. (2000 Guidelines, Section 4.1.1.)

### **Finding II.2.**

Pre-permit inspections are required by Code Section 60-1-103 (a)(4). This mandate, coupled with limited resources, causes delays in permitting and limits the ability of staff to conduct inspections during the conduct of other activities.

### **Recommendation II.2.**

The Review Team recommends that, in order to prevent a backlog of permit applications, adequate resources be provided to conduct the pre-drilling inspections and also allow inspections to occur at any time during the drilling activity. Again, this increase will allow staff to have additional time to attend to other program activities. (2000 Guidelines, Section 4.1.1.)

### **Finding II.3.**

Permits expire in ninety days.

### **Recommendation II.3.**

The Review Team recommends increasing the life of a permit from ninety days to at least twelve to twenty four months. Increasing the life of a permit will allow staff to have additional time to attend to other duties rather than pro forma process requests for extensions. (2000 Guidelines, Section 4.1.1.)

## **Compliance Evaluation**

### **Finding II.4.**

The Review Team finds the state has the authority to conduct compliance evaluations. However, compliance evaluations are essentially nonexistent because of lack of staff, lack of staff training and lack of an adequate data base to track compliance. The current database is unreliable. Because of the above named factors, combined with increased permitting applications and certain statutorily required procedures that increase administrative efforts, compliance evaluations are not being conducted. The state does maintain a website and toll-free number for the public to use to report complaints.

### **Recommendation II.4.**

Conducting compliance evaluations is an important facet of an oil and gas regulatory program and can assist in managing an effective program. Therefore the Review Team recommends that the state increase the number of staff, provide industry-specific training to the staff, and develop or purchase a database system, such as RBDMS, in order to conduct compliance evaluations. (2000 Guidelines, Section 4.1.2.)

### **Finding II.5.**

The oil and gas program does have a procedure to receive and evaluate information from the public regarding alleged violations. The program maintains a website and has a toll-free number that is only answered during working hours.

### **Recommendation II.5.**

The Review Team recommends that the program provide a 24-hour system for responding to a spill related call. A system might be as simple as providing a list of people who rotate the duty to respond to a spill-related call during off duty hours or contracting with an answering service to accept and route calls. (2000 Guidelines, Sections 4.1.2.1.c. and 4.2.1.2.)

## **Enforcement**

### **Finding II.6.**

The state does have the legal authority to enforce the oil and gas program. The enforcement tools are more thoroughly discussed in the “Legal” section of this review, and include the standard regulatory tools, such as issuing notices of violations, assessing penalties, issuing administrative orders, stopping issuance of permits and shutting down operations. Penalties are deposited into a well plugging fund. The state does not have a standard procedure for assessing penalties. The state can refer matters to the attorney general’s office.

### **Recommendation II.6.**

The Review Team finds that the program is understaffed for enforcement matters. Currently, they do not have adequate staff in order to conduct unannounced inspections or follow up on enforcement actions. The office was only able to bring three enforcement actions last year and assessed about \$3,500 in penalties.

The Review Team recommends that the state increase the number of staff, provide industry specific training and utilize an effective data base in order to enforce the existing regulatory program. Both of these administrative changes could free up staff time for more productive functions. (2000 Guidelines, Section 4.1.3.1.)

### **Finding II.7.**

The Review Team finds that the oil and gas program does not use a written standard procedure to assess penalties.

### **Recommendation II.7.**

The Review Team recommends that the program develop a penalty matrix or some other written procedure to assess penalties. A penalty policy could adequately address any economic or environmental benefits that have accrued to an operator through non compliance and help provide a “level playing field” for all operators. (2000 Guidelines, Section 4.1.3.1.g.)

## **Contingency Planning and Spill Risk Management**

### **Finding II.8.**

The Review Team finds that the state does not have a spill response program. The Tennessee Oil and Gas Association responds on a voluntary basis to reported spills. The only action the oil and gas program takes is to call FEMA and the Emergency Response Center.

### **Recommendation II.8.**

The Review Team recommends that the oil and gas program develop a spill response program by developing a written procedure to work with The Tennessee Oil and Gas Association, and for calling FEMA and the Emergency Response Center. A Memorandum of Understanding with the Water Division for utilization and spill enforcement authority in that program would also be beneficial. (2000 Guidelines, Section 4.2.1.)

### **Finding II.9.**

The Review Team finds that the oil and gas program is working on an informal basis with the Water Division and other state programs.

### **Recommendation II.9.**

The Review Team recommends that the program develop a Memorandum of Understanding or other formal arrangement with parties with whom they work in order to clearly articulate the individual responsibilities of the parties. (2000 Guidelines, Section 4.2.1.3.)

### **Finding II.10.**

The Review Team finds that the state does not have a state contingency program that addresses all the elements of the Guidelines. However, the state does require an operator to provide various information that would be part of a contingency plan. Information such as the operator's command structure and emergency contact numbers are required to be submitted during the permitting process. Rule 1040-2-6.04 requires that all oil and gas operations be conducted in a manner that will prevent or mitigate adverse environmental impacts such as soil erosion and water pollution.

### **Recommendation II.10.**

The Review Team recommends that the state develop a contingency plan that formalizes and includes the various recommended elements set forth in the Draft Guidelines. (2000 Guidelines, Proposed Revision Section 4.2.1.4.1.)

### **Finding II.11.**

The Review Team finds that the state does not have primacy for the “SPCC” program. However, the state does require an oil and gas operator to provide spill containment measures which are protective of the environment. Rule 1040-4-1.03 requires proper disposal of waste such that no oilfield waste shall be discharged to or disposed of in any way into any body of water except with a discharge permit obtained from the Department of Environment and Conservation. Rule 1040-4-1.07 requires containment pits at tank batteries and sets forth how containment pits and tank batteries are to be configured. Rule 1040-2-6.02 requires blowout preventers on wells so that uncontrolled emissions of oil and gas and water from wells does not occur. Rule 1040-2-6.03 requires that all wells be equipped with casing heads for connections and valves in order to prevent leaking gas and oil fluids.

### **Recommendation II.11.**

The Review Team recommends that the state establish a database, as more fully set forth later in this report, to assist in tracking compliance with spill control requirements. The database should be developed which would include the ability to collect and utilize the information on spills and unauthorized releases. Development of a database and utilization of the data is discussed at various points throughout this report. Development of an effective database would aid in all facets of administering the oil and gas program. (2000 Guidelines, Proposed Revision Sections 4.2.1.4.2. and 4.2.1.6.)

## **Public Participation**

### **Finding II.12.**

The Review Team finds that the state does provide the public an opportunity to comment on the rules developed by the Tennessee Oil and Gas Board. The state also has an open records act which allows the public to obtain information.

### **Recommendation II.12.**

The Review Team recommends that the state follow its current procedures to notify the public. One improvement, noted earlier in this report, is maintaining records related to the oil and gas industry in Knoxville, where oil and gas development occurs, rather than maintaining the records in Nashville, Knoxville, and the geology office which is located in Knoxville. In addition, the Review Team recommends that the public be educated regarding the use of these materials. (2000 Guidelines, Sections 4.2.2.1. and 4.2.2.2.)

### **Finding II.13.**

The Review Team finds that the state primarily utilizes the Oil and Gas Board as an advisory group for the industry and public representatives. Since part of the severance tax from oil and gas production flows to the counties, county officials may be interested in working with the oil and gas program.

### **Recommendation II.13.**

The Review Team recommends continuing to follow the existing process and, in addition, make an attempt to reach out to other groups that may be impacted by oil and gas development. (2000 Guidelines, Section 4.2.2.3.)

## **Program Planning and Evaluation**

### **Finding II.14.**

The Review Team finds that the oil and gas program does not have any written, clearly articulated goals and objectives.

### **Recommendation II.14.**

The Review Team recommends that the program develop specific written goals and objectives for administering the oil and gas program. For example, the state does not have a permit for the discharge of waters contained in pits, but the Review Team understands that the state is currently developing and drafting a general permit for the discharge of pit water. The Review Team encourages the state to finalize and implement this general permit. (2000 Guidelines, Section 4.2.3.1.)

### **Finding II.15.**

The Review Team finds that the oil and gas program does not have any criteria for assessing the efficacy of the program with respect to protection of public health and the environment, and therefore, is not able to assess the oil and gas program. The lack of the ability to evaluate the program is interwoven with the lack of written goals, shortage of personnel, and lack of an adequate database.

### **Recommendation II.15.**

The Review Team recommends that the program develop numerical criteria by which the program can be evaluated. These criteria could follow from the goals and objectives and include, for example, the number of permits processed, the amount of permit fees received, the time of issuance of permits, the number of inspections, the number of notices of violations issued, the number of enforcement actions, and the number of penalties issued and collected, the

number of wells plugged and so forth, - all data necessary for managing the oil and gas program. A good database management program could be of assistance in collecting, assessing and using management data. See the Guidelines for greater details and examples. (2000 Guidelines, Section 4.2.3.2.)

## **Financial Assurance**

### **Finding II.16.**

The Review Team finds that the state requires bonding of wells by Rule 1040-2-1.01, "Amount of Bond." Single well bonds are in the amount of \$2,000 and multiple well bonds can be \$10,000 for up to ten wells. The state also requires reclamation bonds in the amount of \$1,500 by Rule 1040-2-1.03, "Reclamation Bond." \$500 of the \$1,500 is refunded pending completion of certain reclamation requirements.

The state has a well plugging fund where revenues from bond forfeitures are used for plugging certain abandoned wells when an operator cannot be located.

### **Recommendation II.16.**

The Review Team recommends that the state review their current bonding requirements and consider instituting a bonding program which would include an increased amount for graduated blanket bonds to include more wells and may also include an amount of bond which varies according to the well depth, deep wells tend to be more expensive to plug than shallow wells. (2000 Guidelines, Section 4.2.4.)

## **Waste Tracking**

### **Finding II.17.**

The Review Team finds that the oil and gas program does not have any certification for E&P waste haulers. The Department of Transportation handles this issue.

### **Recommendation II.17.**

The Review Team recommends that the state develop a mechanism to assure that waste haulers use a method such as registration, record-keeping and a chain of custody to insure proper handling of E&P waste. (2000 Guidelines, Section 4.2.5.)

### **Finding II.18.**

The only sites being utilized in Tennessee for E&P waste disposal are one public landfill and six UIC wells. The Division of Oil and Gas witnesses the plugging of UIC wells and the Division of Solid Waste maintains records of landfills.

## **Data Management**

### **Finding II.19.**

The Review Team finds that the current electronic data management system is inadequate to manage the oil and gas program. The oil and gas program currently has a limited number of databases which have been developed primarily using the Microsoft Excel and Access databases. Data tends to be old and unreliable and no quality control procedures are utilized. Field inspectors can not access that data via the internet.

### **Recommendation II.19.**

The Review Team recommends that the program either develop or purchase a commercially available software management program such as RBDMS in order to electronically manage data. Benefits would accrue to many oil and gas program functions including, permitting and enforcement, as well as help provide public access to data. (2000 Guidelines, Section 4.2.7.2.)

## **Personnel and Funding**

### **Finding II.20.**

The Review Team finds that the state currently has a total of five employees to administer the oil and gas program. Of those five, three are field inspectors and work out of their homes. Field Inspectors do have equipment, vehicles, GPS units, computers and testing equipment. They do not have equipment to detect for the presence of hydrogen sulfide. The field inspectors do not have any formal training or any requirements for having specific oil and gas experience before obtaining their position. Of the remaining two employees, one is the oil and gas program supervisor and one is an administrative assistant.

Funding for the program is provided through the Water Division but no formal budget exists for the Section of Oil and Gas. The amount of funding is about \$360,000 per year.

### **Recommendation II.20.**

The Review Team finds that the staff is insufficient to properly administer the program and recommends the state provide adequate funding to the program.

Funding is necessary in order to hire and train staff with the expertise and training to properly administer a technical program. The staff is working hard and is well intentioned but because of staffing and funding limitations, is only able to work on permitting issues. The size of the staff is insufficient to develop written policies which would aid in the administration of the other program elements such as compliance and enforcement and training. Currently, the staff can only undertake limited compliance and inspection and enforcement actions in order to ensure the proper administration and handling of E&P wastes.

The state did undertake a study which indicated that a staff of six to nine individuals could effectively operate the program. The Review Team recommends that the state increase the level of funding and support to the program. Increasing the number of staff and the training can help assure a properly and adequately administered oil and gas program. An increase in the effectiveness of the program would benefit the state of Tennessee. Adequately administering the program would help assure the protection of the environment of the citizens, and in addition, would help promote a viable oil and gas industry. (2000 Guidelines, Section 4.3.1.1.)

#### **Finding II.21.**

The Review Team finds that the oil and gas program currently has access to an attorney through the Attorney General's office. In addition, the program has available the typical range of administrative enforcement tools. The tools include the ability to assess monetary penalties under Rule 1040-2-12.01. Penalties can be assessed up to \$1,000 per day for each day the violation exists and assess up to \$10,000 for willful violations. The right to appeal to an administrative board is set forth in Rule 1040-6.1., and appeal procedures are set forth in the Tennessee Uniform Administrative Procedures Act. The program can forfeit bonds under Code Section 60-1-705, and terminate, "red tag," production of any wells in violation under Rule 1040-2-12.02. The state only undertook three enforcement actions last year and assessed about \$3500 in penalties.

#### **Recommendation II.21.**

The Review Team recommends the program enter into a Memorandum of Understanding with the Attorney General's office to formalize the process of securing legal assistance in enforcement actions. In addition, the Review Team recommends that the state provide adequate funding to increase the number and training of field inspectors to assure compliance with the program requirements. (2000 Guidelines, Section 4.3.1.2.)

#### **Finding II.22.**

The Review Team finds that the oil and gas program has only limited technical expertise in oil and gas matters. The program does not have a petroleum engineer on staff. A minor variation in casing requirements is not able to be currently evaluated by the staff.

### **Recommendation II.22.**

The Review Team recommends that state undertake measures, including a review of salaries sufficient to attract qualified personnel, to increase their access to specific oil and gas technical expertise. Such measures could include hiring a petroleum engineer or engaging a petroleum engineering consultant on a part-time basis or as needed basis to provide technical assistance to the program. (2000 Guidelines, Section 4.3.1.3.)

### **Finding II.23.**

The Review Team finds that the oil and gas program has three oil and gas field inspectors. The civil service position for an oil and gas inspection has no specific requirement for oil and gas industry experience. In addition, field inspectors receive no specific training because of inadequate funding for the oil and gas program. The oil and gas inspectors receive only on the job training. The three field inspectors have attended a Site Coordinator Program sponsored by the department. Currently, the field inspectors do not have a field manual, but do have vehicles and other inspection equipment. The field inspectors have limited access to the internet and no access to a database of relevant data for handling their jobs.

### **Recommendation II.23.**

The Review Team recommends that the state require specific oil and gas experience prior to hiring an inspector. Oil and gas development is technical and the state should adequately fund the program to afford adequate training to the inspectors for safety and related technical issues.

### **Finding II.24.**

The oil and gas program is developing a site coordinator training manual.

### **Recommendation II.24.**

The Review Team urges the program to complete that manual. (2000 Guidelines, Section 4.3.1.4.)

### **Finding II.25.**

The Review Team finds that no formal training exists for the staff. No funds are available for training. The only training program that oil and gas program personnel attend is a Site Coordinator Training program that is sponsored by the department.

**Recommendation II.25.**

The Review Team recommends that the state fund the oil and gas program to a sufficient level to fund training for the staff. Training opportunities could be accomplished, in part, by the State of Tennessee becoming a member of the Interstate Oil and Gas Compact Commission (“IOGCC”) in order to take advantage of training opportunities underwritten by the IOGCC. In addition, the state may be able to leverage funding opportunities for well plugging and orphan sites for which the IOGCC is currently seeking on a national level. Well service companies, trade organizations and other industry related entities sponsor training which the program could attend. (2000 Guidelines, Section 4.3.1.5.)

**Finding II.26.**

The oil and gas program obtains funding from the Division of Water Resources. These funds are in the amount of approximately \$327,000 to \$360,000 per year. No formal process exists to obtain funding other than a generalized request to the Water Division.

**Recommendation II.26.**

The Review Team recommends that program investigate mechanisms to obtain specific line item funding from the State of Tennessee. Funding could occur through the Water Division, but the recommendation is for the oil and gas program to have a specific budget. The current means of funding the program is inadequate for operating the oil and gas program, because insufficient funds are available to hire and train sufficient staff to operate the various program elements for permitting, compliance inspection, and enforcement. (2000 Guidelines, Section 4.3.2.)

### **III. TECHNICAL CRITERIA (2000 Guidelines Section 5)**

#### **General Criteria**

Tennessee's statutory authority for management of exploration and production wastes is contained in § 60-1-202, Title 60, Chapter 1 (Production of Oil and Gas) of the Tennessee Code which enumerates the powers granted to the state oil and gas board. Those powers include authorization "To make rules, regulations, and orders..." to address various aspects of oil and gas operations including "To require that any person conducting oil or gas operations...conduct such operations in a manner which will prevent or mitigate adverse environmental impacts, such as soil erosion and water pollution..." The Rules of the Tennessee Oil and Gas Board (§ 1040-1-1 et. seq.) utilize the granted authority to address specific aspects of waste management.

The Board's rule establishes general and specific performance standards for handling of wastes commonly associated with oil and gas drilling and production. Under the rules, each drill site is required to have a Site Coordinator who is trained in environmental response and operational safety. The rule addresses pollution control and avoidance, and provides a broad base for regulatory prevention of waste management problems.

Wastes that result from drilling or production activities are required to be contained and handled in pits or tanks in a manner that will prevent contamination of surface or ground water. The containment facilities are subject to siting and disposal restrictions as defined in the Board's rule. All operators are required to conduct operations and maintain equipment so as to reduce the danger of explosion, fire or waste, and all waste is to be disposed of in a manner that will avoid creating pollution of streams or fresh water strata.

Disposal of E&P wastes in landfills is allowed if the landfill in question is licensed to accept that waste. Landfill disposal is controlled by the Tennessee Division of Solid Waste and is not the responsibility of the Oil and Gas Board. The Solid Waste Division did not participate in the STRONGER review.

The Tennessee State Oil and Gas Board rules are sufficiently flexible to allow for site-specific and regional differences affecting siting, construction and operation of waste storage facilities that are associated with drill sites and production operations. As examples, wastes may be collected in lined pits or tanks, and secondary containment structures can be tailored to the location of the operation.

#### **Siting Criteria**

Tennessee addresses siting of exploration and production operations and their associated waste management facilities through rules and enforcement. Pits, for example, must be constructed so that waste fluids can drain directly into the pit rather than into the state's waters. No pit may be constructed so that any part of it is within 25

feet of the normal high water line of any lake or stream. Pits used for cleaning out wells must be at least 100 feet from any fire hazard or dwelling, and no well may be drilled closer than 200 feet from a dwelling or 100 feet from a public road, although the distance to a dwelling may be waived with written and notarized agreement from the dwelling owner. Also, secondary containment pits are required for any permanent storage tank within corporate limits, within 600 feet of a dwelling or highway, within 1,000 feet of a school or church, or within 100 feet of a stream. Other tanks must be walled, ditched or connected to sumps capable of containing any potential spill. Because site construction takes place prior to permit issuance, the siting of pits, tanks and other waste management facilities are not part of the permit package. The sites are inspected prior to permit issuance and must meet agency approval before the permit to drill is issued. Field inspectors are available to provide operator assistance on such matters as pit and tank placement.

### **Waste Characterization**

Board rules require that all waste is to be disposed of in a manner that will avoid polluting streams and fresh water strata (1040-3-3-.01(5)). Further, the rules specifically require that no oil, condensate, salt water or other fluid substance may be disposed into any body of water (1040-3-3-.01(6)), that all wells will have the equipment and containers or lined pits necessary to prevent spillage (1040-3-3-.01(7)), and that no salt water shall be discharged to land surfaces where it could enter surface water of ground water. There are, however, no waste characterization practices in use. The state does not provide funding for testing by the oil and gas office, and there are no statutory or regulatory requirements for testing by operators.

#### **Finding III.1.**

Tennessee rules do not have adequate requirements for definition and characterization of exploration and production wastes.

#### **Recommendation III.1.**

The Review Team recommends that the Oil and Gas Board develop rules or required procedures to characterize wastes to facilitate proper handling and disposal. (2000 Guidelines, Section 5.2.1.)

### **Waste Management Hierarchy**

The oil and gas program has not developed a waste management hierarchy, largely because substantial portions of disposal processes are handled by other agencies in the state (e.g., the office of solid waste). Fluid disposal is addressed in the Board's rules to the extent that disposal into waters or in a manner that would cause pollution is prohibited, but the rules do not extend to actual disposal methods for anything other than salt water. Disposal of salt water by underground injection is the "preferred method" of the rules (1040-4-1-.12), and no salt water may be discharged to

any land surface where it can enter surface water or ground water. This effectively eliminates any ground dispersal of salt water.

The oil and gas program is in the process of developing a general permit document for handling and disposal of pit wastes. This document is designed to clarify requirements relating to pit fluids and their final disposal. It is an important process because there seems to be a significant lack of understanding of requirements as evidenced by responses during the STRONGER on-site interview. The document also provides an opportunity to develop a hierarchy for secondary use and or source reduction of pit wastes associated with the drilling and completion process.

Salt water disposal by injection is not a part of the Board's responsibilities. Tennessee does not have primacy for the Underground Injection Control program in the state, that being the responsibility of the Environmental Protection Agency. Because there is no required or practiced characterization of produced brines, there are no disposal, reuse or reduction practices in place. There are also no requirements for tracking of wastes from source to final disposal.

### **Finding III.2.**

Tennessee has not developed a waste management hierarchy to focus on protection of public health and the environment.

### **Recommendation III.2.**

The Review Team recommends that the Oil and Gas Board develop a hierarchical system that includes source reduction, recycling and treatment of E&P wastes to better manage handling and disposal of those wastes. (2000 Guidelines, Section 5.3.)

### **Recommendation III.3.**

The Review Team commends the oil and gas program for its attempts to develop a general permit for disposal of pit wastes and recommends that the final document include waste reduction, recycling and reuse provisions. (2000 Guidelines, Section 5.3.)

### **Recommendation III.4.**

The Board should require that all wastes be tracked by the producer from source to final disposal. Operators should be required to maintain records of waste movement for examination by inspectors. (2000 Guidelines, Section 5.3.3.)

## **Technical Criteria for Pits**

Tennessee allows the use of reserve and production pits on oil and gas operations. Reserve pits are used during the drilling process for the circulation and capture of drill cuttings and circulated waters, both those introduced during the drilling process and

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those encountered down-hole. Reserve pits are used to bury cuttings upon closure. After drilling, the reserve pit usually becomes the production pit and is used for flow back after stimulation and as a receptacle for fluids produced during testing. Tennessee requires liners for all pits, so percolation pits are not allowed. While evaporation pits are acceptable under the Board's rules, the climate is not conducive to this method of disposal, and the option is seldom used. Work-over pits are allowed on well sites when drilling pits have been eliminated.

While pits are addressed in the Board's rule, and operators are required to comply with all associated requirements, pits are not part of Tennessee's permitting process. Permits to drill are issued after drill sites, including pits, are built and have passed inspection. Operators are free and encouraged to build additional pits on any site where the existing pit is in danger of overflowing.

### **Finding III.5.**

Permits or other authorizations are not required prior to construction of pits making their management and disposal difficult to track.

### **Recommendation III.5.**

The Review Team recommends that the Board implement permit requirements regarding pits. (2000 Guidelines, Section 5.5.2.)

Tennessee's rule has multiple requirements relating to construction of pits, and all are general in nature and provide ample latitude for enforcement by the office of oil and gas. Pits are to be designed and constructed so as to allow waste to drain only into the pit, and so that no wastes can escape into the environment, must include no discharge devices such as pipes or weirs (1040-3-3-.02.2(g)), and must be large enough to contain any plausible spill (1040-3-3-.01(7)). There are no rules or guidelines specifying construction details such as depth to groundwater, berm height or freeboard. Operators are required to build additional pits or move in tanks if it seems likely that a pit will overflow.

All pits are required to be lined with heavy gauge seamless plastic sheets or other artificial liner approved by the Supervisor (4040-3-3-.01.8(a)). Multiple sections of the rule refer to the requirement for "lined pits", and temporary ditches or pits used to store or transport salt water are required to be lined. The rule does not include liner material specifications or performance standards.

Pit security to protect the public, domestic animals or wildlife has not been recognized as a problem in Tennessee and, as such, there are no rules or practices that address fencing or netting of pits.

### **Finding III.6.**

Tennessee is commended for requiring that all pits be lined to prevent contamination of the environment.

### **Finding III.7.**

The Board does not have detailed requirements for construction of pits.

### **Recommendation III.7.**

The Review Team recommends that the Oil and Gas Board develop and promulgate rules for pit construction to include such aspects as berm construction, slope stability, etc. The requirements should include minimum liner specifications. (2000 Guidelines, Section 5.5.3.1.)

All fluids from drilling or completion activity must be captured in a pit or other containment device. There are, however, no restrictions regarding other substances that can be placed in the pits. Likewise, there are no requirements for freeboard or other means of prevention of discharges due to unforeseen events. As mentioned above, the Board rule requires operators to construct extra pits or transfer fluids to tanks if a pit is likely to overflow.

The lack of staff prevents the office of oil and gas from performing regular inspections of pits to ensure that they meet all operating and structural integrity requirements as specified in the Guidelines. The Board's rule does not specifically require operators to conduct regular inspections or pit maintenance.

Operational requirements for pits are geared toward containment and prevention of pollution by contained fluids. The rule does not address removal of wastes including oil.

### **Finding III.8.**

The Board does not have specific operational requirements for pits beyond the requirement that waste fluids be placed in pits. There are no requirements for waste types, maintenance of freeboard or liner integrity.

### **Recommendation III.8.**

The Review Team recommends that the Board develop operational rules to include all items listed in the Guidelines. (2000 Guidelines, Section 5.5.4.)

The Board's rule requires that all pits must be drained of water and back filled with dirt as soon as they are no longer needed for drilling or testing (1040-3-3-.02(3)). The Surface Reclamation portion of the rule requires that, except for active work areas, operators shall drain and fill all pits that are not needed for production purposes within 30 days of initial disturbance. In practice, all pits meet the guideline recommendation that they be closed within 12 months of cessation of drilling operations. The rule does not provide guidance or technical standards regarding method of closure other than backfilling.

Removal and handling of pit liquids are not addressed in the Board's rule. Because authority for disposal of wastes resides with other agencies, the oil and gas office does not require testing or tracking of pit wastes, nor do they have control over or official knowledge of methods of disposal. The office relies on the prohibitions of pollution in the rule but has difficulty enforcing this because there are no notification requirements for pit disposal.

The oil and gas program has records of all modern wells and, in accordance with the guidelines, the need for permanent records of pit locations is satisfied. The office does not require permits for drill sites, so the precise locations of pits are not preserved.

### **Finding III.9.**

There are no regulations governing the disposal of E&P wastes in pits at closure.

### **Recommendation III.9.**

The Review Team recommends that the Oil and Gas Board develop rules for the testing and disposal of pit contents and for pit closure as outlined in the Guidelines. (2000 Guidelines, Section 5.5.5.)

## **Technical Criteria for Landspreading**

The Tennessee Oil and Gas rule contains no provisions for landspreading of exploration and production wastes. Because most wastes are the responsibility of other agencies, the oil and gas office has not, to date, found the necessity to develop landspreading rules. As previously mentioned, the office is developing a general permit for fluid discharge from pits, and may consider landspreading as a disposal method.

## **Technical Criteria for Burial and Landfilling**

As with landspreading, the Tennessee rule has no provisions for or restrictions on burial or landfilling of oil and gas wastes. The Surface Reclamation section of the rule (1040-2-9-.05) states that "All drilling supplies and equipment, trash, discarded materials and other refuse not contained and covered in the reclaimed pits shall be removed from the site", implying that burial of such wastes is allowed although such wastes are not characterized or restricted. Solid wastes are generally controlled by Tennessee's solid waste division. That division is responsible for ensuring that wastes are properly handled and that they are disposed in a facility that is properly licensed to receive oilfield waste. The solid waste division did not participate in the review.

## **Technical Criteria for Roadspreading**

Again, as with landspreading, burial and landfilling, The Tennessee Gas and Oil Board rule does not address roadspreading as a disposal method for exploration and production wastes. The general permit for fluid discharge from pits may address this alternative.

### **Finding III.10.**

The Board rules do not address landspreading, roadspreading or other potential waste reduction , recycling and alternate disposal methods.

### **Recommendation III.10.**

The Review Team recommends that the Board expand its proposed general permit for disposal of pit fluids document to include processes that would gain beneficial use from wastes. (2000 Guidelines, Section 5.8.1.)

## **Technical Criteria for Tanks**

Tank storage in Tennessee is mostly used for waters collected in conjunction with gas and oil production and for crude oil and wastes associated with crude oil. The state has prohibitions against pollution of waters and direct discharge to waters, but does not enforce the federal SPCC requirements.

The permit to drill that is required for all modern operations in Tennessee provides the state with location information from which tank locations can be inferred. There is no information collected regarding tank capacity, age or construction material. While there are no specific requirements that prevent tanks from being placed in streams, siting and secondary containment requirements effectively prevent such locations. All tanks are subject to requirements for spill prevention or control in the form of secondary containment requirements and required equalizer lines.

While construction standards for tanks are absent from the Board's rule, operation of tanks so as to prevent spillage and pollution are addressed in a significant manner. Tanks or batteries that are to be located in areas where they may pose special hazards (see Siting Criteria, above) are required to be protected by a containment pit designed to hold any or all spillage from the tanks. Construction details for the pits are shown in and are a part of the rule. Tanks at all other locations are required to be surrounded by a retaining wall or ditched to a sump capable of containing any spill from the tank or tanks. Additionally, fill lines are to be attached in such a manner as to prevent spray into the atmosphere and equalizer lines are to be placed between adjacent tanks to prevent overflowing. Valves are to be guarded by locks or have their handles removed to prevent unauthorized access and vandalism. There are no requirements for tanks to be covered, but in practice, all modern tanks are reportedly of the covered type.

In accordance with the guidelines, Tennessee's reclamation rules require that all production equipment, including tanks, be removed within 30 days of plugging a well. This is part of the required restoration of the site. The Board's rule does not address the handling of residual materials that may be in the tanks and require disposal. Such materials, which are a very small portion of the exploration and production waste stream, are generally controlled by other agencies.

**Finding III.11.**

Tennessee's tank management program is commendable but doesn't address closure and waste disposal.

**Recommendation III.11.**

The Review Team recommends that the Board assess the need for specific requirements for closure of tanks including disposal of associated wastes. (2000 Guidelines, Section 5.9.1.)

**Technical Criteria for Commercial and Centralized Disposal Facilities**

Tennessee has landfills that accept oil-contaminated soils, but these facilities and materials that go to them for disposal are regulated by the Tennessee solid waste division. There are no centralized or commercial disposal facilities for disposal of oilfield wastes. There are Class II injection wells that accept waste from multiple operators, but these facilities are under the primacy of the U. S. Environmental Protection Agency. The Tennessee office of oil and gas is responsible for proper plugging of UIC wells upon abandonment.

## **IV. ABANDONED SITES (2000 Guidelines Section 6)**

The Tennessee oil and gas program has an inventory of abandoned wells that was developed in 1999 by the Tennessee Oil and Gas Association. Although the state feels the list is fairly complete, the database is limited with respect to query abilities. Field inspectors have added to the list when wells are found during routine inspections.

Sources of income for the plugging fund include penalties and bond forfeitures. The program currently has \$264,000 in a dedicated fund. A contract bid system is used to plug 30 to 40 abandoned wells per year at a cost of \$700 to \$2000 for shallow wells without site remediation. Bids allow for salvage of equipment when present. Outside of the abandoned well program, industry plugs 100 to 150 wells each year. The 300 wells associated with the Big South Fork National River and Recreation Area are being plugged with federal funds.

The program prioritizes the remediation of abandoned sites depending on the presence of tank batteries and pits that may still contain waste, potential for release, and costs of closure. Limited staff time and budget constraints lends itself to a more reactive program than a proactive program. There is an obvious and critical need for increased budget for additional staff to manage and improve the database(s) and perform risk analyses of sites on the inventory.

### **Finding IV.1.**

The Board does not have a specific definition for abandoned sites but has various rules that address when and how wells are classified as abandoned. For example, the program considers forfeited bonds and whether the well needs to be plugged.

### **Recommendation IV.1.**

The Review Team recommends that the Board develop a formal definition of “abandoned site”. (2000 Guidelines, Section 6.2.)

### **Finding IV.2.**

Although, the oil and gas program does have an abandoned well inventory for the State, they do not have a written policy or procedure concerning the identification of abandoned wells or sites.

### **Recommendation IV.2.**

The Review Team recommends that the oil and gas program develop a written policy or procedure for updating the inventory that could include such concepts as notification of the last known responsible party, providing legal notice, and dedication of staff time for improving the database contents and descriptors, as well as tracking those sites that have been remediated. (2000 Guidelines, Section 6.3.)

### **Finding IV.3.**

With the increase in gas production outgrowing the gas transmission lines, some oil and gas wells are left idle for longer periods of time than allowed and are thus classified as abandoned wells.

### **Recommendation IV.3.**

The Review Team recommends that Board develop a regulatory program that allows for a classification of temporary abandonment of both oil and gas wells to address this type of situation, including the concept of bona-fide future use. (2000 Guidelines, Section 6.3.)

### **Finding IV.4.**

Sites included on the abandoned site inventory could be resolved by adoption or other change in ownership, but no formal procedure is in place.

### **Recommendation IV.4.**

The Review Team recommends that the state reassess their evaluation of what constitutes an abandoned well. Simply doing so may decrease the number of abandoned wells, which are not abandoned per se but are merely sitting and waiting completion and are not causing any environmental harm or harm to the public health. The Review Team recommends that the state investigate developing some type of “working well adoption program” that might assist in allowing operators to take over abandoned wells. (2000 Guidelines, Section 6.3.)

### **Finding IV.5.**

The oil and gas program has a very limited budget for state-initiated plugging of abandoned oil and gas wells derived from penalties and bond forfeitures. The program has not formally considered additional fees that could be dedicated to the plugging fund and is interested in proven concepts.

#### **Recommendation IV.5.**

The Review Team recommends that the oil and gas program develop additional funding method(s), such as a production fee, that may be a more reliable or constant source and that will accumulate more money to the plugging fund. (2000 Guidelines, Section 6.4.)

#### **Recommendation IV.6.**

The Review Team recommends that the program should periodically review the financial assurance and plugging costs to assure that adequate funding exists to remediate known abandoned sites. (2000 Guidelines, Section 6.4.)

#### **Finding IV.7.**

Both limited staff and budget constraints prevent the program from performing detailed risk analysis beyond basic issues of imminent harm to public health and the environment.

#### **Recommendation IV.7.**

The Review Team recommends that the State consider increasing the budget for the program for the purpose of developing formal procedures, risk analyses related to site remediation, and database management. (2000 Guidelines, Section 6.4.)

#### **Finding IV.8.**

The oil and gas program has an informal and reactive system for scheduling state-initiated activity, but does not have a formal, written prioritization policy. When staff time allows, the program can make site by site evaluations to determine cost effectiveness compared to environmental benefit, as well as the overall well/site condition.

#### **Recommendation IV.8.**

The Review Team recommends that the program develop a more proactive system with formal prioritization and scheduling of site remediation focused on risk categories related to the potential threat to human health and the environment, such as potential for imminent release, nature and extent of contamination, proximity to populated areas, and proximity to surface, ground water, and environmentally sensitive areas. (2000 Guidelines, Section 6.5.)

**Finding IV.9.**

The oil and gas program has an informal list of criteria for determining which wells and sites will be managed in the abandoned well program.

**Finding IV.10.**

The program has flexibility and discretion to consider the factors associated with the individual sites when considering what constitutes a proper plugging plan and which sites will be remediated a priori.

**Finding IV.11.**

The oil and gas program does not keep a separate log of those sites on the Inventory that have been remediated.

**Recommendation IV.11.**

The Review Team recommends that once remediation of an abandoned site has been completed, reports on how the site was remediated should be maintained by the regulatory agency. (2000 Guidelines, Section 6.6.3.)

**Finding IV.12.**

Although the rulemaking portion of the abandoned well program allows for public involvement, the program stated that the prioritization, characterization, and scheduling of site remediation does not formally include the public beyond the applicable permittee.

**Recommendation IV.12.**

The Review Team recommends that the program develop a public participation, including landowners at the site, process for the abandoned site program, such as adding a site to the inventory, changing the priority of remediation of site(s), and request additional site remediation. (2000 Guidelines, Section 6.7.3.)

**Finding IV.13.**

The public has access to the data maintained in the state inventory of abandoned sites and any other data the program has, such as site inspection reports, permit files, logs, bonding, and well history. Access to information related to well location, extent and degree of contamination, and method of remediation is limited by the program's current data management system.

**Recommendation IV.13.**

The Review Team recommends that the program evaluate other data management systems that would enhance the extent and descriptors for the Abandoned Site Inventory. (2000 Guidelines, Section 6.7.1.)

**Recommendation IV.14.**

The Review Team recommends that the program publish the abandoned well list as part of the requirements for public participation. (2000 Guidelines, Section 6.7.1.)

**Finding IV.15.**

The program finds that the bonds have been successful as one mechanism the State uses to prevent new wells from being added to the Inventory. In particular the reclamation bond that went into effect in 1988 has caused operators to keep their wells in operating condition because they have more financial risk associated with the well.

**Recommendation IV.15.**

The Review Team recommends that the program continue to evaluate financial security options to minimize the likelihood that new wells are added to the abandoned well inventory. (2000 Guidelines, Section 6.8.c.)

**Finding IV.16.**

The Review Team commends the program worked with the federal government during the development of scoping documents for site remediation of the abandoned wells located in the Big South Fork National River and Recreation Area.

## **V. NATURALLY OCCURRING RADIOACTIVE MATERIAL (NORM) (2000 Guidelines Section 7)**

Oil and gas production and processing operations sometimes cause NORM to accumulate at elevated concentrations in by-product waste streams. The primary radio nuclides of concern are isotopes of radium that originate from the decay of uranium and thorium naturally present in the subsurface formations from which oil and gas are produced. The production wastes most likely to be contaminated by elevated radium include produced water, scale, and sludge. (DOE)

In Tennessee, recent focus on NORM related issues have been directed to the Big South Fork National River and Recreation Area in Scott County near the Kentucky/Tennessee border. The USGS 2000 open file report 00-419 describes radionuclide studies of several oil and gas production areas in the Big South Fork. The report indicates the only readings above background occurred at a brine pit tied to barium sulfate precipitation. The lack of readings elsewhere in the oil and gas production zone was explained by either a lack of water production and subsequent plating of barium sulfate in the piping of oil wells or lack of Pb-210 plating in gas production equipment.

The Oil and Gas Section does not have primary jurisdiction over radioactive materials.

### **Finding V.1.**

Although a regional study has been done on oil and gas exploration and production issues including NORM at the Big South Fork area, the State has not performed a study state-wide mainly because production is not water-driven and there are no enhanced recovery operations.

### **Recommendation V.1.**

The Review Team recommends that the program develop a state-wide assessment of the potential for NORM related issues, especially with respect to those wells that may be developed in the future that are water-driven, enhanced, or otherwise encounters formations known to have radioactive materials that could accumulate in surface equipment and piping and determine if an oil field NORM regulatory program is warranted. (2000 Guidelines, Section 7.2.)

## **VI. STORMWATER MANAGEMENT**

### **(Proposed Revision to 2000 Guidelines Section 8)**

Tennessee recognizes the Energy Policy Act of 2005 stormwater exemption and therefore, has not applied NPDES stormwater regulation to oil and gas sites. However, Tennessee does apply the NPDES stormwater rules to transmission lines i.e., those lines that extend from compressors to markets. The state also has a NPDES Permit for discharges of stormwater associated with construction activities, Permit No. TNR 100000, which was issued on June 16, 2005. It was effective on June 17, 2005 and will expire on May 30, 2010

Tennessee Oil and Gas Rule 1040-2.6.04, "Environmental Protection," sets forth statutory authority for preventing and mitigating adverse environmental impacts such as soil erosion and water pollution. The rule states that all areas disturbed by the operation, including access roads shall be reclaimed. The rule further states that all access roads shall be constructed in such a manner as to reduce erosion to a practical minimum. Sediment ponds, berms, diversion ditches, hay bales, and other measures designed to prevent erosion and discharge from well sites shall be taken to prevent or minimize soil erosion and pollution of surface waters. The state does not have specific regulatory requirements for a formal best management practices.

Part of the well permit application requirement is to include a plan for erosion control for oil and gas sites. In addition, a reclamation bond in the amount of \$1,500 is required by Rule 1040-2-1.03, "Reclamation Bond." Five hundred dollars of the \$1,500 is refunded upon achievement of certain milestones. Reclamation bonds have been forfeited.

The state has a Site Coordinator Training Program for the staff and the public. This site training includes practices for erosion control. The oil and gas inspectors have taken the Site Coordinator Training program.

#### **Finding VI.1.**

The Review Team finds that the state is doing a good job in developing a stormwater management program.

#### **Recommendation VI.1.**

The Review Team recommends that the state provide adequate resources to implement its stormwater management program. (2000 Guidelines, Proposed Revision 8.1.)

## **Appendix A**

### **Glossary of Acronyms**

BMP	Best Management Practices
DOE	United States Department of Energy
E&P	Exploration and Production
FEMA	Federal Emergency Management Agency
IOCC	Interstate Oil Compact Commission
IOGCC	Interstate Oil and Gas Compact Commission
MOU	Memorandum of Understanding
NORM	Naturally Occurring Radioactive Material
NPDES	National Pollution Discharge Elimination System
RBDMS	Risk Based Data Management System
SPCC	Spill Prevention Contingency and Countermeasures
STRONGER	State Review of Oil and Natural Gas Environmental Regulation, Inc.
UIC	Underground Injection Control
USEPA	United States Environmental Protection Agency

**Appendix B**  
**Completed Tennessee Questionnaire**

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

State Tennessee

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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

Waste Management Practices	Number of Facilities	Volume Managed Annually	Basis for Volume Determination
Pits:			
Drilling	<b>Unknown</b>		
Production	<b>Unknown</b>		
Special Use	<b>Unknown</b>		
Landspreading	<b>None</b>		
Roadspreading	<b>None</b>		
Tanks	<b>Unknown</b>		
Commercial Facilities:			
Multipractice	<b>None</b>		
Landfarms	<b>None</b>		
Tank Bottom Reclaimers	<b>None</b>		
UIC Surface Facilities	<b>6</b>	<b>Unknown</b>	
Oil-Field NORM	<b>None</b>		
Centralized Facilities (non-NORM)	<b>None</b>		
Oil-Field NORM			
Municipal Landfills Accepting E&P Waste	<b>1</b>	<b>Unknown</b>	
Underground Injection Surface Facilities			
Abandoned Sites			
Other			

## E&P Waste Management Matrix (cont.)

Waste Management Practice	Principal Agency	Primary Statute	Primary Rules, Regulations, or Orders	Applicable Guidelines
Pits:				
Drilling	TN Oil and Gas Bd	60-1-201	1040-2-6-.04	
Production	TN Oil and Gas Bd	60-1-201	1040-3-3-.02	
Special Use	TN Oil and Gas Bd	60-1-201	1040-4-1-.12	Disposal of Salt
Landspreading	None			
Roadspreading	None			
Tanks	TN Oil and Gas Bd	60-1-201	1040-4-1-.07	600ft from Road and dwelling, 1000ft Church 100ft stream
Commercial Facilities:				
Multipractice	None			
Landfarms	None			
Tank Bottom Reclaimers	None			
UIC Surface Facilities	Division of Water Supply	69-3-101	1200-4-6-.11	Integrity Test on casing
Oil-Field NORM				
Centralized Facilities (non-NORM)	None			
Oil-Field NORM	None			
Municipal Landfills Accepting E&P Waste	Solid Waste Division	68-203-1033 & 68-211-101	1200-1-7-01(2)	Special Waste Permit
Underground Injection Surface Facilities				
Abandoned Sites				
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]

A. **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]

B. **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]