Guidelines for the Review of State Oil and Gas Environmental Regulatory Programs

2019.2 Edition

STATE REVIEW OF OIL AND NATURAL GAS ENVIRONMENTAL REGULATIONS, INC.
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SECTION 1 | Introduction

1.1 Background

The 1980 amendments to the Resource Conservation and Recovery Act (RCRA) created an exemption to the federal hazardous waste program for oil and gas exploration and production (E&P) wastes pending completion of a study by the U.S. Environmental Protection Agency (EPA). In 1988, EPA completed its study and determined that these wastes should not be regulated as hazardous wastes. EPA's regulatory determination concluded that existing state and federal regulations were generally adequate, but that some regulatory gaps existed, and that enforcement of existing regulations was inconsistent. EPA proposed a three-pronged approach to address these concerns that included working with the states to encourage improvement in state regulations and enforcement programs. Further discussion of the regulatory determination follows in section 1.2.

In 1989, the Interstate Oil and Gas Compact Commission ("IOGCC") responded by offering to assist EPA by creating a state regulatory review process. The IOGCC created the Council on Regulatory Needs, bringing together state, environmental, and industry representatives to develop national guidelines for state oil and gas programs. In early 1990, the Council released a document entitled "EPA/IOCC Study of State Regulation of Oil and Gas Exploration and Production Waste". This document established guidelines that represented recommended criteria for regulatory programs. The Council also proposed to implement a process by which state oil and gas programs were reviewed in comparison with those guidelines.

In 1990, EPA provided a grant to the IOGCC to initiate state regulatory program reviews in comparison with the guidelines. Review teams were comprised of state regulatory officials, environmental representatives, and industry representatives. Representatives of other interested parties, such as federal agencies and tribal governments, were invited to observe the process. State reviews were conducted in states that volunteered for review. Recommendations were offered as blueprints for change to be considered by state legislators and regulators.

The Council recommended that the guidelines be reviewed and updated every three years. In 1994, the Council updated the guidelines and added sections regarding naturally occurring radioactive material (NORM) and abandoned wells.

In 1999 a multi-stakeholder organization was formed by the state review program participants to revitalize and carry the state review program forward. This organization is called State Review of Oil and Natural Gas Environmental Regulations, Inc. ("STRONGER"). STRONGER is a non-profit corporation that has been formed to educate regulators and the public as to the appropriate elements of a state oil and gas exploration and production regulatory program, and to compare various state programs against the guidelines developed by STRONGER and for the protection of public health, safety and the environment.

In 1999, STRONGER established five committees to review and update the 1994 version of the Guidelines. STRONGER incorporated the consensus recommendations of the committees, including a new section on performance measures in the 2000 Guidelines update. STRONGER again initiated revision and updating of the Guidelines in 2004, which resulted in the 2005 Guidelines. The 2005 Guidelines incorporate spill prevention and performance measures into the administrative criteria section and were expanded to include a new section on stormwater management.

In 2009 STRONGER formed a workgroup that developed guidelines for hydraulic fracturing that were finalized in 2010, and updated in 2013. STRONGER adopted guidelines for Air Quality in 2014, and updated the Air Quality Guidelines to address methane emissions in 2019. In 2015 STRONGER adopted guidelines for Reused & Recycled Fluids, as well as making minor updates to the General Criteria, Administration, Technical Criteria, NORM, and Hydraulic Fracturing sections. In 2017 STRONGER developed additional reused and recycled fluids guidance pertaining to pipelines used to transport produced water. In 2019 the STRONGER Board of Directors updated the Administrative and Technical Criteria.

Since 1990, 41 initial, follow-up, and single-topic state reviews have been conducted against the guidelines criteria: 12 under the 1990 edition guidelines, 5 under the 1994 edition guidelines, 11 under the 2000 edition guidelines, 2 under the 2005 edition guidelines, 7 single-topic reviews on hydraulic fracturing, 3 single-topic reviews on air quality, and 1 follow-up review under the 2015 edition guidelines. These states have implemented many of the recommendations from their respective state reviews, as documented in STRONGER's report entitled "A Report and History on the STRONGER State Review Process" (June, 2015).

1.2 EPA's Regulatory Determination for E&P Waste

The 1980 amendments to the RCRA required EPA to conduct a study of the environmental and potential human health impacts associated with E&P wastes and their associated waste management practices. EPA completed its two-year study in 1987. Based on the findings in the Report to Congress, and on oral and written comments received during public hearings in the spring of 1988, on June 30, 1988, EPA decided not to recommend federal regulation of E&P wastes as hazardous wastes under Subtitle C of RCRA (EPA 1988). The Agency gave the following reasons for its determination:

a. "Subtitle C does not provide sufficient flexibility to consider costs and avoid the serious economic impacts that regulation would create for the industry's exploration and production operations;

b. "Existing state and federal regulatory programs are generally adequate for controlling oil, gas, and geothermal wastes. Regulatory gaps in the Clean Water Act and UIC (Underground Injection Control) program are already being addressed, and the remaining gaps in state and federal regulatory programs can be effectively addressed

by formulating requirements under Subtitle D of RCRA and by working with the States;

c. "Permitting delays would hinder new facilities, disrupting the search for new oil and gas deposits;

d. "Subtitle C regulation of these wastes could severely strain existing Subtitle C facility capacity;

e. "It is impractical and inefficient to implement Subtitle C for all or some of these wastes because of the disruption and, in some cases, duplication of state authorities that administer programs through organizational structures tailored to the oil and gas industry; and

f. "It is impractical and inefficient to implement Subtitle C for all or some of these wastes because of the permitting burden that the regulatory agencies would incur if even a small percentage of these sites were considered Treatment, Storage, and Disposal Facilities (TSDFs)." (53 FR 25456, July 6, 1988).

In the determination, EPA found that "existing state and federal regulations are generally adequate...Certain regulatory gaps do exist and enforcement of existing regulation in some states is inadequate." To address those concerns, EPA announced a three-pronged approach that consists of:

- "Improving federal programs under existing statutory authorities in RCRA Subtitle D, the Clean Water Act, and the Safe Drinking Water Act;
- "Working with states to encourage improvements in the states' regulations and enforcement of existing programs; and
- "Working with Congress to develop any additional statutory authority that may be required."

1.3 State and Federal Relations

Periodic evaluations of state and federal E&P waste management programs have proven useful in improving the effectiveness of those programs and increasing cooperation between federal and state regulatory agencies. Stakeholder review mechanisms have demonstrated the need for establishment of a performance baseline against which E&P waste management programs can be evaluated. Those mechanisms have led to the identification of strategies that will improve communication and program understanding between the states and the federal government.

1.3.1 Strategies for Maintaining a Successful Relationship Between State and Federal

Agencies

As stated in EPA's regulatory determination for E&P waste, "…existing state and federal regulations are generally adequate to control the management of oil and gas wastes. Certain regulatory gaps do exist, however, and enforcement of existing regulations in some states is inadequate." The key is that overall state programs are adequate, and have improved since 1990 through adoption of recommendations from reviews, information sharing among the states and self-initiated program improvements. To address remaining gaps and build upon the success of the state review program, the focus of future efforts should be to utilize information developed from the reviews already conducted, augmented by new information developed by the stakeholders, to improve the performance of state regulatory programs.

The stakeholders — oil and gas producing states, public interest representatives, and industry representatives — have identified ten related strategies that enhance state and federal relationships.

a. Commitment to Work Cooperatively. The states and federal agencies should maintain a commitment to work cooperatively to improve the design, implementation, and enforcement of state and federal programs for managing E&P wastes. State and federal agencies should take steps to encourage open communications among state and federal agencies, the regulated industry, and other interested parties pertaining to the management and regulation of E&P wastes.

b. Recognition of Different Priorities. States should recognize the interest of federal agencies in achieving national goals and objectives and assuring adherence to federal statutory and regulatory requirements. At the same time, federal agencies should recognize the authorities, responsibilities, and capabilities of states to regulate certain activities within their borders.

c. Recognition of Different Statutory Objectives. Several of the federal statutes governing protection of the environment (*e.g.,* RCRA, Clean Water Act (CWA), Safe Drinking Water Act (SDWA), Clean Air Act (CAA)) provide for state implementation of certain elements with federal oversight. The objectives of and authorities granted by each statute differ. As such, it should be recognized that federal and state authorities and implementation approaches may differ.

d. Recognition of Regional Diversity. As discussed in the Report to Congress and the legislative history of the SDWA, variable approaches to the management of E&P wastes are necessary. These variable approaches are partly a result of the different geologic, hydrologic, or historic conditions in states and areas within a state, the diverse characteristics of oil and gas activities, and differences in state government structures among the producing states. Guidelines or criteria, whether issued by a federal agency such as EPA or as advocated by STRONGER, should be sufficiently flexible to permit states to take into account these varying conditions.

e. Baseline of Performance. The criteria adopted by STRONGER should be used by

federal or state agencies that are responsible for any portion of an E&P waste management program. These criteria should serve as a baseline of performance by which the effectiveness of programs can be judged. The criteria provide states flexibility to address unique conditions while accomplishing the goals set forth in Section 3.

f. State Responsibility for Enforcement. Enforcement is a critical component of a state E&P waste management program. Federal government involvement should occur only if the state agency fails to enforce the requirements or requests federal assistance.

g. State Program Review Process. The state program review process should continue to provide states with an independent evaluation of their E&P waste management programs using criteria adopted by the IOGCC and STRONGER.

h. Resolving Conflicts/Building Consensus. Where there are unresolved national issues or concerns regarding E&P waste management, a task force should be created which is similar in makeup and form to that established for the EPA's Office of Drinking Water Mid-Course Evaluation of Class II UIC programs. The creation of this task force would bring knowledgeable federal and state regulators together to discuss issues, to ascertain whether problems associated with these issues are real or perceived, and to decide how best to address the issues. This process should be based on the best available information and could be initiated by either the federal government or the states.

i. Effective Multi-Agency Coordination. Coordination among the state agencies is addressed in more detail in section 4.4. However, each state should recognize that coordination among various agencies is necessary for building and maintaining trust between the state agencies and the federal agency that has oversight responsibilities.

j. Technical and Financial Assistance. The federal government should provide technical and financial assistance to states to improve the design, implementation, and enforcement of state E&P waste management programs. Such assistance may be in the areas of training, enforcement, and data management.

SECTION 2 | Scope of the Criteria

2.1 General

a. These criteria are intended to guide states in assessing and improving their regulatory programs for E&P waste management, abandoned sites, naturally occurring radioactive materials (NORM), storm water management, hydraulic fracturing, air quality, and reused & recycled fluids. This document, therefore, sets out the elements of an effective program using "should" rather than the mandatory "shall", and “are encouraged to” for elements which are desirable, but which are not necessary for an effective program.

b. These criteria address waste management practices that are unique to E&P operations and wastes that were determined by EPA to be exempt from the hazardous waste management requirements of Subtitle C of RCRA. These narrowly defined wastes include drilling muds and cuttings, produced water and other wastes associated with E&P activities. The chemical and radiological characteristics of these wastes and the management practices associated with the storage, treatment, and disposal of these wastes are covered by these criteria. Wastes that are uniformly regulated by RCRA hazardous waste management requirements, as well as general industrial wastes such as solvents, off-specification chemicals, commercial products, household wastes, and office refuse are not addressed by these criteria.

c. These criteria apply to all new and currently operating E&P waste management facilities. In addition, the criteria in Section 6 apply to abandoned sites, the criteria in Section 7 apply to NORM, the criteria in Section 8 apply to storm water management, the criteria in Section 9 apply to hydraulic fracturing, the criteria in Section 10 apply to air quality, and the criteria in Section 11 apply to reused and recycled fluids.

d. These criteria do not address disposal of E&P wastes by injection or surface discharge when those waste management practices are regulated by EPA or by the states under authority of the federal SDWA and federal CWA, respectively. Brief descriptions of the regulatory frameworks authorized by those laws follow in Sections 2.2. and 2.3.

e. In addition to a review of provisions of the SDWA and CWA that are applicable to E&P wastes, this section also contains federal definitions of solid wastes and hazardous wastes and reviews EPA's waste mixture rule; lists examples of exempt and non-exempt E&P wastes; and describes general requirements for the management of non-exempt wastes. States may have different definitions for solid and hazardous wastes.

2.2 Class II Injection Wells

The SDWA is the primary federal statute that governs injection wells. The SDWA required the EPA to promulgate regulations to protect drinking water sources from contamination through underground injection, but directed the Agency not to prescribe requirements that

would impede oil and gas production. EPA established five classes of injection wells, categorized by purpose, potential for endangering drinking water, depth of injection, and characteristics of their injectate quality. Class II injection wells are broadly defined as related to oil and gas injection activities. Activities in this class relate to the disposal of fluids associated with oil and gas exploration and production, enhanced recovery operations, and the storage of liquid hydrocarbons.

Enhanced recovery describes all efforts to increase ultimate production of oil and gas from a reservoir, and this terminology will be considered to encompass other nomenclature in common usage such as pressure maintenance, secondary recovery, and tertiary recovery. All enhanced recovery techniques include methods for supplementing natural reservoir forces and energy, or otherwise increasing ultimate recovery. Such techniques include water injection, gas injection, gas cycling, and miscible chemicals and thermal processes.

Class II UIC programs are administered by the States where EPA has approved primary enforcement authority (primacy), or are directly implemented by EPA where the States have not sought or received approval for their UIC program. Amendments to the SDWA in 1980 further allowed a State with an existing regulatory program to obtain primary enforcement authority from EPA as long as the State was able to demonstrate that its program was effective in protecting underground sources of drinking water (USDWs), rather than adopting the complete set of Federal requirements. States with UIC program primacy receive federal funding for program implementation.

In general, EPA determines which fluids may be injected into Class II wells in direct implementation UIC programs. Primacy States follow their EPA-approved primacy agreements in ascertaining whether specific fluids are qualified for injection into their Class II wells.

Among the minimum requirements for Class II wells are:

a. Only approved fluids may be injected,

b. No injection may endanger a USDW,

c. No well may be used for injection without a permit, unless authorized by rule.

d. All injection wells must demonstrate mechanical integrity at least once every 5 years.

2.3 NPDES-Permitted Discharges

All point-source discharges of pollutants to surface waters of the United States must comply with the requirements of permits issued under the National Pollutant Discharge Elimination System (NPDES). The NPDES program is administered by EPA under the authority of the federal CWA or by the states through programs delegated by EPA. NPDES permits establish effluent limitations and monitoring requirements for discharges.

Effluent limits are based upon the more stringent of levels which can be achieved through the use of available technology, and levels necessary to meet EPA-approved state water quality standards.

The CWA requires NPDES permits for E&P waste discharges to surface water. Currently, effluent guidelines prevent most discharge to surface waters except the following categories:

a. Discharges to certain coastal areas;

b. Discharges of low-salinity produced waters which are of beneficial use in arid regions west of the 98th meridian; and

c. Discharges from stripper oil wells in certain areas.

2.4 Federal Definition of Solid Waste

a. In simplest terms, a solid waste is any material that is discarded or intended to be discarded. According to RCRA, solid wastes may be solid, semi-solid, liquid, or contained gaseous material. Commercial products are not solid wastes unless, and until, they are discarded. Commercial products and their releases may also be regulated under other statutes such as the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA), the Toxic Substances Control Act (TSCA), Superfund Amendments and Reauthorization Act (SARA), and the Occupational Safety and Health Act (OSHA).

b. EPA has also determined that produced water injected for enhanced recovery is not a waste for purposes of RCRA Subtitle C or D, since produced water used in enhanced recovery is beneficially recycled and is an integral part of some crude oil and natural gas production processes.

2.5 Hazardous Waste

Under RCRA, a solid waste may be designated as hazardous waste if it is specifically listed as a hazardous waste or if it exhibits one or more of the characteristics of hazardous wastes. (See 40 CFR 261).

2.5.1 Listed Hazardous Waste

a. EPA has listed numerous types or classes of solid wastes as hazardous waste because they typically exhibit one or more of the characteristics of hazardous waste, or have been shown to exceed certain human toxicity criteria, or contain any one of the chemical compounds or substances that are listed as hazardous constituents. (see 40 CFR 261 APP VIII.)

b. EPA's regulations contain four lists of hazardous wastes: 1) hazardous waste from non-specific sources; 2) hazardous waste from specific sources; 3) commercial chemical products that become acutely hazardous waste when disposed; and 4) commercial chemical products that become toxic wastes when disposed.

2.5.2 Characteristically Hazardous Waste

a. EPA considers any solid waste to be a hazardous waste if it exhibits any one of the characteristics of ignitability, corrosivity, reactivity, or toxicity.

b. The toxicity characteristic is determined by the toxicity characteristic leaching procedure (TCLP). The list of constituents includes eight heavy metals and thirty-two organic compounds

2.6 EPA's Identification of Exempt Exploration and Production Wastes

The list below identifies many, but not all, exempt wastes. In general, E&P exempt wastes are generated in "primary field operations" and are unique or intrinsic to exploration and production activities (e.g., drilling for, producing, and purifying crude oil and natural gas), and not as a result of maintenance or transportation activities.

All wastes generated in transportation and refining are non-exempt. EPA's regulatory determination for E&P wastes (see 53 FR 25453, July 6, 1988) found that the following wastes are exempt from RCRA hazardous waste management requirements:

- "Produced water;
- "Drilling fluids;
- "Drill cuttings;
- "Rig wash;
- "Drilling fluids and cuttings from offshore operations disposed of onshore;
- "Well completion, treatment, and stimulation fluids;
- "Basic sediment and water, and other tank bottoms from storage facilities that hold product and exempt waste;
- "Accumulated materials such as hydrocarbons, solids, sand, and emulsion from production separators, fluid treating vessels, and production impoundments;
- "Pit sludges and contaminated bottoms from storage or disposal of exempt wastes;

- "Workover wastes;
- "Gas plant sweetening wastes for sulfur removal, including amine, amine filters, amine filter media, backwash, precipitated amine sludge, iron sponge, and hydrogen sulfide scrubber liquid and sludge;
- "Cooling tower blowdown;
- "Spent filters, filter media, and backwash (assuming the filter itself is not hazardous and the residue in it is from an exempt waste stream);
- "Packing fluids;
- "Produced sand;
- "Pipe scale, hydrocarbon solids, hydrates, and other deposits removed from piping and equipment prior to transportation;
- "Hydrocarbon-bearing soil;
- "Pigging wastes from gathering lines;
- "Wastes from subsurface gas storage and retrieval, except for the listed non-exempt wastes;
- "Constituents removed from produced water before it is injected or otherwise disposed of;
- "Liquid hydrocarbons removed from the production stream but not from oil refining;
- "Gases removed from the production stream, such as hydrogen sulfide and carbon dioxide, and volatilized hydrocarbons;
- "Materials ejected from a producing well during the process known as blowdown;
- "Waste crude oil from primary field operations and production; and
- "Light organics volatilized from exempt wastes in reserve pits or impoundments or production equipment."

On March 22, 1993, EPA provided "clarification" regarding the scope of the E&P waste exemption. (see 58 FR 15284-15287.) EPA clarified the concept of primary field operations for crude oil and natural gas production. To fall under the scope of the exemption, an E&P waste must be generated in primary field operations and be unique or intrinsic to the production process. In addition, EPA stated that certain waste streams generated by oil and gas service companies may be "uniquely associated" with primary

field operations and as such are within the scope of the RCRA Subtitle C exemption. EPA further clarified that an exempt waste remains exempt regardless of the waste's custody transfer, and that the residual waste from the treatment of an exempt waste remains exempt (e.g., residual sediment and water from crude oil reclamation from exempt tank bottoms). EPA's clarification cautioned, however, that exempt crude oil reclamation and service-company wastes may not remain exempt if they are mixed with non-exempt materials or wastes. States should carefully review EPA's clarification along with EPA publication EPA530-K-01-004 (October 2002). (found at http://www.epa.gov/epaoswer/other/oil/oil-gas.pdf). EPA periodically issues interpretive letters regarding the oil and gas exemption. One such letter was issued in November 1993 and is referred to in EPA publication EPA530-K-01-004.

2.7 EPA's Identification of Non-exempt Exploration and Production Wastes

Non-exempt wastes include wastes that are not unique to E&P and wastes generated by transportation (pipeline and trucking) and service activities. While the following wastes are non-exempt, their regulatory status as "hazardous wastes" is dependent upon whether they are listed as hazardous waste or they exhibit a hazardous waste characteristic. Non-exempt wastes should be managed as described under Section 2.8. EPA's 1988 regulatory determination lists the following wastes as non-exempt:

- "Unused fracturing fluids or acids;
- "Gas plant cooling tower cleaning wastes;
- "Painting wastes;
- "Oil and gas service company wastes, such as empty drums, drum rinsate, vacuum truck rinsate, sandblast media, painting wastes, spent solvents, spilled chemicals, and waste acids;
- "Vacuum truck and drum rinsate from trucks and drums transporting or containing non-exempt waste;
- "Refinery wastes;
- "Liquid and solid wastes generated by crude oil and tank bottom reclaimers;
- "Used equipment lubrication oils;
- "Waste compressor oil, filters, and blowdown;
- "Used hydraulic fluids;
- "Waste solvents;

- "Waste in transportation pipeline-related pits;
- "Caustic or acid cleaners;
- "Boiler cleaning wastes;
- "Boiler refractory bricks;
- "Incinerator ash;
- "Laboratory wastes;
- "Sanitary wastes;
- "Pesticide wastes;
- "Radioactive tracer wastes; and Drums, insulation, and miscellaneous solids."

EPA did not specifically address, in its 1988 regulatory determination, the status of hydrocarbon-bearing material that is recycled or reclaimed by re-injection into a crude stream. However, under existing EPA regulations, recycled oil, even if it were otherwise hazardous, could be reintroduced into the crude steam, if it is from normal operations and is to be refined along with normal process streams at a petroleum refinery facility. Regulations addressing an exclusion for used oil are at 40 C.F.R 261.6(a)(4), and regulations addressing an exclusion for recovered oil are at 40 C.F.R. 261.4(a)(12) as revised.

2.8 Requirements for Non-exempt Wastes

a. EPA's hazardous waste regulations require that a hazardous waste determination be made for any non-exempt E&P waste. The determination may find the non-exempt waste either to be listed as a hazardous waste or to exhibit a hazardous waste characteristic. If a non-exempt waste is found not to be listed as a hazardous waste or not to exhibit a hazardous waste characteristic, it is a non-exempt non-hazardous waste.

b. If a non-exempt waste is not a listed hazardous waste, it should be tested whenever there is reason to believe it may exhibit one or more of the hazardous waste characteristics. Alternatively, a hazardous waste determination may be made based on knowledge of the process by which the waste is produced. Although there is no requirement that a non-exempt waste be tested to determine if it is hazardous, civil and criminal penalties may be imposed if the waste is not managed in a safe manner and according to regulations.

c. Depending on the actual hazardous waste quantity generated and accumulated on-site, RCRA hazardous waste management standards for generators may apply.

Additionally, treatment, storage, or disposal activities on-site may be subject to more stringent RCRA Subtitle C requirements, such as permitting and corrective action.

d. Non-exempt waste should also be segregated whenever possible from exempt waste. If the non-exempt waste was a listed hazardous waste, its mixture with an exempt waste could make the entire commingled waste stream subject to stringent RCRA Subtitle C requirements, including the requirement that the waste be disposed at a hazardous waste facility. When segregation is not practical, the non-exempt waste should be examined closely to assure that it is not a hazardous waste. See Section 2.9 for additional discussion of waste mixtures.

e. Some states have adopted hazardous waste regulations and have obtained authority from EPA to administer the federal hazardous waste regulations. Those state programs' regulations may differ from those that EPA has promulgated; however, by law, the states' regulations must be at least as stringent as the federal programs.

2.9 Waste Mixtures

EPA's RCRA regulations provide that the commingling of any listed hazardous waste with a non-hazardous waste generally renders the entire mixture a hazardous waste. The intent of this mixture rule is to prevent avoidance of hazardous waste regulations through dilution. For example, discarding a listed hazardous waste (e.g., a half-empty container of a listed solvent) in a reserve pit could cause the otherwise exempt pit contents to become a hazardous waste and result in the expensive closing of the reserve pit under RCRA hazardous waste regulations. Likewise, the mixing of a characteristic hazardous waste with an exempt waste could render the entire mixture a hazardous waste. Also, in those cases where the mixture is no longer considered a hazardous waste, the process of rendering the hazardous waste non-hazardous could be considered treatment of a hazardous waste and RCRA Subtitle C would apply.

Unused commercial products are not exempt wastes when disposed and, if hazardous (or potentially hazardous), should not be disposed with exempt E&P waste. All reasonable efforts should be made to completely use commercial products, return them to their vendor if they are not fully used, or segregate them from other waste for management and disposal.

SECTION 3 | General Criteria

3.1 General

An effective program for the regulation of E&P activities should include, at a minimum:

a. Statutory authority that adequately details the powers and duties of the regulatory body;

b. Statutory authority to promulgate appropriate rules and regulations;

c. Statutes and implementing regulations which adequately define necessary terminology;

d. Provisions to adequately fund and staff the program;

e. Mechanisms for coordination among the public, government agencies, and regulated industry; and

f. Technical criteria for E&P environmental management practices.

3.2 Goals

An effective state program should contain a clear statement of the program's goals and objectives. Such goals should include, at a minimum, protecting human health and the environment from the mismanagement of E&P activities while recognizing the need for an economically viable oil and gas industry. When establishing regulations and policies for E&P waste management, states should use the waste management hierarchy set forth in Section 5.3 to encourage waste minimization and source reduction.

3.3 State/Regional Variations in Criteria

These criteria are intended to provide guidance to the states in the formulation, development, and evaluation of oil and gas environmental regulatory programs. Fundamental differences exist from state to state, and within regions within a state in terms of climate, meteorological patterns, air quality compliance status, hydrology, geology, economics, and method of operation, which may impact on the manner in which oil and gas exploration, development, and production is performed. State oil and gas programs can and should vary from state to state and within portions of a state. The process by which these criteria are incorporated into state programs is a function of, and within the discretion of, the responsible state agency. It is recognized that state programs must vary in order to accommodate differences in climate, hydrology, geology, economics, and method of operation or to accommodate individual differences in state administrative procedures or law. Furthermore, in some instances, in order to accommodate regional, area-wide, or individual differences within a state, it is appropriate for site-specific waivers or variances to be allowed for good cause shown. All such variations should be consistent with the goals of Section 3.2.

SECTION 4 | Administrative Criteria

4.1 Basic Requirements

Various federal regulations applicable to the delegation to states of federal environmental programs provide a useful framework for the development of criteria for an effective state oil and gas exploration and production (E&P) environmental regulatory program. Such environmental regulatory programs should, at a minimum, include provisions for permitting, compliance evaluation, and enforcement.

4.1.1 Permitting

A state should have a regulatory mechanism to assure that E&P activities are conducted in an environmentally responsible manner. A program to achieve that objective may rely on one or more mechanisms, including issuance of individual permits, issuance of permits by rule, establishment of regulatory requirements by rule, issuance of general permits, registration of facilities, and/or notification of certain activities undertaken pursuant to general regulations. State agencies should have authority to refuse to issue or reissue permits or authorizations if the applicant has outstanding, finally determined violations or unpaid penalties, or if a history of past violations demonstrates the applicant's unwillingness or inability to comply with permit requirements. Where the operator responsible for E&P activities changes, state requirements should address the new operator's financial responsibility and compliance history. An effective state program should provide that a state permit does not relieve the operator of the obligation to comply with federal, local, or other state permits or regulatory requirements.
Individual permits for specific facilities or operations should be issued for fixed terms. In the case of commercial or centralized facilities, permits generally should be reviewed and revised, if necessary, no less frequently than every five years. Where two or more regulatory programs mandate similar requirements, those requirements should be combined where feasible. The process for obtaining permits and other authorizations should also involve prompt consideration and response to applications while preserving the integrity of the permit review process, including appropriate public participation. For the purposes of these guidelines, the terms "license" or "licensing" as used in Section 7 of these guidelines, criteria for the management of E&P NORM, will be synonymous with the terms "permit" or "permitting" as they are used throughout these guidelines.

4.1.2 Compliance Evaluation

State programs should contain the following compliance evaluation capabilities:

a. Procedures for the receipt, evaluation, retention, and investigation for possible enforcement action of all notices and reports required of permittees and other regulated persons. Investigation for possible enforcement action should include determination of failure to submit these notices and reports. Effective data management systems as prescribed in Section 4.2.7. can be used to track compliance.

b. Inspection and surveillance procedures that are independent of information supplied by regulated persons and which allow the state to determine compliance with program requirements, including:

   i. The capability to conduct comprehensive investigations of facilities and activities subject to regulation in order to identify a failure to comply with program requirements by responsible persons;

   ii. The capability to conduct regular inspections of regulated facilities and activities at a frequency that is commensurate with the risk to the environment that is presented by each facility or activity; and

iii. The authority to investigate information obtained regarding violations of applicable program and permit requirements.

c. Procedures to receive and evaluate information submitted by the public about alleged violations and to encourage the public to report perceived violations. Such procedures should not only involve communications with the public to apprise it of the process to be followed in filing reports or complaints but should also communicate how the state agency will assure an appropriate and timely response.

d. Authority to conduct unannounced inspections of any regulated site or premises where E&P activities are being conducted, including the authority to inspect, sample, monitor, or otherwise investigate compliance with permit conditions and other program requirements.

e. Authority to enter locations where records are kept during reasonable hours for purposes of copying and inspecting such records.

f. Investigatory procedures that will produce a paper trail to support evidence which may be admitted in any enforcement proceeding brought against an alleged violator, including clear inspection and inspection reporting procedures.

4.1.3 Enforcement

4.1.3.1 Enforcement Tools

With respect to violations of the state program, the state agency should have effective enforcement tools, which may include the following actions:

a. Issue a notice of violation with a compliance schedule;

b. Restrain, immediately and effectively, any person by order or by suit in state court from engaging in any impending or continuing unauthorized activity which is causing or may cause damage to public health or the environment;

c. Establish the identity of emergency conditions which pose an imminent and substantial human health or environmental hazard that would warrant entry and immediate corrective action by the state agency after reasonable efforts to notify the operator have failed;

d. Sue or cause suit to be brought in courts of competent jurisdiction to enjoin any impending or continuing violation of any program requirement, including any permit condition, without the necessity of a prior revocation of the permit;

e. Require, by administrative order or suit in state court, that appropriate action be undertaken to correct any harm to public health and the environment that may have resulted from a violation of any program requirement, including, but not limited to, establishment of compliance schedules;

f. Revoke, modify, or suspend any permit upon a determination by the state agency that the permittee has violated the terms and conditions of the permit, failed to pay an assessed penalty, or used false or misleading information or fraud to obtain the permit; or

g. Assess administrative penalties or seek, in court, civil penalties or criminal sanctions including fines and/or imprisonment.

h. Forfeiture of financial assurance instruments.

i. In some states, enforcement remedies include authorities to cause cessation of production or transportation of product, and/or seizure of illegal product.

4.1.3.2 Penalty Guidance

States should develop guidance for calculations of penalties that include factors such as the economic benefit resulting from the violation, willfulness, harm to the environment and the public, harm to wildlife, fish or aquatic life or their habitat, expenses incurred by the state in removing, correcting or terminating the effects of the unauthorized activity, conservation of the resource, timeliness of corrective action, notification of appropriate authority, and history of violations. Benefits of guidance for calculation of penalties include consistency in the assessment of penalties and development of readily defensible assessments. Penalties should be such that an operator does not benefit financially from unlawful conduct and should provide compliance incentive to other operators. States should evaluate their enforcement options and policies to assure that the full range of actions available are effectively used.

4.1.3.3 Right of Appeal

The right to appeal or seek administrative and/or judicial review of agency action should be available to any person having an interest which is or may be adversely affected, or who is aggrieved by any such action.

4.2 Additional Program Requirements

Beyond basic requirements, an effective state program should also include a variety of other administrative requirements as discussed below.

4.2.1 Contingency Planning and Spill Risk Management

4.2.1.1 State Contingency Program

a. The state should develop and adopt a state contingency program for preventing and responding to spills and unauthorized releases to land, water, or air from E&P facilities. The state program need not duplicate applicable federal regulations for contingency planning and spill risk management. The state's contingency program may include a state contingency plan or may consist of a set of regulations or operator contingency plan requirements. The program should define the volume of a spill or release of a petroleum product or waste and the level of risk to various receiving environments that triggers implementation of the spill contingency plan and response requirements.

b. The state contingency program should also contain funding provisions which enable the state agency to undertake immediate response actions for significant spills or releases which constitute a threat to human health or the environment in the event that a responsible operator cannot be located or is unwilling or unable to respond to the spill or release in a timely manner.

4.2.1.2 Reporting Capabilities

The state should provide mechanisms for operators or the public to report spills and unauthorized releases. These mechanisms should include telephone access 24 hours a day, 7 days a week. A single point of contact 1-800 telephone number should be considered. Telephone answering capabilities should include provisions for the prompt notification of appropriate state agency personnel.

4.2.1.3 Interagency Coordination

The state should provide for coordination of actions between appropriate agencies that have jurisdiction for the management of risks from spills and unauthorized releases from E&P facilities. This includes clear designation of onsite spill responsibilities.

4.2.1.4 Operator Prevention of, and Response to, Spills and Releases

The state agency should require an operator to take measures to prevent, and prepare to respond to, spills or unauthorized releases of petroleum products or waste that may occur at an E&P facility. These requirements can be spelled out in regulations or guidance, or they may be included in operator-specific or site-specific plans.

4.2.1.4.1 General

State contingency programs should address the following:

a. E&P facilities, equipment at those facilities, and materials found at E&P sites that may pose a significant threat to human health and/or the environment;

b. The various types of receiving environments, including water (surface and groundwater) and land (environmentally sensitive areas, special soil or geological conditions, urban areas, cultural and special resource areas); and

c. Public and responder safety concerns, including training for response personnel.

The state program should require the operator to identify the following:

d. The operator's incident command structure, including emergency contact information for key personnel;

e. Equipment, manpower, contracted services, and other logistical support necessary for response to spills and unauthorized releases;

f. Opportunities for coordination of joint response actions, manpower or equipment, with nearby well sites or other facilities of the operator or other operators;

g. Procedures for identification of and communication with parties impacted or threatened by spills or unauthorized releases;

h. Acceptable methods of containment of spills and unauthorized releases; and

i. Acceptable disposal methods, such as on-site remediation, approved disposal facilities, and waste haulers, for materials of concern.

4.2.1.4.2 Prevention Measures

Where spills and unauthorized releases pose a significant risk to human health and/or the environment, the State should require prevention measures that may include the following:

a. Secondary containment such as dikes, berms and firewalls, or equivalent measures;

b. Tertiary containment and/or monitoring systems in high-risk areas;

c. Inspection, testing, and maintenance schedules and procedures for facilities and equipment;

d. Site security measures as necessary; and

e. Periodic review of spill histories to identify opportunities to reduce future spills and unauthorized releases.

4.2.1.4.3 Response Measures

A State program should include reporting and notification procedures to be used in the event of a spill or unauthorized release. These should include the following:

a. Agencies and parties to be notified with contact information;

b. The type of reporting (verbal, written) required for various incidents;

c. Reporting time requirements;

d. Reporting thresholds;

e. Operator reporting information, such as the name of the operator and the operator's representative reporting the incident; a description of the incident, including the date and time of the incident and its discovery; the type and volume of material released; the location of the incident; the apparent extent of the release; damage or threat to groundwater, surface water, land, and/or air; and weather conditions; and

f. The state should specify any requirements for final reporting, site monitoring, and necessary agency approvals. Any final report should identify the incident cause and actions taken to prevent or minimize the likelihood of a recurrence.

States should provide guidance for containment, abatement, and remediation, including the following:

g. Cleanup standards;

h. Required sampling and analyses;

i. Where appropriate, approved non-mechanical response actions, such as the use of dispersants and in-situ remediation, including identification of the agencies that must provide approval of these operations; and

4.2.1.5 Follow-Up Actions

The state program should provide for enforcement, as described in Section 4.1.3. of these Guidelines, for the failure of an operator to report or respond to spills and unauthorized releases as required. The state program should also consider provisions for the assessment of damages caused by an incident. A state program should contain provisions allowing the state to pursue a responsible operator for reimbursement of state monies expended in responding to such a spill or release.

4.2.1.6 Database

The state data management program, as described in Section 4.2.7. of these Guidelines, should include information on spills and unauthorized releases. This data should be analyzed periodically as part of a program effectiveness evaluation as described in Section 4.2.3, Program Planning and Evaluation, of these Guidelines.

4.2.2 Public Participation

4.2.2.1 Notice and Records

The affected public should be provided with adequate notice of the agency's consideration to issue a permit or license for appropriate E&P activities. Such efforts should balance efficient permit processing with meaningful opportunity for input from the affected public. The agency should establish guidance on determining the degree of public input for different types of permits or licenses. Where public input is sought, the agency should utilize communication methods that will most effectively reach the affected public, including options for non-English speakers where necessary. The agency should consider methods to enhance the responsiveness of its public participation such as responding to comments and sharing how the program considered comments in its decision making. Where possible, notice should be coordinated with the requirements of other concurrently applicable state or federal programs. The agency may also require operators to provide written notice to adjacent landowners of record for such areas and in such manner as may be prescribed by the agency.

Agency records related to this program should generally be available for review by the public in accordance with applicable state and federal laws and agency practices. Such records are to include waste disposal and pit locations and any required analytical data. Where information submitted by an operator is of a "confidential business" nature, an agency should have procedures for segregating that information and protecting it from disclosure. In all cases, spill and violation records should be available to the public. Agencies should establish a minimum record keeping time period of three years that should be automatically extended while any unresolved enforcement action regarding the regulated activity is pending.

4.2.2.2 Program Information

States should provide for the dissemination of program information to the regulated industry and the public. Such educational materials should include information or guidance on contingency planning, spill response, permitting, operating, monitoring and other requirements. Such efforts should be part of an ongoing process through which information is exchanged in an open forum. Because E&P environmental requirements are undergoing numerous changes, states have the obligation to inform the regulated industry and the public of changes.

Industry associations and other organizations may provide a convenient and effective mechanism for dissemination of information. States should actively make use of seminars, newsletters, special mailings, association committees, incentive programs and other mechanisms.

4.2.2.3 Advisory Groups

States should use advisory groups of industry, government, and public representatives, or other similar mechanisms, to obtain input and feedback on the effectiveness of state programs for the regulation of E&P activities. Provision should be made for education or training as is appropriate to give such advisory groups a sound basis for providing input and feedback.

4.2.3 Program Planning and Evaluation

4.2.3.1 Program Planning

States should have a sound regulatory development process which includes both short- term and long-term strategic planning for defining goals and objectives, setting priorities, and evaluating the clarity, efficiency, and effectiveness of the E&P environmental regulatory program. In formulating environmental

regulatory programs, states should use the best available scientific and technical information and should consider the environmental, economic and energy impacts of the regulations.

4.2.3.2 Program Evaluation

Beyond the general, technical, and administrative criteria set forth elsewhere in this guidance document, a program for the regulation of E&P activities should evaluate how well the program protects human health and the environment while recognizing the need for an economically viable oil and gas industry. Program evaluation measures may be of a wide variety and include positive indicators (what's working) as well as negative indicators (what's not working). Some administrative aspects of program performance can be evaluated by examining how well the program enables the industry, the public, and the regulators themselves to function. Environmental aspects can be evaluated by assessing some combination of preventive measures, the qualities and characteristics of E&P wastes the severity of impact from a spill or unauthorized release, and the timeliness of remediation. While it is important for the program to have adequate rules, performance evaluation indicates to what extent the implementation of a rule or practice of the program brings about environmental protection.

Although a formal evaluation of program performance might occur at periodic intervals, the monitoring of activities and the modifications to the program form an ongoing, cyclic process. This process has no specific beginning or ending point. Rather, the steps in the process form a continuous progression that should be examined during performance review.

A state should select parameters that are appropriate for use in measuring the effectiveness of its E&P regulatory program. Documentation of the selected parameters and the ability to acquire, assess, and present the relevant data are critically important to evaluation of performance. This requires establishing a definition of the parameters being evaluated and specifying the technical measurements to be made or the technical data to be examined. In addition, it requires installation and use of a data management system that facilitates review and evaluation.

Program performance should be evaluated periodically, using measures that can be applied consistently from one evaluation period to another, although the measures may evolve and improve in time. If a database of releases, regulatory activities, remediation sites, or other information is used for performance evaluation, it should, if possible, extend backward in time so as to enable a measure of progress on historical problems.

4.2.3.3 Qualities of Performance Measures

In evaluating its performance, a program should have data management capabilities to enable assessment of program effectiveness and timeliness. Evaluation measures should do the following:

a. Be quantitative, whenever possible;

b. Allow consistent evaluation across time;

c. Be available to program personnel, the industry, and the public;

d. Document significant trends;

e. Summarize an evaluation of the nature and extent of contamination [Section 5.2], abandoned wastes, and abandoned facilities [Section 6] as they occur across the state; NORM [Section 7], stormwater management [Section 8], hydraulic fracturing [Section 9], air quality [Section 10], and reused & recycled fluids [Section 11].

f. Include identification and priority of outstanding environmental threats, so as to aid the program in

targeting its efforts;

g. Enable evaluation of whether the program's responses to violations encourage compliance.

Evaluation of performance may include, as an example:

a. Contamination: the state-wide nature and extent of environmental contamination by E&P wastes;

b. Trends: whether the extent of contamination by E&P wastes is increasing or decreasing, and the reasons why;

c. Prevention: the effectiveness of the program's efforts in preventing releases of E&P wastes to the environment;

d. Timeliness: the timeliness of agency actions in controlling the impacts of E&P wastes released to the environment;

e. Abatement: the effectiveness of agency actions in abating pollution by E&P wastes, or in causing pollution to be abated; and

f. Enforcement: the effectiveness of the agency's administrative controls in the prevention or abatement of pollution by E&P wastes [Section 4.1].

4.2.3.4 Baselines and Follow-Up

A state agency should regularly evaluate its effectiveness in attaining the goals set forth in Section 3.2 in a way that will create a baseline against which to compare the program's performance in the future. A state agency is encouraged to conduct periodic self-assessments in addition to the assessments conducted in the State Review Process. These self-assessments should document successes and should identify areas for improvement. This will allow continual improvement of a state's program while recording its successes.

The utilization of performance evaluations and a continual improvement process will demonstrate the state's efforts to adapt to changes in technology, concerns of the public and regulated community, and to provide both for the documentation of successes and identification of areas requiring improvement.

4.2.3.5 Examples of Program Evaluation

4.2.3.5.1 Assessment of Impacts

A state could identify documented cases that demonstrate reasonably clear links of cause and effect between operational practices and resulting environmental impacts. Such impacts might be human health effects, ecological effects, effects on wildlife or livestock, or effects on natural resources. From examination of documented cases, a state could determine whether those cases were the result of violations of existing program requirements, insufficient programmatic enforcement of the requirements, other causes, or whether the cases suggest that the requirements should be revised.

A case could be documented if impacts are found to exist as part of the findings of a scientific study. Such studies could be formal investigations supporting litigation or a state enforcement action, or they could be the results of technical tests (such as monitoring of wells) if such tests (a) were conducted with state-approved quality control procedures, and (b) revealed contamination levels in excess of an applicable state or federal standard or guideline (such as a drinking water standard or water quality criteria).

Examples of possible impact indicators could include the following:

a. The area or other measure of contaminated or affected ground or surface water, tracked periodically over time.

b. A histogram of the number of releases versus time, amount of produced resource and number of wells in the state. Releases might be grouped by material released, such as crude oil, produced water, etc.

c. A histogram of the number of releases of a given material versus the approved time to completion of remediation.

d. The time elapsed between an agency's receipt of a remediation proposal or related correspondence, and the agency's response to that proposal or correspondence.

e. Analysis of activities and results

f. Activity and results analysis comprise administrative measures of program goals, plans, and operations. These measures focus on prevention of pollution, efficiency of operations, priorities, and the allocation of resources within the program.

The following are examples of activities:

g. The development of a strategic plan with goals, milestones, and establishment of priorities [Sections 3.2, 4.2.3]. The plan should be based on anticipated threats and/or known impacts, as well as budget and administrative factors that may be beyond the control of the agency.

h. The development of a program promoting use of the waste management hierarchy [Section 5.3].

i. A review of the number of stream miles listed as impaired by oil and gas activities in the state biennial Integrated Water Quality Monitoring and Assessment Report required under Sections 305(b) and 303(d) of the federal Clean Water Act.

j. An evaluation of the number of wells abandoned without being properly plugged compared to levels of financial assurance or other program measures to address orphan wells.

k. Evaluation of the results of surveys to determine the satisfaction of permit recipients and other customers with program implementation.

l. The development of a program, including time and activity tracking, to conduct efficiency studies of average time to issue permits, conduct inspections and perform other required activities.

m. A documented process for obtaining input from within the agency, from the public, and/or from an advisory group for identification of program strengths and deficiencies [Section 4.2.2.3].

n. Evaluation of the results of a training, educational, or outreach program [Section 4.2.2].

o. Evaluation of the effectiveness of the agency’s enforcement program. [Sections 4.1.2, 4.1.3, 4.2.1.2].

The following are examples of results:

p. The number of inspections by the agency.

q. The number, type and causes of spills, accidents and safety incidents reported to the agency.

r. The number of operations witnessed by the agency.

s. The number, type, frequency and cause of violations detected by inspectors [Section 4.1.2].

t. The number, type, frequency and cause of complaints by the public, and the time required to resolve those complaints [Section 4.2.2.1].

u. The number of violations, the time to resolve those violations, and the number unresolved [Section 4.1.2].

v. The number of actions going to hearing, enforcement, and/or fines [Section 4.1.3].

4.2.4 Financial Assurance

All states should have an adequate financial assurance program to provide resources to the state to close or remediate a site should an operator fail to meet its obligations under the law. The goal of any financial assurance program should be to avoid passing on the responsibility for closure and remediation costs to the state. An adequate financial assurance program should be supported by the following elements: frequent site inspections; strict permit enforcement; and appropriate regulations governing and monitoring “inactive status” of covered facilities.

States should identify activities such as closure and remediation and other relevant activities for which criteria have been set forth in Section 5 that need to be covered by financial assurance. Some states require financial assurance for inactive wells, some for drilling and/or plugging, some for waste disposal facilities, and some for the life of the well.

States should determine the types of financial assurances that will provide reliable monetary resources to the state and will facilitate an operator’s compliance with permit requirements. Types of financial assurance may include the following:

a. Surety bonds;

b. Self-bonding;

c. Letters of credit;

d. Certificates of deposit;

e. Cash,

f. Federal, state, or municipal bonds; and

g. Other forms of collateral.

Some states require performance bonds and some states require penal bonds. Some states accept a nonrefundable fee to be paid into the well plugging fund in lieu of a bond. Some states allow phased payments of collateral into a fund so that small operators can develop a collateral bond over a specified period of time. States should develop financial assurance options that facilitate an operator's compliance with bonding requirements. In addition to single well bonds, many states allow blanket bonds. This allows operators to assure that an established minimum level of financial assurance is provided without the commitment of an unnecessary amount of operating funds.

States should periodically review the amount of assurance required to determine if the amount is adequate to provide incentive for proper plugging of a well and reclamation of a site, and to assure proper management of E&P wastes.

In the case of commercial and centralized facilities as defined in Section 5.10, including those that manage TE/NORM, state financial assurance requirements should be sufficient to cover the costs of appropriate facility decontamination, reclamation, and closure, and should extend through any post-closure care, monitoring, or control period. (see Section 5.10.2.2.4.)

States should develop appropriate procedures to access an operator's financial assurance when the operator does not meet the obligations covered by the financial assurance. These procedures should include provisions for notice, hearings, and forfeiture.

Some states have special funds, such as well-plugging funds, that are available for state use to correct problems where an operator does not comply with state requirements.

Although the availability of such funds may be a consideration in some states when determining bond coverage amounts, special funds should be used to supplement rather than completely take the place of other forms of financial assurance provided by the operator. The use of special funds should be limited to instances where the responsible operator cannot be determined or is unavailable. These special funds can be generated by taxes, fines, forfeitures, or fees.

4.2.5 Waste Hauler Certification

The appropriate state agency should have authority to require the training of drivers of trucks that are involved in the commercial transportation of E&P waste to a commercial or centralized disposal facility. Such training should include, among other things, emphasis on proper record keeping, the need to deliver the waste to the designated facility and emergency response and notification procedures. The appropriate state agency should also have authority to require the registration of all vehicles used to commercially transport the waste and of all commercial waste haulers.

4.2.6 Location of Closed Disposal Sites

A state program should contain authority with respect to disposal site closure, including authority to identify the location of the disposal site and for such information to be permanently maintained by the state agency for public review. Whether the location of a waste disposal site is disclosed in the public land records is a matter that is within the discretion of the state.

4.2.7 Data Management

4.2.7.1 General

Effective data management systems should be maintained due to the amount of information that states compile. Such systems should include permitting, operating, spill, remediation, and monitoring information and should include those data elements that an individual state finds are necessary to make cost-effective, risk-based decisions. Data should be maintained on as detailed a level as is necessary for the agencies to conduct their regulatory reviews. States and the federal government should undertake efforts to facilitate the sharing of data among responsible agencies, the public, and other users. States should develop policies for data access, data dissemination, and the allocation of cost of services to governmental and non-governmental users.

4.2.7.2 Electronic Data Management

Electronic filing, permitting, imaging, geographic information systems and internet data transfer and access are technologies that can contribute to program efficiency and data accessibility. Because of the efficiencies of electronic data management and enhanced accessibility of electronic data to regulators, the industry and the public, agencies are encouraged to develop systems for the electronic submittal, storage and retrieval of agency data. States are encouraged to implement electronic data management systems to improve program efficiency, public data access, and data security to the extent they are appropriate to the State's regulatory program.

Web-based maps available to the public should include appropriate information (i.e. permits, enforcement activities, and information from co-regulators to the extent possible). In developing such maps, state programs should balance publicly available information with contemplation of possible safety and security issues associated with mapped facilities.

4.2.7.3 Retention and Access

An agency's data management program should provide for the capture of data and images as appropriate, and for both protecting the quality of data collected and the long-term protection and backup of captured information through measures such as off-site duplicate storage, archiving, and/or data retention and destruction policies.

Agencies should include public and industry access in their data management systems. Most program data are available to the public under various sunshine rules. Some records may be retained as confidential files for a defined period of time. Certain confidential types of data may also be discoverable. States should develop policies that define data sets to be made available to the public and/or industry.

4.3 Personnel and Funding

4.3.1 Personnel

For a state program to function effectively, sufficient, properly trained personnel to accomplish the goals and objectives of the program are necessary.

In determining its personnel needs, a state agency should consider not only the number of activities that it must regulate and inspect, but also the accessibility of those activities to agency personnel. Accessibility will be heavily influenced by the size of the area to be regulated, the local terrain, and road conditions. In addition, a state agency should evaluate how its personnel needs will be affected by activities occurring in environmentally sensitive areas (e.g., in close proximity to surface water and groundwater).

Generally, personnel needs should be evaluated in each of the categories of administration, legal, technical, and field inspectors. In each case, a state agency should define the areas of responsibility for the position, as well as any prerequisite experience and background. In addition, the state agency should provide for the continuing training of personnel to keep them abreast of changes in regulations, policy and technical issues, and to increase professionalism. This training can be accomplished through such means as seminars and university short courses. The following discussion addresses these issues in each of the major personnel categories:

4.3.1.1 Administration

The elements of the administration of a state program should include traditional administrative functions

such as program planning and evaluation, budgeting, and personnel. In addition, administration should be responsible for such programmatic functions as permitting, licensing, financial assurance, and ownership transfer. Public involvement and data collection management are also key elements of program administration. The conduct public hearings, the coordination of enforcement activities, and the referral of cases to legal personnel for follow-up action should also be administrative functions.

4.3.1.2 Legal

Legal support for an E&P environmental regulatory program can be provided by in-house state agency lawyers through the support of the attorney general's office or through independent counsel. In any case, sufficient legal support should be provided to a state agency to assure that the regulatory program has an effective capability to pursue appropriate enforcement actions in a timely manner against violators of program requirements. A critical element of this capability is that the program's legal element be capable of directing the preparation of enforcement cases and providing guidance and direction to field inspectors and others involved in case preparation. The legal element of a program should also be involved in both the procedural and substantive aspects of rulemaking.

4.3.1.3 Technical

All program elements require adequate technical support. In supporting administrative functions, technical personnel should provide geologic and engineering evaluation, and technical specifications on such matters as cementing and casing. Technical support to the legal and field personnel is necessary for the development and implementation of rules and in the preparation of enforcement cases.
In support of field inspectors, technical personnel should be capable of mapping hydrologically sensitive areas and areas containing treatable water and provide support in determining pit construction requirements and guidance in waste handling. Key technical personnel should have a Bachelor of Science degree in geology, engineering, hydrology, earth science, environmental science, or a related field, or possess equivalent experience. Technical personnel should be subject to continuing education in such areas as ongoing development of rules, policies, and technological changes.

4.3.1.4 Field Personnel

Field personnel should be responsible for conducting routine inspections of regulated facilities and activities to assure compliance with program requirements. In addition, field personnel should be among the state agency's on-site representatives to witness critical regulated activities and to observe or supervise clean-up or remedial actions. Field personnel also should be involved in the assembly of evidence for enforcement actions and in the state agency's community relations.

Field personnel generally should be high school graduates or have equivalent experience and should otherwise be knowledgeable about oil and gas field-related work and waste management practices. The ongoing training of field personnel should emphasize the range of chemical and radiological constituents in E&P wastes and at E&P sites, sampling and investigative procedures associated with enforcement proceedings, and a thorough understanding of current rules and policies of the program, as well as sound environmental practices. Field personnel should be provided with training in TE/NORM identification and management, where appropriate.

In addition, field personnel should be skilled in the handling of hazardous materials and in all aspects of personnel safety. They should also be trained in the identification of abandoned sites and the abandoned site remediation program, storm water management practices and requirements, and hydraulic fracturing processes.

4.3.1.5 Training Requirements

State programs should provide for adequate and effective training of state agency personnel regarding the regulations, policies, and criteria applicable to E&P activities. These programs should include training for agency personnel on such issues as site maintenance, contingency planning and spill response, permitting requirements and standards, compliance requirements and criteria, data management, enforcement procedures, investigative procedures, court preparation, report writing, sampling and analysis, and such other issues relating to proper E&P environmental regulation as may be necessary. Training programs should be incorporated as an on-going activity to encourage consistent enforcement of regulation throughout the state.

4.3.2 Funding

An effective E&P environmental regulatory program should be funded at a level sufficient to allow it to accomplish its environmental protection goals and objectives. While many state agencies are funded through a general appropriation from that state's legislature, each state agency should evaluate other sources of funding such as user fees, special levies on production, the dedication of fees and penalties to special accounts, and grants from various sources.

4.4 Coordination Among Agencies

Many state programs regulating E&P activities have their roots in oil and gas conservation programs that were established during the early part of the last century. In most cases, these programs have evolved to accommodate other state and federal objectives such as protection of human health and the environment.

In most states, multiple agencies are involved in the management of E&P activities. Different agencies are often responsible for the regulation of oil and gas wells, pits and impoundments, disposal wells, surface water discharges, spill prevention and response, and disposal of drill cuttings and muds. Each agency has its own administrative requirements relating to permitting, operational requirements, and financial assurance, and develops its own budget priorities. Each has its own inspection and enforcement authorities. Unless a high level of formal interagency coordination exists, such unilateral program development and implementation can lead to duplication of personnel effort, duplication of regulation with sometimes conflicting standards for the industry, and duplication of funding. Duplication of programs often diminishes the effectiveness of spill response, permitting, inspection, enforcement, training, and other regulatory activities.

Where multiple state agencies have jurisdiction over the management of E&P activities, budget development should be coordinated and the agencies should develop formal coordination procedures, such as the development of interagency Memoranda of Agreement, interagency task forces with periodic meetings, and/or interagency legislative and regulatory review panels to ensure jurisdictional clarity and regulatory consistency.

Additionally, states should review existing agreements to assure that they are current and effective. Finally, interagency mechanisms should be developed to facilitate the sharing of information among and between involved agencies so that each agency can carry out its program responsibilities.

SECTION 5 | Technical Criteria

5.1 General

These technical criteria for E&P waste management practices address waste characterization, waste management hierarchy, pits/impoundments, land applications, tanks, and centralized and commercial facilities. In most cases, these criteria are general in scope. States should establish and implement specific performance standards and design specifications based on site-specific or regional differences in geology, hydrology, climate, and waste characteristics. State E&P waste management programs should include the following general provisions as requirements:

a. Facilities and sites used for the storage or disposal of wastes derived from the exploration and production of oil and natural gas should be operated and managed at all times to prevent contamination of groundwater, surface water, soil, and air with the goal of, protecting public health and safety, the environment, and preventing property damage.

b. Facilities and sites operated specifically for the storage or disposal of exempt E&P wastes should not receive, collect, store, or dispose of any wastes that are listed or defined as hazardous wastes and regulated under Subtitle C of RCRA, except in accordance with state and federal hazardous waste laws and regulations.

c. Disposal of E&P wastes into municipal solid waste landfills may be considered. If such disposal is allowed, it should only be allowed where the landfill is designed to contain such wastes, and the E&P wastes contain no free liquids and are not mixed with non-exempt wastes prior to disposal.

d. Technical criteria for siting, construction, and operation of E&P waste disposal facilities should be flexible enough to address site-specific or regional conditions based on findings by the regulatory agency.

e. Siting Criteria

   i. States should incorporate siting requirements in statewide rules for pits, landspreading, landfilling and burial, and waste reclamation facilities. Area-wide rules or site-specific permits may contain additional siting conditions.

   ii. No E&P waste management facility should be located in within a 100-year flood plain or areas where other surface drainage issues may impact surface impoundment in the event of a significant storm event.

   iii. Where necessary to protect human health, E&P waste management facilities should not be located in close proximity to existing residences, schools, hospitals or commercial buildings. The need for minimum distance criteria from residences or other buildings to the boundary of E&P waste management facilities should be considered.

   iv. Siting requirements should consider factors such as depth to and quality of groundwater; proximity to wetlands, floodplains, water bodies; proximity to drinking water supplies; topography, geology, geologic hazards; and other environmentally sensitive areas as designated by the appropriate governmental authority.

   v. Siting of E&P waste management facilities should be consistent with applicable land- use requirements.

5.2 Waste Characterization

5.2.1 Purposes

Waste characterization should support at least the following functions of a state's E&P waste management program:

a. Ensuring E&P waste management practices are suited to the particular wastes involved and in compliance with applicable program requirements; and

b. Ensuring commercial E&P waste facilities are managing only wastes they are authorized to handle.

5.2.2 Sampling and Analysis

a. Waste characterization requirements should include appropriate testing of E&P wastes prior to disposal. Testing should be appropriate for the type of waste, method of disposal, and the potential for adverse health and/or environmental effects associated with potential exposure. State waste management programs should establish criteria for ongoing testing to detect changes in the chemical composition of wastes as necessary. Waste management practices and regulatory requirements may be improved by obtaining a more complete knowledge through sampling and analysis of the range of hazardous and toxic constituents in E&P wastes. Potential waste characteristics include radionuclides, metals, organic content, pH, salinity, sulfur compounds including hydrogen sulfide content, and other potentially hazardous compounds as required by the state. At a minimum, waste characterization requirements should provide data necessary to meet the purposes of waste characterization described in Section 5.2.1, and to administer and enforce state program requirements effectively.

b. Testing and sampling data conducted as part of waste characterization should be available to the public consistent with the provisions of Section 4.2.2.1.

c. State requirements for the assessment of E&P wastes for TE/NORM should meet the criteria of this section and of sections 7.3.3. and 7.3.9. Such requirements should address all types of radiation expected in E&P wastes.

d. These guidelines do not address all the details of a waste characterization program, such as testing methods, frequencies, or parameters. The details are expected to vary depending upon the waste, the proposed management practice, and other state program requirements.

5.2.3 Quality Control

a. State programs should contain provisions that any required waste sampling follow appropriate sampling procedures, and any required laboratory analysis be performed by qualified laboratories in order to produce valid and reliable results. A state may rely on field testing to satisfy waste characterization requirements where it can be determined that such testing will produce valid and reliable results.

b. Testing methods should produce data that are valid for the purpose intended. By example, EPA's Toxicity Characteristic Leaching Procedure (TCLP) may not accurately

predict the leachability of oily E&P wastes.

5.3 Waste Management Hierarchy

As in any aspect of waste management, there are some general, sound practices that should be employed. These practices, which emphasize waste minimization, not only serve to protect human health and the environment, but also tend to protect waste generators from long-term liabilities associated with waste disposal. Additionally, waste minimization may reduce regulatory compliance concerns for E&P operators and result in cost savings. Generally, the choice of an E&P waste management option should be based upon the following hierarchy of preference:

a. Source Reduction: Reduce the quantity and/or toxicity of the waste generated;

b. Recycling: Reuse or reclaim as much of the waste generated as possible, and whenever possible, combine hydrocarbons with crude oil, condensate, or natural gas liquids;

c. Treatment: Employ techniques to reduce the volume or the toxicity of waste that has been unavoidably generated.

d. Proper Disposal: Dispose of remaining wastes in ways that minimize adverse impacts to the environment and that protect human health.

5.3.1 Source Reduction Opportunities

There are significant source reduction opportunities in E&P waste management. State programs have a variety of available resources which provide proven source reduction techniques. Categories of source reduction opportunities and examples include:

a. Equipment Modifications: Many technically and economically feasible equipment modifications are available. For example, retrofitting glycol dehydration units with volatile organic vapor recovery units can result in the recovery, in certain circumstances, of economically viable quantities of volatile hydrocarbons that would otherwise be released to the atmosphere. In addition, compliance concerns regarding air emission regulations may be reduced considerably.

b. Procedure Changes: Many times a simple change in the procedure used in an operation can result in significant source reduction. A simple example with significant results is the change one operator made in produced water filter replacements in an EOR project. The original procedure of bi-monthly filter replacements was changed to a procedure based on filter differential pressure. The result was a 98% reduction in the quantity of generated waste filters. At production sites where NORM-scale formation is expected, implementing a procedure of scale inhibitor injection may reduce its occurrence.

c. Product Substitution: The careful selection of chemical products used in exploration and production can reduce the toxicity of E&P wastes. Potential product substitution candidates include biocides, coagulants, dispersants, emulsion breakers, scale and corrosion inhibitors, gas sweetening and dehydration agents, catalysts, and pipe dope. In particular, many substitute drilling fluids have been developed to replace oil-based drilling fluids.

d. Reduction in the Use of Fresh Water: A significant example of the reduction of freshwater use is the use of produced water for EOR whenever possible (See Section 11 for additional discussion of fluid reuse and recycling). Another simple example is the use of high-pressure, low-volume nozzles on rig wash hoses.

e. Good Housekeeping and Preventive Maintenance: In addition to product substitution, source reduction can be achieved by minimizing the generation of clean-up wastes from production facilities and waste management facilities. An evaluation of potential spills and mitigation measures may identify effective spill and release prevention techniques. These techniques include good housekeeping practices, routine inspections of equipment, equipment innovations, and containment systems. Radiation surveys of equipment and sites can be helpful in preventing or minimizing the spread of above-background levels of E&P TE/NORM that may be encountered during routine equipment maintenance and servicing and site cleanup.

f. Planning: The first opportunity to accomplish source reduction is in the planning stage of an operation. For example, careful planning of a well stimulation can result in the reduction of leftover chemical that may be disposed. Also, careful planning of a drilling site's construction to control stormwater runoff may reduce the quantity of contaminated stormwater that may be generated as waste.

g. Training: Training is possibly the most important source reduction opportunity. Personnel in the E&P conduct the activities that generate waste. Training in waste identification, classification, and source reduction techniques provides the field personnel with the tools necessary to effectively reduce waste generation.

h. Selection of Contractors: Service companies perform a wide variety of functions in the E&P on behalf of E&P operators. An important source reduction opportunity for operators is the selection of service companies that implement source reduction opportunities as a business practice.

5.3.2 Recycling and Reduction Opportunities

Many opportunities now exist to recycle E&P wastes. State programs are encouraged to develop or coordinate with recycling programs developed by other agencies responsible for waste management. For example, many states' agencies provide listings of companies that recycle wastes common to E&P and, in some instances, operate waste exchange programs.

Wastes generated at E&P facilities that may be recycled include drilling fluids, used lubricating oil, used lubricating oil filters, antifreeze, wooden pallets, spent solvents, unused chemicals, liners, aggregate, and scrap metal. Also, recycling opportunities include the use of produced water for enhanced recovery, and the recovery of hydrocarbons in crude oil tank bottoms, skim oils, gas pipeline drips, slop oil emulsions solids and sludges, and other oily sludges.

Recycling also includes reuse of materials that would otherwise be managed as waste. For example, a natural gas company found that partially spent caustic sweetening solution was suitable for use as reagent in sulfur dioxide scrubber units at a natural gas processing plant.

See Section 11 for guidance specific to the reuse and recycling of fluids generated during the drilling, completion (e.g. hydraulic fracturing flowback), and production stages of a well.

5.3.3 State Program Elements

State programs should contain mechanisms to encourage waste management consistent with the hierarchy of this section. A variety of mechanisms may be used, such as the following:

a. Program requirements or policies that encourage source reduction and recycling;

b. Improved training of state personnel so they can identify source reduction opportunities;

c. Technical assistance or incentives to operators; and

d. Educational activities aimed at informing facility operators of the options available.

The waste management hierarchy should be integrated into the other elements of a state program. For example, spill and release prevention should be incorporated into facility management regulations. Similarly, state requirements should address the segregation of waste streams that have a higher pollution potential from those with a lower pollution potential. State information program elements should include a component related to hierarchy planning and implementation.

State program planning activities should include goals and objectives that provide for substantial progress in this area over a reasonable time. States should have sufficient information to evaluate whether the mechanisms used to encourage source reduction and recycling are achieving those goals and objectives. State program requirements should be reviewed for consistency with the waste management hierarchy and the established goals and objectives.

State agencies should also coordinate their efforts with other agencies that are responsible for waste management.

5.4 Quantitative Elements

Specific quantitative guidelines have been included for some waste management practices. The numbers cited are considered to be conservative values for protection of human health and the environment. However, they are not intended to be the basis for nationwide standards. Regulatory agencies may approve either less stringent or more stringent requirements where circumstances warrant, as long as they afford the protections described in Section 5.1.a, and in the goals statement of Section 3.2.

5.5 Technical Criteria for Pits

5.3.1 Definitions

The terms “pit” and “impoundment” are used to describe earthen depressions constructed to contain fluids or other materials. For the purpose of these Guidelines, the term “pit” is used to describe such structures. The following are generally accepted definitions for different types of pits and their uses:

a. Reserve Pits:

   i. Store additional drilling fluids for use in drilling operations; and/or

   ii. Dispose of wastes generated by drilling operations and initial completion procedures.

b. Production Pits

iii. Skimming/Settling: Pits used to provide retention time for settling of solids and separation of residual oil.

iv. Produced Water: Pits used for storage of produced water prior to injection for enhanced recovery or disposal, off-site transport, or surface-water discharge.

v. Percolation: Pits used to dispose of waste liquids via drainage or seepage through the bottom and/or sides of the pits into surrounding soils.

vi. Evaporation: Lined pits used to contain produced waters which evaporate into the atmosphere by natural thermal forces.

c. Special Purpose Pits

i. Blowdown: Pits used for collecting material resulting from the emptying or depressurization of wells or vessels.

ii. Flare Pits: Pits used exclusively for flaring gas.

iii. Emergency Pits: Pits used to contain liquids on a temporary basis due to process upset conditions.

iv. Basic Sediment: Lined pits used for temporary storage of production wastes from tank batteries or production vessels which may contain residual oil.

v. Workover: Pits used to contain liquids during the performance of remedial operations on a producing well in an effort to increase production.

5.5.2 Permitting

a. A permitting or review process should be in place for all pits. Pits may be authorized by rule, general permit, individual permit, or as a part of an operational permit or program.

b. Pits may be permitted by rule based upon specific requirements in areas where geologic, topographic, hydrologic or other conditions are similar.

c. Authorization for a pit may be included in operational, facility, or other environmental permits (e.g., drilling, workover, gas plant, NPDES discharge). The permit application process may have to be expanded to include certain additional information concerning the pit (i.e., intake volume, soil type, fluid makeup, topography, geology, hydrology, climatology, and such other factors as may be necessary to protect human health and the environment).

d. Construction and use of rule-authorized pits should require prior notification of the appropriate regulatory agency to ensure that proper construction, operation, and closure methods are used to protect human health and the environment.

e. State programs should include provisions to accommodate approval of pits for emergency situations.

5.5.3 Construction

General standards for construction of pits should be included in area or statewide regulations and should contemplate the following:

a. Size should be sufficient to ensure adequate storage until closure, taking into account historical precipitation patterns.

b. Depth should be such that the bottom has sufficient separation between base of impoundment and shallow-most water bearing zone (seasonal high), or such that the pit contents do not adversely impact groundwater or surface water. A review of available information or a study should be made of the area where the pit is to be located to determine if aquifers are present and should be protected.

c. Berm height, slope, and material should be such that the pit is structurally sound and that pit integrity is not compromised by terrain or breached by heavy rains, winds, seepage, or other natural forces.

d. If a salt section is anticipated or oil-based muds are used during a drilling program, reserve pits should be designed to accommodate those fluids.

e. Construction standards for pits may differ depending upon the wastes they receive, the length of time they are used, and site-specific conditions.

   i. Pits should be sited consistent with the provisions of Section 5.1.e.

   ii. In the case of reserve and workover pits, liners should be required in certain instances based upon fluid type and site-specific characteristics (e.g., unconsolidated soils and/or hydro-geologic conditions that create a potential for adverse impact to surface water or groundwater, and proximity to environmentally sensitive areas).

   iii. Special purpose pits and other pits such as dehydration, tank drain, pipeline drip collector, and compressor scrubber pits should be lined.

   iv. The use of production pits is declining nationally due to changes in industry practice and concerns about potential contamination of air, soils, and groundwater. In many instances, equipment consolidation, process modifications, or tanks can be used in lieu of pits. The use of alternatives is generally encouraged. Where production pits are used, they should generally be lined, except as provided below in 5.5.3.e.v.

   v. Blowdown, flare and emergency pits may be unlined where the removal requirement of Section 5.5.4.k. will prevent adverse groundwater quality impacts.

   vi. Variances to the above liner requirements should only be provided, and percolation pits should only be used, where it is clearly demonstrated that pit contents do not contain constituents that may harm water, soil or air.

   vii. Liners may consist of natural or synthetic materials, should meet accepted engineering practices, and should be compatible with expected pit contents.

   viii. State programs should have the ability to specify additional construction requirements such as double-liners and leak detection and notification technology where deemed

necessary.

f. Requirements for fencing, netting, and caging, or any other method to secure a pit, should be set by area or statewide regulations, as necessary, to protect the public, domestic animals, and/or wildlife. Netting of a pit is recommended as the preferred method to protect wildlife.

g. Where feasible, reserve pits should be placed to directly receive the discharge from solids separation equipment and to collect rigwash water, spills, and leaks from drilling equipment.

5.5.4 Operational Requirements

a. Specific restrictions on the type of wastes that can be placed in the different types of pits should be included in area or statewide regulations. Restrictions should consider salinity, hydrocarbon content, pH, radionuclides associated with E&P NORM, or other characteristics that may be detrimental to the environment.

b. General security guidelines should protect the public, the environment, and wildlife.

c. Liquids should be maintained at a freeboard level determined by the state that takes into account extreme precipitation events or other possibilities and prevents overtopping or un-permitted discharges.

d. Lined pits should be operated in a manner that ensures liner integrity.

e. Inspections and monitoring should be conducted at regular intervals or as necessary to ensure that pits meet all operating and structural integrity requirements and to ensure that pit contents do not adversely impact groundwater or surface water.

f. Hydrocarbons that inadvertently accumulate in a reserve pit should be skimmed off the pit at the cessation of drilling and completion operations.

g. Separated oil or accumulated wastes should be periodically removed from skimming/settling pits.

h. Produced water pits should be used only for storage of produced water prior to injection or off-site transport.

i. Percolation pits should be used only for disposal of produced waters when it is clearly demonstrated that pit contents do not contain constituents that may harm water, soil or air, and only when area or statewide restrictions established under Section 5.5.4.a. above are met.

j. Evaporation pits should be periodically inspected for compliance with permitted input volumes and liner integrity. Evaporation pits should be skimmed as necessary to maintain an optimum evaporation rate.

k. Blowdown, flare, and emergency pits should not be used for long-term storage or disposal. The regulatory agency should be notified promptly of the use of emergency pits. Fluids diverted to emergency pits should be removed as quickly as practical following the end of the emergency.

l. Unlined basic sediment pits should only be used when it is clearly demonstrated that pit contents do not contain constituents that may harm water, soil or air.

m. Unlined basic sediment pits should not be used for storage of oily wastes; they should be replaced by lined pits or tanks.

n. Workover pits should be open only for the duration of workover operations and should be closed within 120 days after workover operations are complete.

o. Pit wastes that exhibit oilfield NORM above regulatory action levels should be managed in accordance with the criteria of Section 7 and any other applicable criteria of these Guidelines.

5.5.5 Closure

a. Pits should be closed in accordance with local, state, and federal regulations and, if on private property, consistent with lease obligations.

b. Reserve pits should be closed as soon as practical but no later than 12 months after cessation of drilling operations. However, the closure of reserve pits beyond 12 months after cessation of drilling operations may be allowed in unusual circumstances if good cause can be demonstrated.

c. Pit liquids should have free oil removed and, when appropriate, should be sampled prior to closure for salinity, hydrocarbon content, pH, radionuclides associated with E&P NORM, or other characteristics which may be detrimental to the environment. On-site disposal of pit contents should be conducted in accordance with the landspreading, burial, and landfilling criteria of Sections 5.6. and 5.7, or by NPDES or UIC permit.

d. Liquid and nonliquid materials not satisfying the on-site criteria for landspreading or burial (Sections 5.6. and 5.7.) should be disposed in federal or state approved disposal facilities.

e. Pit sites should be capped, compacted, contoured, vegetated, and remediated where necessary, in accordance with applicable state or area regulations to ensure ground support stability, prevent erosion and ponding, and protect the environment.

f. Records should be permanently kept by the regulatory agency of all pit locations.

5.6 Technical Criteria for Landspreading

5.6.1 Definition and Applicability

a. Landspreading is a method of treatment and disposal of low toxicity wastes in which the wastes are spread upon and sometimes mixed into soils to promote reduction of organic constituents and the dilution and attenuation of metals. Landfarming or multiple applications are covered under Section 5.10.

b. These criteria apply to waste disposal at or near E&P locations and do not apply to commercial disposal operations. Commercial facilities used for disposal of E&P wastes are covered in Section 5.10.

c. On-site landspreading of E&P wastes containing TE/NORM above regulatory action levels should be prohibited.

5.6.2 Regulatory Requirements

When landspreading practices are used at E&P sites, they should be conducted consistent with local, state, and federal regulations. General standards for landspreading should be included in area or state regulations and should address the operational requirements of Section 5.6.3.

5.6.3 Operational Requirements

a. Free oil should be removed to the extent possible before the wastes are landspread.

b. Landspread liquids should have a pH of 6 to 10 S.U. Where needed, liquids should be neutralized to obtain this range.

c. Solid wastes should be spread evenly and disked into the soil.

d. E&P wastes should be subject to loading rates, location restrictions, and/or other appropriate requirements that promote biodegradation of organic constituents; will not result in waste pooling, ponding, or runoff; will prevent the contamination of groundwater or surface waters; and will protect air quality.

e. Where enhancement of biodegradation is desired, nitrogen and other nutrients should be added to the soil before disking. Nutrient application can be repeated over time.

f. Amounts of waste added to soil during landspreading are generally limited by the electrical conductivity (EC), exchangeable sodium percentage (ESP), and sodium absorption ratio (SAR). The state should determine its criteria based on site-specific and waste-specific conditions. For example, some plants tolerate higher or lower salt levels, higher rainfall areas encourage salt movement out of the root-zone, or shallow groundwater may severely limit application.

g. After landspreading of hydrocarbon containing waste, the waste-soil mixture should not exceed one percent by weight oil and grease, unless the state regulatory agency approves a less or more stringent requirement where circumstances warrant.

h. Salt- and hydrocarbon-loading criteria apply to the final waste-soil mixture and are not an application standard. The operator should be required to demonstrate that these criteria are met within 12 months of cessation of drilling or production. If these criteria are not met, remediation will be required. Nothing in this paragraph is intended to delay any requirement for erosion control and/or site reclamation or re-vegetation.

i. Soil analyses should be performed prior to landspreading and again upon closure of the site. Upon site closure, waste constituents should not be present at levels that pose a significant risk to human health and the environment.

j. Enhanced techniques, such as repetitive disking and nutrient addition, may be needed to meet the salt and hydrocarbon criteria of the final waste-soil mixture.

k. Under special or abnormal conditions, additional limitations and analysis requirements should be considered for wastes that may contain toxic constituents derived from

formation liquids, cuttings, drilling muds, or drilling-mud activities. Records should be permanently maintained by the agency of all waste analyses conducted pursuant to such additional requirements.

5.7 Technical Criteria for Burial and Landfilling

5.7.1 Definitions and Applicability

a. Burial of wastes involves placing the wastes in an excavation and covering the wastes with a layer of soil.

b. Landfilling of wastes involves placing the wastes on the ground and covering them with a layer of soil.

c. These criteria apply to waste disposal at or near E&P sites and do not apply to commercial disposal facilities. Criteria for commercial disposal facilities are contained in Section 5.10.

5.7.2 Regulatory Requirements

When burial or landfilling is used at E&P sites, either should be conducted consistent with lease and landowner obligations and with local, state, and federal regulations. General standards for burial or landfilling should be included in area or statewide regulations and should address the operational requirements in Section 5.7.3.

5.7.3 Operational Requirements

a. Wastes or waste-soil mixtures may be buried or landfilled without a protective bottom liner only when they meet the landspreading criteria of Section 5.6 prior to burial. The contents of such waste or waste-soil mixtures should be limited to materials such as fresh water-based drilling muds, drill cuttings, spent iron sponge, gas plant catalyst, or molecular sieve. Closure should be consistent with Sections 5.5.5.a and 5.5.5.e.

b. A protective bottom liner, solidification, fixation, or encapsulation should be required for burial or landfilling of wastes whose salt and/or hydrocarbon content exceeds the landspreading criteria of Section 5.6.3. A protective bottom liner, solidification, fixation, or encapsulation should be required for burial or landfilling of E&P wastes containing NORM above regulatory action levels. The regulatory agency may grant a variance from this requirement for fields or portions of fields, upon a showing by the operator that groundwater either is not present beneath the waste site or is naturally protected from the threat of contamination.

c. Agency records should be permanently maintained for any required analytical data taken, sites used, and types and quantities of waste disposed. Site locations should be located on plat maps.

5.8 Technical Criteria for Roadspreading

5.8.1 Definition

Roadspreading is the placement on roads of E&P wastes that exhibit properties similar to commercial

road oils, mixes, dust suppressants, or road compaction or deicing materials. Roadspreading of E&P wastes that do not exhibit such properties should be prohibited. Roadspreading of E&P wastes containing NORM above regulatory action levels should be prohibited. Generally, materials that will harm soil, water, or air should not be roadspread.

5.8.2 Regulatory Requirements

When roadspreading is used, it should be conducted consistent with local, state, and federal regulations. General standards for roadspreading should be included in area or state regulations and address the operational requirements in Section 5.8.3.

5.8.3 Operational Requirements

a. Exempt wastes such as tank bottoms, emulsions, heavy hydrocarbons, and crude oil-contaminated soil may be used for road oil, road mix, or asphalt if they are not ignitable and have a mixed density and metal content consistent with approved road oils or mixes.

b. Roadspreading should be subject to loading rates and/or other appropriate requirements that prevent pooling, ponding, or runoff; prevent the contamination of groundwater and surface water; and protect air quality.

c. Roadspreading should be subject to appropriate buffer zones established to protect waters of the state, water wells, and wetlands.

d. Produced water should be tested and should exhibit properties similar to commercial roadspreading products that are regulated by federal, state, or local agencies.

5.9 Technical Criteria for Tanks

5.9.1 Scope

This section applies to permanently installed E&P waste tanks and to produced water storage tanks located at enhanced recovery operations. Where some waste tanks are regulated under the Spill Prevention Control and Countermeasures (SPCC) requirements of the federal Clean Water Act, states may defer to the SPCC requirements for those tanks. The regulatory agency may adjust or exempt from the requirements of this section small-capacity tanks. Except as provided in Section 5.9.3.b., this section does not apply to:

a. Condensate and crude oil tanks;

b. Process vessels, such as separators, heater treaters, dehydrators or freewater knockouts, except that stacks or vents on such vessels should be equipped, where necessary, to protect migratory birds and other wildlife; and

c. Tanks used temporarily in drilling and workover operations.

5.9.2 General Requirements

a. States should have information, where available, on the locations, use, capacity, age and construction materials (e.g., steel, fiberglass, etc.) of tanks as needed to administer and enforce state program requirements effectively. Such information may be obtained through registrations, inventories, or other appropriate means.

b. Tanks covered by this section should be sited consistent with applicable local land-use

requirements, and should not be located within the 100-year flood plain or areas where other surface drainage issues may impact surface impoundment in the event of a significant storm event, unless the tanks have adequate floodproofing in accordance with state requirements.

c. Tanks should be subject to spill-prevention, preventive maintenance and inspection requirements.

5.9.3 Construction and Operation Standards

a. A principal goal of construction and operation standards for tanks is to minimize the occurrence of and the environmental impacts from spills and leaks.

   i. New tanks should be constructed in a manner that provides for corrosion protection consistent with the intended use of the tanks. All tanks covered by this section should be operated in a manner that provides for corrosion protection consistent with the use of the tanks.

   ii. Tanks should exhibit structural integrity consistent with their intended use. Wooden tanks should receive increased scrutiny in this regard.

   iii. Tanks should be operated in a manner that protects against overtopping.

   iv. Secondary containment systems or other appropriate means, such as leak detection, should be employed to minimize environmental impacts in the event of releases.

b. Covered tanks are preferred to open tanks. Open E&P waste and product tanks should be equipped to protect migratory birds and other wildlife in a manner consistent with the wildlife-protection criterion of Section 5.5.3.d.

c. Tanks located in populated areas where emissions of hydrogen sulfide can be expected should be equipped with appropriate warning devices.

5.9.4 Tank Removal and Closure

a. Tanks should be emptied prior to their retirement and the resulting materials should be managed properly.

b. Tanks and associated above ground equipment should be removed upon cessation of operations. For good cause, a state may allow tanks to be removed as soon as practical thereafter. Site reclamation should meet all landowner and lease obligations and any other applicable requirements.

c. Prior to removal, closure, or release for unrestricted use, tanks and associated piping and equipment should be surveyed for TE/NORM. When regulatory action levels are exceeded, TE/NORM and the equipment containing TE/NORM should be managed in accordance with the state's NORM regulatory program. See Section 7 for full TE/NORM criteria.

5.10 Technical Criteria for Commercial and Centralized Disposal Facilities

5.10.1 Definitions and Exemptions

a. Commercial Disposal Facility: A facility whose owner(s) or operator(s) receives compensation from others for the temporary storage, reclamation, treatment, and/or disposal of produced water, drilling fluids, drilling cuttings, completion fluids, and any other RCRA exempt E&P waste, and whose primary business objective is to provide these services. These facilities may, under certain circumstances, also accept non-exempt, non-hazardous wastes generated from E&P operations. This definition also includes facilities whose owner(s) or operator(s) receives compensation from others for E&P NORM-related storage, decontamination, treatment, or disposal.

b. Centralized Disposal Facility: A facility, other than a commercial disposal facility, that is:

   i. Used exclusively by one owner or operator; or

   ii. used by more than one operator under an operating agreement, and

   iii. receives for collection, treatment, temporary storage, and/or disposal of produced water, drilling fluids, drill cuttings, completion fluids, and any other RCRA exempt E&P wastes that are generated from two or more production units or areas or from a set of commonly owned or operated leases.

   iv. These facilities may, under certain circumstances, also accept non-exempt, non-hazardous wastes generated from E&P operations. This definition covers the surface storage and disposal facilities that are present at Class II disposal well sites. This definition also covers TE/NORM related storage, decontamination, treatment, or disposal.

c. Exemptions: The definitions and technical criteria of Section 5.10 do not apply to Class II injection wells or to enhanced oil recovery projects. The definitions and technical criteria of Section 5.10 are not intended to apply to emergency cleanup situations at a Class II injection facility. The regulatory agency may adjust or exempt from the standards and requirements of this section centralized facilities that receive a limited number of substantially similar waste streams and limited volumes of wastes, or commercial or centralized tank-only facilities.

5.10.2 Technical Standards and Regulatory Requirements

Commercial and centralized off-site disposal facilities should meet the technical and regulatory requirements of this section and the general standards of Section 5.1 of these criteria. Compliance with these requirements should be demonstrated in the permit application required in subsection 5.10.2.1. Because commercial disposal facilities use advanced methods of waste treatment and disposal, the regulatory agency should establish, where applicable, numerical requirements for the design of pond liners and leachate collection systems, for landfarming operations (i.e., repeated land applications), and for E&P waste reclamation facilities. The requirements of this section are intended to furnish the regulatory agency with sufficient and meaningful information such that permitting decisions will lead to no environmental impact or public health impact once the facility has commenced operations and following its closure.

The regulatory agency may adjust or exempt from these requirements centralized facilities that receive a limited number of substantially similar waste streams and limited volumes of waste, such as the consolidated produced water disposal facilities in a large multi-operator field. Administrative criteria for centralized facilities also may be less extensive than those for commercial facilities.

5.10.2.1 Regulatory Agency Responsibilities in Permitting

The regulatory agency should authorize off-site commercial and centralized disposal facilities for E&P wastes by permit. An individual permit should be required for E&P waste reclaimers and other commercial facilities where waste is placed on the land (e.g., in pits and in landfarms). The agency should use the data and information required by the technical standards of this section to approve or deny applications for permits, to ensure compliance with permit conditions, to order corrective actions in order to prevent or abate violations of the standards, or for any other purpose deemed necessary by the agency.

5.10.2.1.1 Acceptable Wastes

The agency should prescribe the range of E&P wastes that can be disposed at commercial and centralized facilities and at municipal solid-waste landfills.

5.10.2.1.2 Waste Characteristics and Disposal

The agency should identify the chemical characteristics of wastes likely to be disposed at commercial and centralized facilities on the basis of published scientific data and on knowledge about regional or site-specific waste characteristics. The agency should consider the types of waste management appropriate for each waste type, and the extent to which additional protective measures (e.g., leachate collection) are needed to protect groundwater, surface water and air.

The agency should prescribe these waste disposal facilities and waste stream relationships by rule or in the permitting process and ensure that operators of commercial or centralized facilities comply with them. For sampling and testing, refer to Section 5.10.2.2.3.f., g. For determining radiological content, refer to Sections 7.3.3 and 5.2.2.

5.10.2.2 Permitting Requirements

A permit should be issued only upon compliance with the general requirements of Section 5.1 and the technical requirements of this section, and upon submittal and approval of an application that contains a Siting Plan, Construction Plan, Operating Plan, and Closure Plan. Operation of a facility should comply with the terms and conditions of the permit. The regulatory agency may tailor the technical requirements for all existing facilities and for centralized disposal facilities to the conditions present at the locations of such facilities. In the case of centralized facilities, the regulatory agency may adjust the requirements of this section in light of the volume and characteristics of wastes received by the facility.

5.10.2.2.1 Siting Plan

The specific site for a commercial facility and, to the extent possible, the site for a centralized facility, should have natural features that prevent or minimize release of pollutants to waters, land, and air. Those natural features could include isolation from or considerable depths to groundwater, protection against flooding, the presence of low permeability soils, and topography conducive to protection against erosion. Additional safeguards may be required by the regulatory agency for centralized facilities that are located on sites that do not exhibit natural protective features or are located in close proximity to residences, schools, hospitals or commercial buildings. An application for a permit for a commercial or centralized facility should, at a minimum, contain the following information:

d. Names, addresses, and telephone numbers of owner(s) and the operator(s) of the facility, the owner(s) and occupant(s) of properties within close proximity of the site, or any nearby person who may reasonably be adversely affected by release from the site;

e. Topographic map showing the location of the site and any highways or roads that abut or traverse the site and depicting all water courses, flood plains, water wells, pipelines, and dwellings located within one mile of the site;

f. Geologic, hydrologic, engineering, chemical, and any other data or information that demonstrate disposal of wastes and operation of the facility will not contaminate fresh water, the surrounding soils or air, endanger public health, safety or the environment, or cause property damage;

g. Average annual precipitation and evaporation rate at the disposal site;

h. Nature and permeability of vadose zone; description of the subsurface strata, identification of the areal extent of underlying aquifer(s), and depth to groundwater; direction of groundwater movement; baseline data on water quality of nearby surface waters, underlying aquifer(s) and soils prior to commencement of operations; and points of past or current use of surface water or groundwater;

i. Proof that all public notice requirements have been met; and

j. Certification by an authorized representative of the applicant that information submitted in the application is true, accurate, and complete to the best of the applicant's knowledge.

5.10.2.2.2 Construction Plan

In general, commercial and centralized disposal facilities should be constructed to prevent or minimize releases of wastes or waste byproducts to surface water, groundwater, soils, and air. Design should allow for the segregation, separation and containment of free oil to minimize emissions, where appropriate. The need for additional protective measures (e.g., barriers) at facilities in close proximity to residences, schools, hospitals, or commercial buildings should be considered. Pits at these facilities should at least meet the construction requirements of Section 5.5.3 In the case of E&P waste reclamation facilities, construction requirements to prevent or minimize releases should also apply to wastes stored before and after reclamation. For commercial facilities, detailed engineering drawings and diagrams of engineered disposal facilities should be required; for centralized or one-owner facilities, such extensive construction details may not be needed. Construction should follow guidelines and rules adopted by the regulatory agency.

5.10.2.2.3 Operating Plan

Applications for permits for existing or new facilities should be accompanied by an Operating Plan that describes the wastes that will be accepted at the facility and the methods by which those wastes will be managed and disposed. The need for groundwater, air, or other monitoring at commercial or centralized disposal facilities where wastes are placed on the land should be evaluated by the state as part of this program development and implementation and should depend upon the nature and size of the disposal activities. At facilities that manage TE/NORM, monitoring should be sufficient to determine compliance with maximum permissible doses to workers and to members of the public in unrestricted areas.
The Operating Plan should contain the following information:

a. Volume, rate of application, and type of material to be disposed at the facilities and the

facilities that will be used to dispose of each waste stream (i.e., unlined or lined pits, above- or below-grade tanks, etc.);

b. Contingency plan for reporting, responding to and cleaning up spills, leaks, and releases of wastes or waste byproducts, including provisions for notifying emergency response authorities and for taking operator-initiated emergency response actions;

c. Plan for routine inspection, maintenance, and monitoring to ensure and demonstrate compliance with permit requirements. At commercial and centralized facilities where wastes are placed on the land, such as in pits or landfarms, groundwater monitoring should be required in the absence of site-specific or facility-specific conditions that minimize the potential for adverse impacts to groundwater. Specific plans for preventing or minimizing air emissions from sources such as

   i. The volatilization of organic materials in the waste;

   ii. Particulate matter (dust) carried by the wind; and

   iii. Chemical reactions (e.g., production of hydrogen sulfide from sulfur-bearing wastes) should be considered.

d. Monitoring to ensure organic wastes are treated effectively should also be required for landfarming operations.

e. Waste acceptance policy for the facility that details the types of wastes that the facility will accept(exempt E&P wastes and/or non-exempt, non-hazardous wastes from E&P operations), how the facility will determine whether a shipment of wastes meets its acceptance criteria including whether on-site sampling and testing will be employed, and the procedures that will be followed if unacceptable wastes arrive at the facility;

f. Plan to characterize wastes received for disposal. Waste characterization requirements for small centralized facilities may be more limited, based on the limited types and volumes of wastes received. At a minimum, waste characterization should comply with the requirements of Section 5.2. States should determine additional minimum testing criteria applicable to their regions;

g. Plan for periodic removal and subsequent handling of free oil;

h. Security plan for the facility;

i. In the case of landfarming operations, loading rates, location restrictions, and/or other appropriate requirements that ensure the treatment of organic constituents, prevent the contamination of groundwater or surface waters, and protect air quality. Operations should comply with the requirements of Section 5.6.3;

j. A community relations or public information plan should be considered; and

k. Environmental, Health, and Safety Plan. Where applicable, an environmental, health, and safety plan should be developed for commercial disposal facilities. Such plan should describe site sampling methods and procedures to determine the potential risks to human health and the environment posed by the site. State regulatory programs should take into

consideration the size and nature (treatment and disposal processes) of each facility when determining whether or not this environmental, health, and safety plan is applicable.

5.10.2.2.4 Closure Plan

Applications for permits for existing or new facilities should be accompanied by a Closure Plan that describes the methods to be used to reclaim the facility following the cessation of operations. Closure should comply with the general requirements of Section 5.1 and with any other requirements established by the regulatory agency. The plan should include a closure schedule, a cost estimate for reclamation, and a schedule for authorized financial assurance instrument. The cost estimate and authorized financial assurance instrument schedule should be used to establish a financial surety level for the facility prior to permit approval. The level of financial surety requested should cover the full estimated cost of facility closure and reclamation.

For commercial disposal facilities and centralized disposal facilities of comparable nature or size, the plan should describe the site sampling methods that will be used to determine the risks to human health and the environment posed by the site, if any, once closure is completed; and any further measures that may be necessary to address remaining site contamination at that time. The plan should also include post-closure monitoring and maintenance requirements where the wastes remaining on-site after closure may adversely affect groundwater or surface waters, or otherwise pose a significant risk to human health and the environment. The duration of the post-closure care period and the nature of the post-closure requirements should correspond to the continuing risks posed by the facility after closure.

5.10.2.3 Waste Tracking Requirements

To assure that only acceptable wastes are disposed of at commercial or centralized facilities, a waste tracking system that documents the movement of wastes from the site of their origin to their final disposition should be implemented. The following elements should be included in the waste tracking system:

a. Multi-Part Form or Equivalent Documentation: State regulatory programs should require operators to use a multi-part form or equivalent documentation that contains the names, addresses, and phone numbers of the generator (producer), hauler, and disposal facility operator; a description of the waste; the time and date it was collected, hauled, and deposited at the disposal facility; and the volume of the waste hauled.

b. Maintenance of Waste Tracking Information: The waste tracking information should be maintained by the generator, hauler, and operator of the disposal facility for inspection by the regulatory agency for a period of three years after the shipment date. This record retention period should be automatically extended for any person who is the subject of an unresolved enforcement action regarding the regulated activity from the date such person receives notice of the enforcement action until it is resolved.

c. Attest to No Illegal Dumping: The waste hauler should certify in writing that no unauthorized wastes were dumped illegally or at a location or facility not designated by the generator and that no unauthorized wastes were mixed with the exempt wastes during transport. The disposal facility operator should certify in writing that the facility is authorized to receive the waste for disposal.

d. Reporting of Discrepancies: The operator of the disposal facility should immediately

report to the regulatory agency and the generator, any discrepancy in waste descriptions, volumes, or place of origin based on personal observations or documentation.

e. Permitting of Waste Haulers: Waste-hauling companies should be permitted by the regulatory agency based on a showing of basic knowledge about the regulatory requirements for disposition of E&P wastes transported from their point of generation to their final disposal site. The regulatory agency may issue permits to individual waste haulers or to waste hauling firms.

5.10.2.3.1 Applicability of Waste Tracking Criteria

These waste tracking requirements do not apply to wastes moved by pipeline. Operators who transport wastes by pipeline should periodically report waste quantities to the regulatory agency.

SECTION 6 | Abandoned Sites

6.1 Abandoned Oil and Gas Sites Introduction

States with current or historic oil and gas operations should develop and implement a program to inventory, prioritize, and remediate, as necessary, abandoned sites. The purpose of this section is to provide guidance for that program. It is not the intent of these guidelines to preclude an abandoned site from being returned to operation in accordance with state requirements.

6.2 Definition of "Oil and Gas Site" and "Abandoned Site"

The terms "Oil and Gas Site" and "Abandoned Site," as used herein, have the following meanings:

a. An Oil and Gas Site is land or equipment, including a wellbore, that is now or has been used primarily for oil or gas exploration or production, or for the management of oil and gas wastes from exploration and production.

b. An Oil and Gas Site is considered an Abandoned Site if the site:

i. Was not adequately plugged or closed at conclusion of operations such that it constitutes or may constitute a threat to public health or the environment; and

ii. Has no owner, operator, or other responsible person (hereinafter called "responsible party") who can be located, or such responsible party has failed or refused to undertake actions, where required by law, to abate the threat. A responsible party cannot be located, among other circumstances, where no liability for remedial actions is imposed by the state upon past or current owners and operators.

6.3 Identification of Abandoned Sites

A state should have a procedure for identifying sites that may constitute a threat to public health or the environment and for determining whether a responsible party exists. The state should develop and maintain an inventory of abandoned sites. Examples of elements that may be considered in identifying sites that may constitute a threat to public health or the environment include agency reviews or inspections, referrals by other agencies, or citizen or landowner inquiries. Classifications or rankings may be used to separate these sites into relative risk categories. Examples of elements that may be considered in determining whether a responsible party exists include the failure to file required data or reports, the failure to respond to agency inquiries, tax defaults, information in public records, or landowner or public inquiries. In developing an inventory of abandoned sites, the state should have procedures for attempting to notify the last known responsible party,

and providing legal notice.

Emergency protocols should be included, so that remedial action can be initiated prior to legal notice on sites that are judged to present an immediate threat to the public health or environment. Where there are agencies with overlapping jurisdiction for abandoned sites, inventory procedures should be coordinated among these agencies as further discussed in Section 4.4 of these guidelines.

6.4 Funding for Abandoned Site Remediation

An effective state program to address abandoned sites should have adequate funds available to permit the state to undertake any necessary assessment, plugging, closure, or remediation of such sites.

Adequate funding involves the development of a financial assurance program as provided in Section 4.2.4. To ensure the continuity of financial assurance in the event of a change of operator, notice to the state of any such change should be required. Any financial assurance provided by the previous operator should remain in effect until the new operator's compliance with the state's financial assurance program is verified.

Section 4.2.4 describes some of the types of financial assurance a state should consider in designing a program to provide it with the necessary economic resources while facilitating operator compliance. As part of a financial assurance program, a state should consider establishing a special purpose fund to plug, close, or remediate an abandoned site. The state should have the authority to recover costs from the responsible party, where such party exists. The state should evaluate its needs and establish such funding mechanisms as are appropriate to satisfy those needs. A wide variety of funding mechanisms have been employed to support existing special purpose funds in various states. Those mechanisms include bond forfeitures; legislative appropriations to the responsible state agency; a percentage of the taxes on oil and gas production; fines and penalty assessments; equipment salvage; and a host of fees, among them fees or charges based on the value of oil and gas, fees or charges based on units of production of oil and gas, operator fees, supplemental fees in lieu of bonds, inactive well fees, permit fees, and waste generation fees.

6.5 Criteria for Prioritizing Remediation

The state program should include criteria for determining whether an abandoned site constitutes a threat to public health or the environment and the site's priority for remediation. Among other things, the following criteria may be used: (1) the occurrence of or potential for an imminent release from the site; (2) the nature, extent, and degree of contamination; (3) the proximity of the site to populated areas, surface water, and/or groundwater; (4) whether the site is in an environmentally sensitive area; and (5) wellbore lithology and condition. Where appropriate, the state should perform a more detailed site evaluation. The state agency should have flexibility and discretion to consider the factors

associated with the individual sites, including cost savings associated with simultaneous remediation of multiple sites that otherwise would have different priorities or similar financial considerations, in assigning them a priority on the inventory of abandoned sites.

6.5.1 Goal for Remediation

A goal of the state program should be to remediate the abandoned sites on its inventory in a manner that assures that reasonable and measurable progress is made.

6.5.2 Liability for Remediation

The state should establish a liability scheme that will ensure that the goals of its abandoned sites program will be achieved. States should consider a range of options with respect to liability for remediation, which may include among others: (1) liability for all current and past owner(s) and operator(s); (2) liability for the owner(s) and operators(s) found to be responsible for the contamination at an abandoned site; or (3) no liability for past or current owner(s) and operator(s) should the state choose to finance the abandoned sites program.

Any liability scheme established by a state should clearly define the responsibility for remediation. A state should allow remediation of an abandoned site by a party that would not otherwise be responsible for the remediation.

6.6 Standards for Remediation

The state should ensure that abandoned sites, including well bores, be plugged or closed in a cost-effective manner that minimizes or removes the threat to public health and the environment and that restores the land to an environmentally stable condition.

6.6.1 Well bore Remediation

The state should consider existing rules and regulations when determining proper plugging procedures for abandoned sites. However, the state should have the flexibility to modify those plugging procedures, while maintaining mechanical integrity of the well bore adequate to ensure that public health and the environment are protected.

In carrying out well bore remediation, the state should use existing information from well records including depth of well, depth of any old plugs, presence of casing and tubing and depths set, perforations, existence of groundwater and hydrocarbon-bearing zones, existence of over-pressured zones, and any junk in the hole to determine the condition of the well and the proper plugging procedure. In the absence of the above information, data such as existing geological and engineering field studies, water well records, interviews with nearby landowners, corporate records, and historical literature can be reviewed.

6.6.2 Site Remediation

The extent of surface remediation of an abandoned site should be determined based on surface and subsurface resources and land use. Consultation by the state regulatory agency with the surface owner, surface tenant, and other federal, state and local agencies, as appropriate, should take place prior to remediation.

As appropriate, abandoned sites should be re-vegetated in accordance with state regulatory agency rules, and with consideration given to recommendations from the surface owner, surface tenant, and federal and local agencies. As appropriate, soil should be evaluated to determine if hydrocarbons, chemicals, or NORM were spilled or leaked, and to determine remediation.

Surface equipment or materials on an abandoned site should be removed, and salvaged when possible, unless the state determines otherwise. Procedures should be identified for handling NORM, if present. Due to the expense and potential damage to the land, there may be situations where equipment or materials would not be removed, e.g., a gathering system might be abandoned in place with appropriate protection. When reclaiming a pit, the state should determine the contents of the pit and how the pit can best be remediated. Once emptied, cleaned and tested as appropriate, pits should be backfilled and contoured to prevent erosion from or ponding of surface water. Monitoring wells at an abandoned site should be as necessary to protect groundwater resources. The state should develop additional remediation criteria for commercial disposal sites, as appropriate.

6.6.3 Record of Remediation

Once remediation of an abandoned site has been completed, reports on how the site was remediated should be maintained by the regulatory agency.

6.7 Public Participation

The state abandoned sites program should provide for public participation. At a minimum, the public should have: (1) access to information about the program; (2) the opportunity to participate in any rulemakings associated with the program; and (3) a statutory or regulatory mechanism to petition the state agency to change a site's status on the inventory and/or the level of remediation required on a site.

6.7.1 Access to Information

The state should maintain and make available to the public, records related to the abandoned sites inventory, including: (1) the location of an abandoned site; (2) the extent and degree of contamination of the abandoned site; and (3) the method of remediation that

has been or will be required for an abandoned site. In addition, the state should maintain public records on the state's progress with respect to implementing the abandoned sites program.

6.7.2 Participation in Rulemaking

The state program should provide an opportunity for the public to participate in any rulemakings associated with the program.

6.7.3 Participation Regarding Priority on the Inventory and Level of Remediation

The state program should include a mechanism by which an affected person could petition the state to: (1) add a site to the abandoned sites inventory; (2) change the priority for remediation of a site on the inventory; and (3) conduct or require additional remediation of a site.

6.8 Avoid Future Abandoned Site Problems

Since abandoned sites may constitute a threat to public health and the environment, the state should:

a. Establish and implement an abandoned site program consistent with the guidance in this section; and

b. Enforce its existing regulatory program, with modifications, if necessary, consistent with this guidance.

c. Evaluate its programs for financial assurance, inspection, compliance tracking, and monitoring of inactive sites to determine whether or not the state should make adjustments to prevent an increase in abandoned sites.

SECTION 7 | Naturally Occurring Radioactive Materials

7.1 Background

Naturally occurring radioactive material (NORM) is present above background levels at some oil and gas E&P facilities and E&P service company locations. NORM found in E&P operations originates in subsurface oil and gas formations and is typically transported to the surface in produced waters. NORM may deposit in well tubulars, surface piping, vessels, tanks, pumps, valves, and other producing or processing equipment and may be found in scales, sludges, contaminated soil, and other associated E&P wastes. NORM is also referred to as Technologically Enhanced Naturally Occurring Radioactive Material or TENORM.

7.2 General

States should adopt an E&P NORM regulatory program that addresses identification, use, possession, transport, storage, transfer, decontamination, and disposal to protect human health and the environment. States may choose not to adopt such a program if they find, based on field monitoring data and other scientific information, that no NORM is present in oil and gas operations in the State, or that the levels of NORM present in oil and gas operations in the State do not present such a risk to human health or the environment to warrant a regulatory program. States that make such a finding should periodically reevaluate the basis for the determinations.

If a state determines that a regulatory program is necessary, it should tailor its program to NORM occurrence in the oil and gas E&P industry and an assessment of risks to human health and the environment. The program should include the elements listed in Section 7.3. E&P NORM should be managed in accordance with the pollution prevention and waste management hierarchy provisions of these guidelines. In addition, the other sections of these guidelines apply, where applicable, to NORM as a constituent of E&P waste.

7.3 Elements of an E&P NORM Program

7.3.1 Definition

States should develop a definition for NORM that is consistent with that which occurs in the oil and gas E&P industry. For purposes of these guidelines, NORM is defined as any naturally occurring radioactive materials (not including byproduct, source or special nuclear material, or low level radioactive waste) not subject to regulation under the Atomic Energy Act, whose radionuclide concentrations have been enhanced by human activities such that potential risk to human health or the environment are increased.

7.3.2 Action Levels

States should establish risk-based numerical action levels above which NORM is regulated taking into consideration the risk of exposure to human health and the environment. Such action levels should also be used to regulate the transfer or release of equipment, materials, and sites.

7.3.3 Surveys

States should develop standards for survey instruments and procedures for identifying and documenting equipment, materials, and sites that may contain NORM above the action levels. States should consider the types of facilities to be surveyed, when surveys should be performed, when survey results should be reported to the state regulatory agency, and any necessary training of surveyors. State survey requirements should provide data necessary to meet the purposes described in Section 5.2.1 and to administer and enforce state program requirements effectively.

7.3.4 Worker Protection

State regulatory programs should include applicable state and federal standards for worker protection from exposure to radiation, including worker protection plans, and other standards necessary for the protection of workers from exposure to NORM. States should establish NORM training or certification requirements based upon E&P work related duties and their associated NORM exposure risk (i.e., NORM awareness training may be sufficient for many common E&P work activities).

States that have not implemented a Federal OSHA-Approved State Plan cannot enforce Federal OSHA standards for worker protection. In such “non-agreement” states, Federal OSHA administers job safety and health programs. States with Federal OSHA jurisdiction should be aware of the limitations this may place on worker protection programs implemented by the state and should communicate with Federal OSHA to ensure that any worker protection program implemented by the state is enforceable under Section 18 of the OSH Act.

7.3.5 Licensing/Permitting

a. General licensing/permitting: Persons who possess E&P NORM in concentrations or at exposure rates that exceed state-adopted action levels should be generally licensed or permitted.

b. Specific licensing/permitting: Specific licenses or individual permits should be required for commercial storage, removal, decontamination, remediation, treatment or disposal of E&P NORM. A state may require specific licenses or individual permits for the

management of E&P NORM at centralized facilities as defined in Section 5.10.

7.3.6 Removal/Remediation

States should consider performance standards for removal, decontamination, and remediation that are protective of human health and the environment.

7.3.7 Storage

States should establish standards for storage of NORM that are protective of human health and the environment. NORM storage facilities should be constructed to prevent or minimize releases. Tanks used to store E&P NORM should meet the requirements of Section 5.9. A state should consider adoption of limits on the amount of time NORM that exceeds action levels can be stored, depending on factors such as quantity, radioactivity, climate, proximity to the public, and protective controls.

7.3.8 Transfer for Continued Use

State regulatory programs should allow for the transfer of land and equipment containing NORM for continued operations in the production of crude oil and natural gas, with appropriate notification to affected parties.

7.3.9 Release of Sites, Materials, and Equipment

State regulatory programs should address the levels below which, and conditions under which, equipment, materials, and sites containing NORM may be released. State regulatory programs should authorize the release of equipment, materials, and sites for unrestricted use only if NORM is below action levels. Such regulations should provide for appropriate notification to affected persons.

7.3.10 Disposal

State regulatory programs should authorize disposal alternatives within the state's jurisdiction for various E&P wastes containing NORM, including contaminated equipment, and should include regulatory requirements for NORM disposal that are protective of human health and the environment. Landowner or other notification may be required as a condition of disposal. Commercial and centralized NORM disposal facilities should meet the criteria of Section 5.10.

7.3.11 Interagency Coordination

State radiation programs, oil and gas programs, and waste management programs are frequently distributed among separate agencies. Therefore, in many states, multiple agencies may regulate NORM. The various agencies should coordinate their regulatory and enforcement activities under the guidance given in Section 4.4 of these guidelines.

7.3.12 Public Participation

State regulatory programs for NORM should meet the public participation guidelines established in Section 4.2.2.

7.4 Regulatory Development and Research

The Conference of Radiation Control Program Directors has prepared suggested state regulations for NORM, and a number of states have developed or are in the process of developing NORM regulations. States that are developing their own NORM programs are encouraged to consult these sources as well as applicable federal radiation guidance and requirements for information and assistance. In addition, states should encourage and keep abreast of ongoing and future research on NORM, including risk assessment.

SECTION 8 | Stormwater Management

8.1 General

Stormwater can become contaminated from contact with spilled or stored materials, from contact with E&P waste, or from the erosion of soils. E&P waste management practices that have a potential of contaminating stormwater include land application, landfarming and roadspreading. States usually have statutory authority for stormwater management programs through general pollution prevention or water pollution control legislation. States should implement programs to minimize the potential for contamination of surface water from sediment and other E&P contaminants contained in stormwater.

Stormwater management requirements should be adapted to regional characteristics. These characteristics include variations in topography, rainfall (annual average, episodic and seasonal), major soil types, proximity to surface waters, floodplains, seasonal and permanent swamps, wetlands and marshes, and vegetative cover.

States should adopt a stormwater management program based on the potential effects on human health and the environment. States may choose not to adopt such a program if they find, based on field monitoring data and other scientific information, that stormwater runoff does not pose a significant risk to human health or the environment. States that make such a finding should periodically reevaluate the basis for the determination. The state program need not duplicate applicable federal regulations for stormwater management.

Stormwater management regulatory activities should be coordinated with activities of other interested parties including landowners, soil conservation agencies, land management agencies, agencies with NPDES jurisdiction, and agencies with spill response authority.

8.2 State Regulatory Elements

The state agency with stormwater management or erosion control authority should require an operator to minimize environmental impacts caused by stormwater. These requirements should include a description of the action the operator will take to meet state program goals for the geographic location in which the activity will take place. These requirements may be spelled out in specific regulations or they may be required to be included in operator- or site-specific plans developed by operators. State program requirements should specify time frames when stormwater control measurements are to be in place and when any state notifications are to occur.

In regions where stormwater has a high potential for causing environmental degradation, states should consider the use of permits or other authorizations to assure that adequate measures will be put in place. Such permits or authorizations should conform to Section 4.1.1. (Permitting).

State stormwater management programs should contain compliance evaluation capabilities as outlined in Section 4.1.2. (Compliance Evaluation), contain enforcement capabilities as outlined in Section 4.1.3. (Enforcement), be applicable to responses to spills and releases as outlined in Section 4.2.1. (Contingency Planning and Spill Risk Management), and contain data management capabilities as described in Section 4.2.8. (Data Management).

States programs should provide for outreach and training on stormwater management requirements and practices for operators, landowners and the public. These activities should conform to Section 4.2.2.2. (Public Participation). Similarly, training should be provided for state agency personnel as outlined in Section 4.3.1.5. (Training Requirements). Where stormwater management and E&P regulatory authority reside in different agencies, oil and gas agency staff should be trained so that they can, as time and staffing patterns allow, provide information and referrals to operators.

State stormwater management programs should be evaluated periodically in accordance with Section 4.2.3 (Program Planning and Evaluation). Such evaluations should include an analysis of all aspects of the program, and procedures for making any necessary program changes identified during the evaluation.

8.3 State Agency Regulatory Program Criteria

8.3.1 Planning

Within the context of an E&P program, selection of the location for a well site, roadway, pipeline or other E&P facility is a critical component of a stormwater management program. Factors to be considered during the development of site requirements with respect to stormwater management include: minimization of the area to be disturbed, current land uses, site gradient, the type of facility to be constructed, springs and seeps, floodways, stream crossings, and the management of E&P wastes.

Other factors that should be considered in the development of stormwater management requirements include well density, distance between wells, existing roads, necessary temporary and permanent roads to be constructed, road alignment, slope, grade and length, the availability of vegetative filter strips, and the management or disposal of trees and stumps to be removed during construction.

8.3.2 Construction

The construction of well sites, access roads, pipelines, stream crossings and crossings of wetlands, swamps and marshes can result in the contamination of stormwater and/or adjacent surface waters. Consequently, state agencies should develop standards or management practices appropriate for these activities. Similar practices may be

necessary when responding to spills and releases when soils are disturbed or contaminants are mobilized by stormwater.

Standards or management practices should be appropriate for the region in which the construction activity will occur. Examples of such requirements include the construction of upgrade diversion channels and the collection of construction site runoff; the use of brush and other barriers and the stockpiling of topsoil and subsoil during clearing and grubbing; and the grading of cut and fill slopes, road embankments, road surfaces (crowned, insloping or outsloping) and roadside ditches to control water.

Similarly, requirements should be developed for bridges, causeways, cofferdams, fords and bank stabilization when surface waters are encountered. Requirements for temporary road or stream crossings and use of rock at construction entrances may be necessary.

Practices to be considered for stormwater controls during construction include drainage ditches, basins, sediment traps, berms, vegetative filter strips, sediment barriers, turnouts, culverts and cross-drains, broad-based dips and swales, waterbars, rock filters, straw bale barriers and fabric filter fence. Outlet protection should be provided for devices with outlets to surface waters.

Additional practices to be considered for pipeline construction include the use of ditchline barriers, timing of backfilling, materials used for trench backfill, location of staging areas, and the use of trench plugs. In fragile soil, wetland and marshy areas, and at stream crossings, construction mats, board roads or geo-textiles should be considered.

Criteria should be developed for temporary stabilization if permanent stabilization will be delayed. Temporary stabilization practices such as seeding with annual grasses and mulching, or seed/filter fabric combinations should be considered. Permanent stabilization can occur through the application of rock to well sites and roads, and achieving adequate growth of (or sodding with) permanent vegetation. Factors to be considered during revegetation include calculation of acreage, soil types and distribution, seed bed preparation, seed mixtures (temporary, permanent), soil amendments, and mulching and anchoring.

8.3.3 Operation and Maintenance

States should require that stormwater control measures be operated and maintained in a manner that will assure their effectiveness during site preparation, well drilling and production, and until the site is restored. These measures should be operated and maintained to control sediment as well as E&P waste and spills. Requirements regarding the frequency and type of inspection, preventative maintenance and repairs are appropriate.

8.3.4 Restoration and Reclamation

Where appropriate, states should incorporate stormwater management during the development of standards for site restoration and reclamation. These requirements should apply to the restoration of recently active sites, orphan sites, remediation sites, and sites where prior restoration efforts failed.

Where appropriate, stormwater management criteria should be developed for the removal of equipment, restoration of pits, disconnection and abandonment of pipelines, backfilling and grading, and access road reclamation.

SECTION 9 | Hydraulic Fracturing

9.1 Background

The practice of completing oil and gas wells through hydraulic fracturing, while not new, has evolved into a key technology in the development of unconventional oil and gas resources, such as coal bed methane or shale gas. This has resulted in questions about the potential impacts on water resources due to the volume of water needed for hydraulic fracturing, the potential impacts to groundwater by the hydraulic fracturing process, or the proper management or disposal of waste and other fluids associated with hydraulic fracturing.

9.2 General

States should evaluate potential risks associated with hydraulic fracturing, taking into account factors such as depth of the reservoir to be fractured, proximity of the reservoir to freshwater resources, well completion practices, well design, and volume and nature of fluids. Where necessary and recognizing the local and regional differences discussed in Section 3.3, states should have standards to prevent the contamination of groundwater and surface water from hydraulic fracturing. State programs for hydraulic fracturing should ensure establishment and maintenance of well control; protection of groundwater zones, other mineral resources.

9.2.1 Standards

State programs for hydraulic fracturing should include standards for casing and cementing to meet anticipated pressures and protect resources and the environment. The state should have the authority as necessary to require the performance and/or submittal of diagnostic logs or alternative methods of determining well integrity. The state program should address the identification of potential conduits for fluid migration in the area of hydraulic fracturing and the management of the extent of fracturing where appropriate. The program should require monitoring and recording of annular pressures during hydraulic fracturing operations. The program also should address actions to be taken by the operator in response to operational or mechanical changes that may cause concern, such as significant deviation from the fracture design and significant changes in annular pressures.

State programs for hydraulic fracturing should consider baseline groundwater monitoring protocols that address appropriate factors which may include distance/radius from the well, timing/frequency of testing, test parameters, reporting and management of and access to data, existing/new development or existing production in area, responsibility for sample collection, testing, cost, location/gradient, surface owner consent, laboratory accreditation, and remedial actions.

Surface controls, such as dikes, pits or tanks, should meet the criteria in Sections 5.5 and 5.9. In addition to pit technical criteria for authorization, construction, operation, pit integrity monitoring, and closure contained in Section 5.5, states should address unique characteristics of impoundments associated with hydraulic fracturing, including the use of centralized and commercial facilities, operatorship, size, location, duration, closure, retention for other use, and characteristics of contained fluids. States should consider erosion and safety issues such as embankment integrity associated with freshwater impoundments associated with hydraulic fracturing.

Contingency planning and spill risk management procedures that meet Section 4.2.1 should be required. Waste characterization should be consistent with Section 5.2. The waste management hierarchy contained in Section 5.3 (source reduction, recycling, treatment and disposal), including the provisions relating to toxicity reduction, should be promoted. The tracking of waste disposed at commercial or centralized facilities should meet the requirements of Section 5.10.2.3. Procedures for receipt of complaints related to hydraulic fracturing should be consistent with Section 4.1.2.1.

9.2.2 Reporting

The regulatory agency should require appropriate notification prior to, and reporting after completion of, hydraulic fracturing operations. Notification should be sufficient to allow for the presence of field staff to monitor activities. Reporting should include the identification of materials used, aggregate volumes of fracturing fluids and proppant used, and fracture pressures recorded.

State programs should contain requirements for public disclosure of information on type and volume of base fluid and additives, chemical constituents, and actual or maximum concentration of each constituent used in fracturing fluids. States are encouraged to require disclosure of such information online. State programs should contain mechanisms for disclosure of chemical constituents used in fracturing fluids to the state in the event of an investigation and to medical personnel on a confidential basis for diagnosis and/or treatment of exposed individuals. Where information submitted is of a confidential nature, it should be treated consistent with Section 4.2.2.

9.2.3 Staffing and Training

In addition to the personnel and funding recommendations found in Section 4.3, state staffing levels should be sufficient to receive, record and respond to complaints of human health impacts and environmental damage resulting from hydraulic fracturing. Staff should receive adequate training to stay current with new and developing hydraulic fracturing technology.

9.2.4 Public Information

State agencies should provide for dissemination of educational information regarding well construction and hydraulic fracturing to bridge the knowledge gap between experts and the public as provided in Section 4.2.2.2. This is especially important in areas where development has not occurred historically and in areas where high volume water use for hydraulic fracturing is occurring.

9.2.5 Coordination

In addition to coordination as contained in Section 4.4, states should consider interstate coordination of regional multi-state issues such as source water, transportation and waste management related to hydraulic fracturing.

9.3 Water and Waste Management

Fundamental differences exist from state to state, and between regions within a state, in terms of geology and hydrology. The state should evaluate and address, where necessary, the availability of water for hydraulic fracturing in the context of all competing uses and potential environmental impacts resulting from the volume of water used for hydraulic fracturing. The use of alternative water sources, including recycled water, acid mine drainage and treated wastewater, should be encouraged.

Waste associated with hydraulic fracturing should be managed consistent with Sections 4.1.1 and 7.

States should encourage the efficient development of adequate capacity and infrastructure for the management of hydraulic fracturing fluids/wastes, including transportation (by pipeline or otherwise), recycling, treatment and disposal. State programs should address the integrity of pipelines for transporting and managing hydraulic fracturing fluids off the well pad.

SECTION 10 | Air Quality

10.1 Background

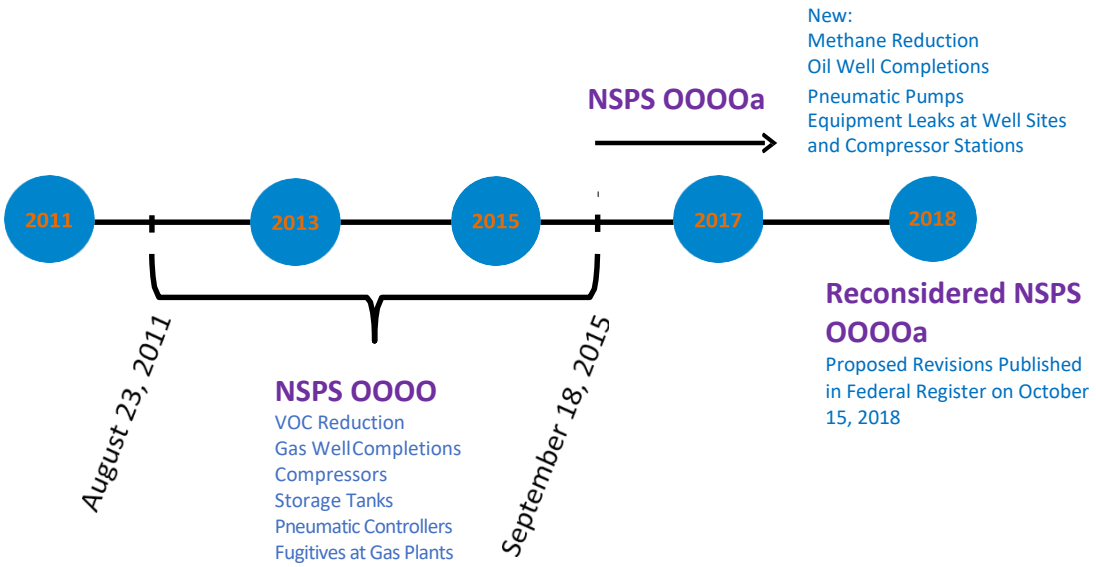
As a result of the increased development of oil and natural gas from shale formations, concerns about air emissions from the oil and gas sector have become more focused. The criteria of this Guidelines section are focused on air emissions from upstream oil and gas exploration and production (E&P) operations. The term “upstream” is used throughout to describe the full array of operations, activities, facilities, and sources in this sector.

On August 16, 2012, EPA published three final rules for the Oil and Natural Gas Sector: NSPS OOOO for the control of VOC and SO_2 emissions; and NESHAP HH/HHH for the control of hazardous air pollutant emissions. For VOC sources, NSPS OOOO applies to affected sources that are new, modified or reconstructed on or after August 23, 2011, and on or before September 18, 2015. NSPS OOOO requires that companies reduce completion flowback emissions from hydraulically fractured and refractured gas wells by employing reduced emissions completions (aka “green completions”), control emissions from storage vessels by 95%, use low or no bleed pneumatic controllers in the production segment, use no bleed controllers at gas plants, replace reciprocating compressor seals every 26,000 hours of operation or three years, reduce wet seal centrifugal compressor emissions by 95%, and implement more stringent NSPS Subpart VVa leak detection and repair (LDAR) programs at natural gas processing plants. NSPS OOOO also revised SO_2 emissions maximum control requirements for sweetening units affected facilities from 99.8 percent to 99.9 percent.

The NESHAP HH/HHH rules amended provisions to previously codified rules. In particular, the amendments set new standards for small glycol dehydrators, lowered the leak detection threshold at gas plants and amended the definition of “associated equipment” used in making major source determinations at well sites.

EPA published minor amendments to NSPS OOOO on September 23, 2013 and December 31, 2014. In response to petitions for administrative reconsideration of certain provisions in NSPS OOOO and in the amendments, EPA granted reconsideration for certain issues and subsequently proposed revisions to the rule on September 18, 2015. In the proposed rule, EPA revised the regulated pollutant to be both methane and VOC across the oil and natural gas source category (i.e., production, processing, transmission and storage). EPA also added control requirements for completion flowback emissions from hydraulically fractured and refractured oil wells, emissions from pneumatic pumps, and fugitive emissions from well sites and compressor station sites (LDAR). On June 6, 2016, EPA published a final NSPS OOOOa. The initial compliance date was August 2, 2016.

NSPS OOOO/OOOOa Applicability Timeline



New petitions for administrative reconsideration of certain provisions in NSPS OOOOa were filed and, after additional input from public and industry stakeholders, EPA published proposed revisions to NSPS OOOOa on October 15, 2018. EPA has not proposed removing any of the current regulated sources. EPA requested public comments on the proposed revisions and for questions the agency has asked in the preamble. A final revised NSPS OOOOa will likely be published in the second quarter of 2019.

10.2 Administrative

While state oil and gas regulatory agencies have many environmental responsibilities, air quality programs are typically administered by state environmental protection or health agencies and are given statutory and regulatory powers as described below.

Recognizing the local and regional differences discussed in Section 3.3, states should have standards to prevent the contamination of air from pollutants such as nitrogen oxides (NOx), volatile organic compounds (VOC), carbon monoxide (CO), methane, hydrogen sulfide (H2S); and air toxics or hazardous air pollutants (HAP) such as sulfur dioxide (SO2), benzene, normal hexane (N-Hexane), and formaldehyde.

10.2.1 Scope of Authority

An effective state program for the regulation of air emissions from upstream operations should include, at a minimum:

1. Statutory authority that adequately details the powers and duties of the respective regulatory body or bodies;

2. Statutory authority that grants the regulatory body or bodies the power to oversee air emissions from upstream operations such as production, gathering,

compression and processing. This authority should include the ability to promulgate appropriate rules and regulations and meet the state's obligations under federal law;

3. Statutory authority to promulgate specific requirements that are more stringent than required under the federal Clean Air Act, or regulations where necessary and appropriate to protect public health and the environment (for example, additional requirements on new and/or existing facilities or sources within ozone nonattainment areas);

4. Authority to accept delegation and authority for implementation of federal air quality programs specific to upstream operations;

5. Authority to consider cost effectiveness in setting air emission standards when appropriate, as well as to exempt facilities or sources based on criteria such as de minimis emissions, or by type of source or facility;

6. Statutes and implementing regulations which adequately and clearly define necessary terminology;

7. Provisions to ensure adequate funding for the staff and program to carry out its objectives and duties;

8. Mechanisms for coordination among stakeholders (including the public, federal and state agencies, and the regulated industry); and

9. Technical criteria for air emission controls that are flexible and forward-looking to encourage and accommodate advancements in technology.

10.2.2 Jurisdiction and Cooperation Between Agencies

The Clean Air Act establishes a dual federal/state system for establishing requirements to protect public health and the environment, and to oversee air pollution sources, including upstream oil and gas exploration and production operations. Under this framework, states are required to establish State Implementation Plans (SIPs) that contain sufficient requirements to attain and maintain compliance with National Ambient Air Quality Standards (NAAQS). Separate from the SIP process, states may, but are not required to, accept delegation of certain federal air quality requirements such as the preconstruction Prevention of Significant Deterioration (PSD) permitting program, the Title V permit program or New Source Performance Standards (NSPS). Even if a state does not accept delegation to implement and enforce a particular federal requirement, EPA retains responsibility for implementing and enforcing that requirement. Part of EPA's role is to ensure a level playing field across the country, therefore where a state accepts delegation of federal regulations, EPA continues to provide oversight to ensure adequate programmatic and compliance efforts across states.

Within states that accept delegation from EPA, jurisdiction over air quality issues related to upstream operations may be split between the state air quality agency, local air quality agencies and/or the agency with jurisdiction over oil and gas drilling and production. Because states do not have jurisdiction over air pollution sources on tribal lands, EPA or the tribes hold responsibility for implementation and enforcement of air quality requirements for upstream operations on these lands.

Where multiple state, federal or tribal authorities have jurisdiction over air quality issues in the same landscape, mechanisms should be in place to avoid duplication, regulatory gaps, or inconsistent air quality requirements or enforcement of such requirements. Consistent with EPA and state agency authority, such mechanisms could include formal Memoranda of Understanding, established interagency task forces, regular periodic meetings between agency staff, and joint inspections of facilities.

In addition to ensuring proper coordination, agencies should communicate with the regulated community and the public to make it clear which agency or agencies have jurisdiction over a particular area, or responsibility for enforcing a given set of air quality requirements.

10.2.3 Permits, Authorizations and Exemptions

The Clean Air Act prohibits the construction of a major source without a permit. State permits should clearly establish what performance standards and/or emission control requirements are required for each covered source. State programs should establish clear permit exemption criteria and employ construction general permits or permits by rule that also serve as final permits to operate.

When emissions are difficult to estimate due to uncertainty of source throughput and composition, states should consider mechanisms that allow operators to construct and operate certain source types for a limited but sufficient period of time to determine actual facility emissions prior to permitting (similar to federal rules such as the storage vessel provisions of OOOO and OOOOa that allow an established period for emissions determination before requiring control). Such mechanisms should be designed to ensure that permit conditions, including emission control requirements and Federal applicability, are properly informed, but that regulatory emissions thresholds are not exceeded during the evaluation period. States should have flexibility to re-visit emissions calculations as necessary.

States with approved Clean Air Act permitting authority should adopt a program for upstream emission sources that:

1. Is designed to protect human health and the environment;

2. Is legally and practicably enforceable;

3. Harmonizes with federal requirements to avoid confusing and duplicative requirements for operators; and

4. Allows the state to develop additional requirements beyond federal requirements to address state-specific air quality issues.

The permitting process should be efficient. Therefore, state air quality permitting programs should be:

5. Straightforward for operators to understand and implement;

6. Administratively efficient for the regulatory agency to minimize cost in time and resources; and

7. Transparent for public understanding.

To accomplish this, states are encouraged to simplify the application process by providing:

8. Accepted emission estimation methods and supporting documentation;

9. Guidance on air quality modeling requirements; and

10. Permit application assistance tools.

10.2.4 Compliance Monitoring, Demonstration & Assurance

State programs should contain the following compliance monitoring, demonstration and assurance capabilities:

1. Procedures for the receipt, evaluation, retention, and investigation of all notices and reports required of permittees and other regulated persons. These procedures should ensure that the notices and reports submitted are adequate in both content and frequency to assess compliance with applicable requirements. States should integrate electronic reporting systems to improve efficiency and timeliness of data received. Duplicative or unnecessary reporting should be minimized. Investigation for possible enforcement action should include determination of failure to submit complete notices and reports in a timely manner. Effective data management systems, as described in Section 4.2.7, should be used to track compliance.

2. Inspection and monitoring procedures that are independent of information supplied by regulated entities and which allow the state to determine compliance with program requirements, including:

    a. The capability to conduct comprehensive investigations, that may include advanced monitoring techniques as appropriate, of facilities and activities subject to regulation in order to assist with the evaluation of operational compliance;

b. The authority to obtain information from regulated entities and investigate information obtained regarding potential violations of applicable program and permit requirements; and

c. The capability to conduct regular inspections of regulated facilities and activities at a frequency that is commensurate with state priorities based on the protection of health, safety and the environment.

3. Procedures to receive and evaluate information submitted by the public about alleged violations and to encourage the public to report perceived violations. Such procedures should not only involve transparent communications with the public, (to apprise it of the process to be followed in filing reports or complaints) but should also communicate how the state agency will assure an appropriate and timely response.

4. Authority to conduct unannounced inspections at a reasonable time of any regulated site or premises where operations are being conducted, including the authority to inspect, sample, monitor, or otherwise investigate compliance with permit conditions and other program requirements, such as proper operation of control devices, process operating conditions and control device operating parameters.

5. Authority to enter locations where records are kept during reasonable hours for purposes of copying or obtaining electronic copies and inspecting such records.

6. Procedures to ensure that documents and other evidence are maintained and/or managed such that they can be admitted in any enforcement proceeding brought against an alleged violator, noting that some information may be entitled to confidential treatment.

   a. Operators and the state should presume that all records submitted to the state are public. It is the operator's obligation to identify which information is confidential business information, to take adequate steps to safeguard that information, and to demonstrate to the state that the release of such information would cause substantial harm.

7. Authority to require regulated persons to conduct stack testing or other measurements to establish or verify compliance with applicable requirements; to provide for state presence at such tests, be given adequate notice of the tests, and to conduct its own tests when deemed appropriate.

8. Authority to require, under statute, regulation or permit, regulated persons to:

   a. Establish and maintain records;

   b. Make reports;

   c. Install, use, and properly maintain monitoring equipment, and use audit

procedures, or methods;

d. Sample emissions in accordance with prescribed methods;

e. Provide stack test protocols and test reports;

f. Perform parametric monitoring where direct emissions measurement is impracticable;

g. Submit compliance certifications; and

h. Provide other information needed to determine compliance on a one-time, periodic or continuous basis.

10.2.5 Enforcement

10.2.5.1 Enforcement Tools

The state agency should have effective enforcement tools to address any violations of the state air program, which may include the following actions:

1. Issue a notice of violation;

2. Restrain, immediately and effectively, any person by order or by suit in state court from engaging in any impending or continuing unauthorized activity which is causing or may cause damage to public health or the environment;

3. Establish the identity of emergency conditions which pose an imminent and substantial human health or environmental hazard that would warrant entry and immediate corrective action by the state agency after reasonable efforts to notify the operator have failed;

4. Sue or cause suit to be brought in courts of competent jurisdiction to enjoin any impending or continuing violation of any program requirement, including any permit condition, without the necessity of a prior revocation of the permit;

5. Require, by administrative order or suit in state court, that appropriate action be undertaken to correct any harm to public health and the environment that may have resulted from a violation of any program requirement, including, but not limited to, establishment of compliance schedules or requiring the source to apply for and obtain permits for previously unpermitted emissions;

6. Encourage Beneficial Environmental Projects or Supplemental Environmental Projects to secure additional environmental benefits through enforcement settlements;

7. After administrative review, revoke, modify, or suspend any permit, or take other enforcement action deemed appropriate by the state, when the state agency determines that the permittee has violated the terms and conditions of the permit, failed to pay an assessed penalty, or used false or misleading information or fraud to obtain the permit;

8. Assess administrative penalties or seek, in court, civil penalties or criminal sanctions including fines and/or imprisonment; or

9. Resolve compliance issues informally, through mechanisms such as settlement agreements or warning letters, in lieu of a formal notice of violation, administrative order, or court order.

Complementing the enforcement tools identified above, state programs should have incentives (such as penalty mitigation and auditing/self-disclosure policies) to encourage operators to voluntarily disclose and correct violations.

10.2.5.2 Penalties

States should develop clear guidance for calculations of penalties that include factors such as the economic benefit resulting from noncompliance, willfulness, harm to the environment and the public, duration of the violation, the operator's compliance history, and the operator's good faith efforts to comply. Some of the benefits of having guidance for calculation of penalties include:

1. An opportunity to encourage voluntary disclosure of violations;

2. Providing consistency and transparency in the assessment of penalties; and

3. Providing for the development of readily defensible assessments.

Penalties should be such that an operator does not benefit financially from unlawful conduct, and should deter noncompliance by other operators. States should evaluate their enforcement options and policies to assure that the full range of actions available to them are applied effectively and consistently.

10.2.5.3 Right of Appeal

The right to appeal or seek administrative and/or judicial review of agency action should be available to any person having an interest which is or may be adversely affected, or who is aggrieved by any such action.

10.2.6 Staffing and Training

In addition to the general personnel and funding recommendations found in Section 4.3,

state staffing levels should be sufficient to receive, record and respond to complaints of human health impacts and environmental damage resulting from air emissions. Staff should receive adequate initial and on-going training to stay current with federal and state air regulatory requirements, state airshed goals, and industry production practices and technology, especially new and developing emissions estimation methods, air pollution control and monitoring technology (e.g., gas detection technologies). This training should include an oil and gas industry overview to familiarize state agency staff with the equipment and processes typical to industry operations, the sources of air pollutants, and the pollution control equipment and monitoring equipment they will be regulating and inspecting. Training programs to accomplish these goals could include:

1. Training courses or resource materials available through EPA, multi-state air planning organizations, private sector, industry associations, consortiums and universities;

2. Field visits and tours to oil and gas facilities in the state;

3. Engagement with other state and EPA air regulatory programs;

4. Conference attendance; and

5. Coordination and frequent discussions with other state and federal agencies regulating oil and gas operations, including state oil and gas conservation commissions and divisions.

Additionally, agencies should have a mechanism to assess and implement strategies designed to recruit and retain key agency staff such as:

6. Maintaining competitive salary levels;

7. Creation of new technical positions (air specialists, oil and gas sector specialists, etc.) in the permitting and enforcement programs; and

8. Increasing staff responsibilities via promotion of staff to higher positions (project leaders, team leaders, etc.).

10.2.7 Data Management

In addition to the data management recommendations found in Section 4.2.7, states should ensure that appropriate data is shared between agencies as efficiently as possible. The air quality program should have electronic access to an inventory that includes the level of detail (locations of oil and gas facilities and a unique identifier for the regulated activity such as API well number) necessary to conduct an effective program. Some of the data gathered may be required to be reported electronically, e.g., EPA Central Data Exchange (CDX).

Emissions data and other information should be made available in user-friendly

electronic formats after thorough and appropriate quality assurance.

10.2.8 Public Involvement

State agencies should provide for the electronic dissemination of educational and other appropriate information regarding air emissions from oil and gas activities to bridge the knowledge gap between experts and the public. This should occur as part of an ongoing process through which information is exchanged in an open forum as provided in Section 4.2.2.2. This is especially important in areas where development has not occurred historically. The public should also have the ability to ask questions and receive responses through the agency website. States should also use advisory groups of industry, government, and public representatives, or other similar mechanisms, to obtain input and feedback on the effectiveness of state programs as provided in Section 4.2.2.3.

In addition to the public participation provisions found in Section 4.2.2, states should take measures, such as web postings, FAQs, and distribution of fact sheets, to ensure that the industry, other state agencies and the public are aware of the delineation of responsibilities between the air quality program and the oil and gas program. Provisions should also be made for the availability of speakers to make presentations to interested groups.

10.2.10 Strategic Program and Resource Planning

State air programs for oil and gas will require adequate resources to fulfill state and federal mandates to ensure healthy air quality while providing adequate response time to permit applications and other needs from industry. As with other growing sectors, the oil and gas industry's potential for rapid growth in production basins can challenge the planning process for air programs, since large numbers of facilities can be deployed in production basins and cumulative emissions from new and existing facilities can potentially have significant impacts on air quality.

To address these challenges, and as set forth in these guidelines, states should have adequate resources to conduct necessary regulatory development, permitting, enforcement, monitoring, modeling, inventory development and public outreach activities. Additionally, states should have strategic planning capabilities to ensure that these resources remain adequate in light of dynamic growth in the oil and gas sector and rapid evolution in production technologies.

10.3 Air Program-Specific Elements

10.3.1 Delineation of Sources

States should consider developing an inventory of sources and activities not previously

registered or permitted, for example grandfathered facilities and equipment, and non-permitted sources and activities, if information about emissions from those sources is critical for planning and analysis for agency priorities such as efficiently ensuring compliance with air quality standards. The inventory should be comprehensive; however, it should not capture inconsequential (de minimis) sources that do not impact air quality.

10.3.2 Source-Specific Requirements

A state's air quality program should identify emission source types that must be represented in applications for air quality permits or authorizations. Source types and activities may include stationary engines and turbines, well completions or recompletions, handling of associated gas from oil wells, venting and leaking gas from compressors, gas-powered pneumatic devices, dehydration units, gas processing plants, storage vessels and other hydrocarbon fluids handling, wellbore liquids unloading, produced water management facilities, sweetening units, flares, fugitive emissions from components at well sites, compressor stations and gas processing plants, and emissions from all other maintenance activities.

The state requirements for these emission source types should be as stringent as the Federal requirements, where such requirements exist, unless the state deems it necessary to establish additional, alternative, or more stringent requirements. When specific air issues demand more stringent requirements, states may consider adopting, as consistently as possible, provisions by other states or the EPA that have been successfully implemented to address similar air quality issues, to minimize the impact on state resources.

State air quality programs may want to address unplanned and episodic emissions due to such things as fugitive air emissions, abnormal process conditions or malfunctions, wellbore liquids unloading, well maintenance, third party equipment downtime, changes in third party product gathering pipeline capacity or business agreements, and equipment failure. The programs should require incident reporting and corrective actions where possible, to ascertain root causes and avoid incident recurrence. However, the state should also consider safety aspects when developing new requirements for unplanned emissions.

The state air quality regulator should coordinate with the state oil and gas conservation regulator to develop a process to quantify and minimize the flaring, and prohibit the venting of, associated gas from oil wells. Such a process should contemplate both the air quality concerns and financial loss to the state, royalty owners, and operators of wasted gas from drilling operations.

In addition to regulatory efforts, there are several voluntary programs that provide best practices and information sharing. Since 1993, industry partners in the EPA voluntary Natural Gas STAR Program have developed and employed a variety of innovative techniques for mitigating methane emissions in the oil and gas sector. In 2016, EPA

updated this program to include the Methane Challenge. The oil and gas industry has developed programs as well, including The Environmental Partnership, ONE Future, and the Oil and Gas Climate Initiative. The Environmental Council of the States (ECOS) has also developed an online Methane and Air Toxics Reduction Information Exchange (E-MATRIX) that provides information on state best practices and cost-effective technologies that reduce emissions at points along oil and gas systems. The state should encourage awareness of the programs.

10.3.3 Air Quality Monitoring Networks

Air quality monitoring is an essential tool both to determine compliance with NAAQS and to assess the impact of air pollution sources on air quality. State programs should have an air quality monitoring network in place that meets these needs. In developing an air quality monitoring network, states should consider several parameters, including but not limited to: the number of monitors, the types of pollutants to be monitored, the location of monitors, specific monitoring instrumentation to be used, frequency of monitoring, and appropriate QA/QC procedures. In placing air quality monitors, states should consider factors such as emission source location, population density, topography and meteorology.

Many of the air quality monitoring requirements for states are set forth in implementing regulations for the various NAAQS. Additionally, federal permitting requirements for major stationary sources include certain source specific monitoring requirements. States should have appropriate mechanisms in place to ensure that this source specific monitoring is conducted in accordance with established standards and methods.

States may also consider whether to conduct ambient air quality monitoring that goes beyond the standards established under federal law. While states should have considerable latitude in determining whether and how to conduct such additional monitoring, appropriate procedures should be established to ensure that such monitoring, if undertaken, accurately assesses ambient air quality levels. As part of this additional monitoring, states should consider, where possible, establishing baseline air quality levels in order to assess the impact of oil and gas development changes.

Areas with significant oil and gas production activity may have few or no regulatory air quality monitors, because these areas may not meet typical criteria for siting of monitors, such as population density. States should consider whether to add monitors in these areas to assess emissions from existing, or anticipated increases in, oil and gas activity.

States should have appropriate monitoring equipment necessary to support emergency response activities as discussed in Section 10.3.5. Monitoring data should be made available consistent with the criteria of 10.2.7.

10.3.4 Reporting, Emission Inventories & Recordkeeping

States should develop and periodically update accurate and robust emission inventories as necessary to conduct good air quality planning and program assessment. States should establish emission-reporting requirements for air pollution sources that adequately support their efforts to develop high quality emission inventories. As states review and update their inventories they should work with industry and other stakeholders to identify the types of oil and gas sources which can produce significant emissions, and determine when updates to inventories are needed due to new information, changes to emission inventory compilation methodologies, or changes in production or operational practices. Consistent calculations methods, based on the gas and oil/condensate compositions for specific formations and basins, should be applied. If included in SIPs, the public review process is a requirement for those current and projected inventories used for both nonattainment area inventories as well as demonstrating attainment through air quality modeling.

States should consider using the EPA's oil and gas emissions tool(s) for computing nonpoint emissions sources. EPA provides the tool, instructions, and other guidance for computing these emissions as part of its National Emissions Inventory (NEI) program available on the Clearinghouse for Inventories & Emissions Factors (CHIEF). The tool allows for local inputs to be added by states to improve their emissions estimates. EPA also develops projection methods available on the CHIEF Emissions Modeling Clearinghouse for use by states. States that have developed emissions estimation techniques beyond those currently available from EPA are encouraged to share their methods with EPA and other states and tribes though channels such as the National Oil and Gas Emission Inventory Committee and the ECOS Shale Gas Caucus.

Every three years, states are required to submit to EPA all sources of emissions of criteria pollutants and their precursors (Air Emissions Reporting Requirements, 40 CFR Part 51, Subpart A). This includes both point and nonpoint sources for the oil and gas sector.

States should also develop well-founded emission projections to ensure that air quality standards will continue to be met in the future. Best available data and methods should be used for these projections. Projections which consider emissions under a range of alternative future conditions, such as the effect of changing industry practices, regulations, and crude oil and gas pricing, will yield better results than those that are based on single factors.

After administrative review, emission inventories and projections and reported emission data should be readily available to the public, including documentation of methodology, data sources, and assumptions made in producing the inventory.

10.3.5 Corrective Actions & Emergency Response

State air quality programs should establish clear criteria for the emergency reporting of significant, non-routine releases. These criteria should consider factors such as the mass and type of constituents released and the proximity of the release to sensitive receptors.

Agencies responsible for receiving emergency notifications of reportable releases to air should be identified and be responsible for the coordination, as appropriate, of any necessary response action with the operator, state and local emergency responders, environmental and/or public health agency and any other agency responsible for public protection.

States should ensure that community residents are notified when potentially hazardous air releases occur and should ensure that operators and emergency responders take necessary actions to minimize public exposure.

States should require operators to submit reports that contain information on the cause of the release, the type(s) and amount(s) of pollutants released and the corrective actions the company implemented, to aid in the prevention of incident recurrence.

10.3.6 Long-Term Planning, Prioritization & Evaluation

The state should develop procedures for regular evaluation and consideration of the appropriateness and adequacy of its air quality regulatory program.

In addition to the program planning and evaluation provisions found in Section 4.2.3, states should have a good understanding of oil and gas operations, including exploration and production; gathering, boosting, processing, and transmission; and accurate inventories and projections of air emissions. Because emissions characteristics, operational requirements, and operational approaches can vary widely by basin, it is critical for regulators to involve stakeholders (including oil and gas producers, environmental and citizen groups, and local governments) in the planning and evaluation processes. Periodic analyses should be completed to ensure that air quality remain protective of public health and the environment, in accordance with state and federal statutes and regulations, as the oil and gas industry evolves and grows.

There are and will be a number of federal regulations applicable to oil and gas operations that must be assessed for state adoption, incorporated by reference into state regulations, or left to EPA for implementation. In most states, these federal regulations become the basis of the state air regulatory program. Airsheds with oil and gas basins that have measured or modeled concentrations of air pollutants near or above the NAAQS, considerable existing or planned development, and/or geographic conditions (topography and meteorology) that can create stagnant air, may require specific, specialized analyses to assess the short-term and long-term status of compliance with the NAAQS. Collaboration with industry and other stakeholders is important to ensure that analyses are comprehensive, scientifically sound, and adequately address the

relevant questions and issues. Technical collaborations may be more successful when accomplished within a structured process that clearly defines the roles and responsibilities of participants, procedures for disseminating analysis design, solicitation of comments, processes for responding to comments, and other opportunities for feedback.

Analyses of criteria pollutant trends, comprehensive emissions trends, and projections of pollutant concentrations, visibility, and deposition are important indicators for evaluation of state air programs. In the process of developing a strategic plan, states may develop specific airshed goals to reduce the impacts of pollutants. The development of these goals should be based upon careful analysis of state needs, priorities, available resources, and applicable state and federal regulations.

Additional program goals could include the following:

1. The development and implementation of an effective stakeholder outreach and education program;

2. The development of incentives for additional pollution control, such as streamlined permitting programs, permits by rule, and other permitting options that simplify the application and review process while promoting air pollution control;

3. The development and posting of guidelines, policies and report templates that result in efficiencies in the permitting and compliance assurance processes while encouraging good practice;

4. The creation of voluntary programs that recognize operators adopting additional air pollution measures; and

5. The development or improvement of an air monitoring network in areas with oil and gas activity, emissions inventories and calculation methods, and air modeling tools.

Regarding evaluation, performance metrics could include an evaluation of ambient pollutant concentrations, emissions trends, permit response time, appropriateness of permitting options, and clarity of conditions required for compliance. States should give consideration to the frequency of the evaluation of these types of metrics as well. Evaluation of emissions trends and modeling data may be more suited to an annual or periodic basis, whereas other metrics, such as stakeholder outreach and monitoring, may be done more frequently. The state agency should identify the set of metrics that is most applicable to its goal and then determine a schedule for program evaluation.

SECTION 11 | Reused and Recycled Fluids

11.1 Definitions

State regulatory programs should define fluids that may be reused and recycled. For the purposes of these guidelines, these are fluids that are generated during the drilling, completion (e.g. hydraulic fracturing flowback), and production stages of a well. The term "reused fluids" is commonly used to refer to fluids that require only minimal processing to remove suspended solids. The term "recycled fluids" is commonly used to refer to fluids that typically require more advanced treatment or processing to reduce the salinity of the recycled fluid. Reused and/or recycled fluids are used for well drilling (generally below the base of protected water), well workover, and completion.

11.2 Water Management Planning

Operators should be encouraged to develop Water Management Plans that consider reuse and recycling options. Water Management Plans should address all aspects of water management from acquisition through final disposition. Plans should be tailored to particular projects. State programs should recognize barriers that would limit an operator's ability to reuse or recycle fluids generated during drilling, completion, and production such as technological limitations, fiscal constraints, lease or surface use constraints, stage of development, fluid quality, and agency approval timeframes. States should encourage the use of fresh water alternatives for the drilling and completion of wells where available sources are feasible and where environmental risks can be adequately identified and controlled. See Section 9.3 for additional information concerning water and waste management related to hydraulic fracturing.

Where jurisdictional issues exist between multiple state agencies, river basin commissions, and other parties involved in the management of reused and/or recycled E&P fluids, coordination should be pursued as discussed in Section 4.4.

11.3 Waste Management

Fluids that are to be reused or recycled should be managed and regulated as a waste up to the point the fluids are used in the drilling, workover, or completion of a well. State programs should consider having a regulatory process to designate fluids as a non-waste when they are treated to a level satisfactory to the State and the fluid is reused or recycled. Regulatory responsibility for the reused or recycled fluids should lie with the operator of the facility that is storing, transporting, or processing the fluids. See Sections 5.1 – 5.3 for information concerning technical criteria of waste.

11.4 Transportation

The fluids to be reused or recycled are generally transported through pipelines or by truck.

11.4.1 Pipelines

11.4.1.1 Scope and Definition

a. The term, “pipeline” is used in this section to describe pipelines used to transport produced water and/or reused/recycled/treated water to or from various oil and gas facilities after separation from the oil and gas product. Such facilities may include, but are not limited to, the following:

   i. Water loading point
   ii. Point of discharge to a pit
   iii. Injection/disposal wellhead
   iv. Reuse/recycling/treatment facility
   v. Oil and natural gas well sites
   vi. CWA/NPDES/state permitted point of discharge to surface water

b. Where appropriate, states may consider adopting a definition for such pipelines that is consistent with the risk profile of the fluids being transported. States may consider several factors when determining a fluid’s risk profile, such as constituents of the fluid, potential release quantity, and potential impact to the environment.

11.4.1.2 Siting, Permitting, and Financial Assurance

a. States may address pipelines in facility and infrastructure permitting.

b. States should require operators to maintain information on the location, purpose, capacity, age, and material type of pipelines.

c. Pipeline siting should be designed to minimize or avoid impact on natural habitats and wildlife designated sensitive or protected.

d. Where appropriate, states should provide requirements for buried and aboveground pipelines, including requirements for repurposing.

e. States should ensure that their financial assurance requirements are sufficient to cover pipelines. For pipelines that would not be covered by existing facility and infrastructure permitting and financial assurance, states should add such pipelines to these existing programs, or create a separate program for those pipelines.

11.4.1.3 Construction and Operational Requirements

a. States should provide requirements for aboveground/overland/temporary lines and buried/permanent lines, including permanent and non-permanent buried lines.

b. Pipelines should be constructed, operated, and maintained in compliance with the manufacturer's specifications, the state's mechanical code, and other applicable industry standards.

c. Pipelines should be subjected to pre-operational hydrostatic integrity testing. Additional hydrostatic integrity testing should be required if the pipeline is moved, altered, repaired, or repurposed.

d. States should require integrity testing for pipelines after an appropriate duration of service, based on criteria such as the type and material of the pipeline, and the fluid being transported. The method of integrity testing should be appropriate for the type of pipeline. Testing methods include, but not limited to, the following:

    i. Hydrostatic
    ii. Data metering
    iii. Visual inspection
    iv. Non-destructive testing

e. States should require operators to maintain documentation of integrity testing and provide documentation upon request.

f. States should consider requiring depressurization and duration limits for pipelines not in continuous operation.

g. Pipelines left in place should be purged, physically disconnected, and capped when abandoned. Buried lines left in place should be cut off below ground.

h. States should ensure applicable OneCall legislation and damage prevention programs (to prevent damage to pipelines from excavators) are followed.

11.4.1.4 Spill Response and Remediation

a. There should be a means of accounting for and reporting leaks in accordance with state and EPA requirements.

b. Contingency planning and spill risk management should be addressed in accordance with the criteria of Section 4.2.1.

c. Site remediation should be addressed in accordance with state and EPA requirements.

11.4.2 Trucks

Truck transportation of fluids to commercial or centralized facilities should be addressed in accordance with the waste tracking and reporting provisions of Section 5.10.2.3. States should encourage operators to utilize smart truck routing to minimize traffic through residential areas, damage to roadways, and to avoid problems associated with spill exposure and complaints.

11.5 Treatment and Storage

Rules for the treatment and storage of fluids to be reused and recycled should be based on the potential risk presented by the treatment or storage of the fluid. Risk factors to consider include location and duration of fluid treatment or storage, chemical content and characteristics of the fluid and waste resulting from the treatment process, the volume of the fluid stored or treated, type of storage structure to be used (i.e. pits, tanks, or modular aboveground storage structures).

Permit processes for the storage of reused or recycled fluids should be streamlined and minimized for activities deemed to be of low risk. For example, the temporary storage and reuse of fluids on an Operator's lease might be approved during the well permitting process, or by other authorization, while facilities used for long-term storage and treatment of fluids may require separate prior authorization by the State.

Reporting requirements should include records of amounts of waste processed and, where appropriate, laboratory results for treated waste. See section 5.10.2.3 for more information on waste tracking requirements. Where appropriate, States should require groundwater monitoring consistent with the provisions of Section 9.2.1.

State regulatory programs should differentiate between centralized and commercial wastewater treatment facilities. See Section 5.10 for additional information regarding the permitting, construction, operation and closure of these facilities.

State regulatory programs should regulate the waste generated during the treatment of fluids in a manner as described in the technical criteria in Section 5. Those criteria address waste characterization, waste management hierarchy, pits, land application, tanks, and centralized and commercial facilities.

State regulatory programs should include a methodology for the determination of whether or not Naturally Occurring Radioactive Material (NORM) is present to the extent that it is regulated. See Section 7 for additional information on the identification, use, possession,

transport, storage, transfer, documentation, and disposal of materials containing NORM.

States should evaluate air emissions at facilities used for the storage and treatment facilities of fluids to be reused or recycled and determine whether a permit or exemption is required. See Section 10.2.3 for additional information regarding air quality permits, authorizations and exemptions.

APPENDIX A | References

REFERENCES

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APPENDIX B | Glossary of Terms

The following is a glossary of selected terms used in the Interstate Oil and Gas Compact Commission Environmental Guidelines for State Oil and Gas Regulatory Programs. The glossary is included only as an aid for the convenience of the reader. It is not intended as an exhaustive compilation of the terms used in the Report, nor are the definitions set forth intended to be preclusive of other potential meanings. Terms expressly defined in the text of the Report are not included in this glossary.

A

Acid: A chemical compound, one element of which is hydrogen, that dissociates in solution to produce free-hydrogen ions. For example, hydrochloric acid, HCl, dissociates in water to produce hydrogen ions - H^+, and chloride ions, Cl^-.

Ambient Air Quality – The concentration of pollutants present in the portion of the atmosphere, external to buildings, to which the general public has access, measured in the form of mass of the pollutant per volume of air or as a certain number of parts of the pollutant per million (ppm) or per billion (ppb). *See generally* 40 C.F.R. § 50.1(e).

Aquifer: A geological formation, group of formations, or part of a formation that is capable of yielding water to a well or spring.

B

Barrel: A measure of volume for petroleum products. One barrel is equivalent to 42 U.S. gallons.

Basic Sediment and Water (BS&W): The water and other extraneous material present in crude oil.

Biodegradation: The process of breaking down matter into innocuous products by the action of living things, such as microorganisms.

Blowdown: The material discarded as a result of depressurizing a vessel or well.

Brackish Water: Water that contains relatively low concentrations of soluble solids. Brackish water has more total dissolved solids than fresh water, but considerably less than sea water.

Brine: Water that has a large quantity of salt, especially sodium chloride, dissolved in it; salt water and certain produced water are considered brines.

C

Characteristic Waste: Waste that is considered hazardous under RCRA because it exhibits any of four different properties: ignitability, corrosivity, reactivity, and toxicity.

Clean Air Act (CAA): The federal act that regulates air emissions from area, stationary, and mobile sources codified at 42 U.S.C. Ch. § 7401 *et seq*.

Clean Water Act (CWA): The act that sets the basic structure for regulating discharges of pollutants to surface waters of the United States. CWA imposes contaminant limitations or guidelines for all discharges of wastewater into the nation's waterways.

Climatology: The science that deals with climates (the prevailing influence or environmental conditions characterizing a group or period) and their phenomena.

Completion Fluid: A special fluid used when a well is being completed. It is selected, not only for its ability to control formation pressure, but also for its properties that minimize formation damage.

Completion Operations: Work performed in an oil or gas well after the well has been drilled to total depth. This work includes, but is not limited to, setting the casing, perforating, artificial stimulation, production testing, and equipping the well for production, all prior to the commencement of the actual production of oil or gas in paying quantities, or in the case of an injection or service well, prior to when the well is plugged and abandoned.

Corrosivity: The characteristic which identifies wastes that are acidic or basic (alkaline) and can readily corrode or dissolve flesh, metal, or other materials. The hazardous characteristic of corrosivity, for purposes of RCRA, is defined in 40 CFR 261.22, and generally includes aqueous solutions with a pH less than or equal to 2.0, or greater than or equal to 12.5, and/or liquids which corrode SAE 1020 steel at a rate greater than or equal to 6.35 mm per year.

Crude Oil: Unrefined liquid petroleum. It ranges in gravity from 9 to 55 API and in color from yellow to black, and it may have a paraffin, asphalt, or mixed base. If a crude oil, or crude, contains a sizable amount of sulfur or sulfur compounds, it is called a sour crude; if it has little or no sulfur, it is called a sweet crude. In addition, crude oils may be referred to as heavy or light according to API gravity, the lighter oils having the higher gravities.

D

Delegated Authority – A state's assumption, after US EPA approval, of partial or complete responsibility for administering EPA's CAA programs.

De-listing: A site-specific petition process whereby a handler can demonstrate to EPA that a particular waste stream generated at its facility that meets a listing description does not pose sufficient hazard to warrant RCRA regulation. Owners and operators can also use the de-listing process for wastes that are hazardous under the mixture and derived-from rules that pose minimal hazard to human health and the environment.

Derived-from Rule:A rule that regulates residues from the treatment of listed hazardous wastes. This rule is found at 40 CFR 261.3.

Disking: The process of using a tractor-pulled set of disks to mix surface soil with waste for the purpose of treating and/or disposing of E&P wastes.

Disposal Well: A Class II well permitted under the SDWA which is employed for the injection of produced water and certain other E&P wastes into an underground formation.

Drill Cutting: The formation rock fragments that are created by the drill bit during the drilling process.

Drilling Fluid: The circulating fluid used in the rotary drilling of wells to clean and condition the hole and to counterbalance formation pressure. Drilling fluids are circulated down the drill pipe and back up the hole between the drill pipe and the walls of the hole usually to a surface tank. Drilling fluids are used to lubricate the drill bit, to lift cuttings, to seal off porous zones, and to prevent blowouts. A water-based drilling fluid is the conventional drilling mud in which water is the continuous phase and the suspended medium for solids, whether or not oil is present. An oil-based drilling fluid has diesel, crude, or some other oil as its continuous phase, with water as the dispersed phase. Synthetic drilling fluid has a synthetic material such as esters or olefins as the continuous phase and water as the dispersed phase. In some circumstances air or another gas is used as a drilling medium.

E

Electrical Conductivity (EC): A numerical expression of the ability of a material to carry a current; the reciprocal of resistivity; normally expressed in milliohm/meter. It is frequently used in soil analysis to evaluate a soil's ability to sustain plant growth.

Emulsion: A mixture in which a liquid, termed the dispersed phase, is uniformly distributed (usually as minute globules) in another liquid, called the continuous phase or dispersion medium. In an oil-water emulsion, the oil is the dispersed phase and the water the dispersion medium; in a water-oil emulsion, the reverse holds. For example emulsions occur during production processes where crude oil is prepared for pipeline transportation.

Exploration: The search for reservoirs of oil and gas, including aerial and geophysical surveys, geological studies, core testing, and the drilling of exploratory wells, also known as wildcats.

Exchangeable Sodium Percentage (ESP): The extent to which the absorption complex of a soil is occupied by sodium.

$$ESP = \frac{\text{exchangeable sodium}}{\text{cation exchange capacity}} \times 100$$

Where the units for both the numerator and denominator are in milliequivalents per 100 grams of soil.

F

FAQs – “Frequently Asked Questions” reference document created, updated, and made publically available by a state that clarifies issues involving the delineation of responsibilities between a state’s air quality program and oil and gas program.

Field: A geographic area in which a number of oil or gas wells produce from a continuous reservoir. A field may refer to surface area only or to underground productive formations as well. In a single field, there may be several separate reservoirs at varying depths.

Formation: A bed or deposit composed throughout substantially the same kinds of rock; a lithologic unit. Each different formation is given a name, frequently as a result of the study of the formation outcrop at the surface and sometimes based on fossils found in the formation, and is sometimes based on electric or other bore-hole log characteristics.

Formation Water: The original water in place in a formation at the time production commences.

Fracturing: A method of stimulating production by increasing the permeability of the producing formation. Under hydraulic pressure, a fluid is pumped down the well and out into the formation. The fluid enters the formation and parts or fractures it.

Fracturing Fluids: The fluids used to hydraulically fracture a rock formation. In some cases, a proppant is deposited in the fractures by the fracturing fluid, which is subsequently pumped out and recovered.

G

Gas Processing Plant: A plant for the processing of natural gas, by other than solely mechanical means, for the extraction of natural gas liquids, and/or the fractionation of the liquids into natural gas liquid produces such as ethane, butane, propane, and natural gasoline.

Gas Treating Plant: A plant for the purification of natural gas (e.g., the removal of water and/or acid gases such as hydrogen sulfide) and recovery of condensate.

Generator:Any person whose act first creates or produces a waste.

Groundwater: Water below the land surface where there is sufficient water present to completely saturate the soil or rock.

Groundwater Monitoring: Sampling and analysis of groundwater for the purpose of detecting the release on contaminants.

H

Hazardous Waste: A waste with properties that make it dangerous or capable of having a harmful effect on human health and the environment. Under the RCRA program, hazardous wastes are specifically defined as wastes that meet a particular listing description or that exhibit a characteristic of hazardous waste.

Hydrocarbon: Organic compound of hydrogen and carbon, whose densities, boiling points, and freezing points increase as their molecular weights increase. Although composed of only two elements, hydrocarbons exist in a variety of compounds because of the strong affinity of the carbon atom for other atoms and for itself. The smallest molecules of hydrocarbons are gaseous; the largest are solid.

I

Ignitability (RCRA): The characteristic which identifies wastes that can readily catch fire and sustain combustion. The hazardous characteristic of ignitability for purposes of RCRA is defined in 40 CFR 261.21 and is generally a liquid with a flash point less than 140 F., a non-liquid that causes fire under a friction condition, an ignitable compressed gas, or is an oxidizer.

L

Land Disposal: For purposes of RCRA Subtitle C regulation, placement in or on the land, except in a corrective action unit, and includes, but is not limited to, placement in a landfill, surface impoundment, waste pile, injection well, land treatment facility, salt dome formation, salt bed formation. underground mine or cave, or placement in a concrete vault or bunker intended for disposal purposes.

Landfill: For purposes of RCRA Subtitle C, a disposal unit where non-liquid hazardous waste is placed in or on the land.

Lease: A legal document executed between a landowner (or a lessor) and a company or individual as lessee, that grants the right to exploit the premises for minerals or other products. The lease is sometimes referred to as the area where production wells, stock tanks, separators, and production equipment are located.

Legally and Practicably Enforceable – All terms or conditions included in a permit issued under a federally approved program – including delegated authority – authorizing EPA to enforce such terms or conditions. Federally enforceable programs under the CAA include, but are not limited to, the New Source Review program, the New Source Performance Standards program under Section 111 of the CAA, the Title IV acid rain program, the National Emission Standards for Hazardous Air Pollutants program under Section 112 of the CAA, the Title V program, and state permit programs approved by EPA in the state's SIP.

Liner: Continuous layer of natural or synthetic materials, beneath and on the sides of a surface impoundment, landfill, or landfill cell, which restricts the downward or lateral escape of waste, waste constituents, or leachate.

Listed wastes: Wastes that are considered hazardous under RCRA because they meet specific listing descriptions.

Loading Criteria: A numeric level, normally expressed in pounds per acre, below which a specific chemical compound may be applied to the soil.

Location: Place at which a well is to be or has been drilled.

M

Mixture Rule: A rule that is intended to ensure the regulation of mixture of listed wastes with non-hazardous solid wastes.

Molecular Sieve: Absorbents that are used to remove small amounts of H_2S and/or water from natural gas, capable of being regenerated.

Municipal Solid Waste: Durable goods (e.g. appliances, tires, batteries), non-durable goods (e.g. newspapers, books, magazines), containers and packaging, food wastes, yard trimmings, and miscellaneous organic wastes from residential, commercial and industrial non-process sources.

N

National Ambient Air Quality Standards (NAAQS) – Nationwide air quality levels, promulgated pursuant to section 109 of the CAA ,42 U.S.C. § 7409, for six criteria pollutants – sulfur dioxide, particulate matter, nitrogen oxide, carbon monoxide, ozone, and lead – of which a state is responsible for achieving, maintaining, and enforcing pursuant to section 110 of the CAA, 42 U.S.C. § 7410, through its approved SIP for each given pollutant.

National Emissions Standards for Hazardous Air Pollutants – Nationally applicable standards under section 112(b) the CAA, 42 U.S.C. § 7412(b), for emissions of hazardous air pollutants listed under section 112(d) the CAA, 42 U.S.C. § 7412(d), that apply to major and area stationary sources as defined under section 112 of the CAA, 42 U.S.C. § 7412.

Natural Gas: Naturally occurring mixture of hydrocarbon and non-hydrocarbon gases found in geologic formations beneath the earth's surface. The principal hydrocarbon constituent is methane.

New Source Performance Standards – Nationwide technology-based emissions standards for new or modified stationary sources in specified industrial source categories promulgated pursuant to section 111 the CAA, 42 U.S.C. § 7411. The standards reflect the degree of emission limitation achievable through the application of the best system of emission reduction, taking into account the cost of achieving such reduction and any health and environmental impact and energy requirements, that EPA determines is adequately demonstrated.

O

Operator: The person or company, either proprietor, contractor, or lessee, actually operating a well, lease, or disposal facility.

P

Permeability: The ability of a formation to transmit fluids.

pH: A measure of acidity or alkalinity of a solution, numerically equal to 7 for neutral solutions, increasing with increasing alkalinity and decreasing with increasing acidity.

Plug and Abandon (P&A or Plugging): The placement into a well of a plug or plugs designed to restrict the vertical movement of fluids after abandonment.

Process Upsets – unintended mode of operation of a unit which could result in impaired functionality.

Produced Sand: The formation solids which flow into the wellbore with the produced formation fluids. In general, the lower the formation competency, the greater the produced sand volumes.

Produced Water: The fluid brought up from the hydrocarbon-bearing strata during the extraction of oil or gas. It can include formation water, injection water, and any chemicals added downhole or during the oil/water separation process.

Production: The phase of the petroleum industry that deals with bringing the well-fluids to the surface and separating them, and with storing, gauging, and otherwise preparing the product for sale.

Q

QA/QC – "Quality Assurance/Quality Control" are criteria and procedures that must satisfied to ensure the quality of data and the calibration, repair, and evaluation of air quality monitoring instruments.

R

Reactivity: The characteristic identifying wastes that readily explode or undergo violent reactions. The hazardous characteristic of reactivity for purposes of RCRA is defined in 40 CFR 261.23 and generally includes wastes with highly exothermic reactions or wastes which create toxic gases when mixed with water.

Reclaimed: For purposes of defining a material as a solid waste under RCRA Subtitle C, a material is reclaimed if it is processed to recover a usable product, or regenerated by processing it in a way that restores it to usable condition.

Reclamation: The process of returning a site or contaminated soil to an appropriate state of environmental acceptability.

Recycled: For purposes of defining a material as a solid waste under RCRA Subtitle C, a material is recycled if it is used or reused, or reclaimed.

Recycled Fluids: Commonly used to refer to fluids that typically require more advanced treatment or processing to reduce the salinity of the fluid prior to reuse in well drilling, workover, and completion.

Reused Fluids: Commonly used to refer to fluids that require only minimal processing to remove suspended solids prior to reuse in well drilling, workover, and completion.

Recycling: The separation and collection of wastes, their subsequent transformation or remanufacture into usable or marketable products or materials, and the purchase of products made from recyclable materials.

Reservoir: A subsurface, porous, permeable rock body in which oil or gas or both are stored. Most reservoir rocks are limestones, dolomites, sandstones, or a combination of these. The three basic types of hydrocarbon reservoirs are oil, gas, and condensate. An oil reservoir generally contains three fluids; gas, oil, and water-with-oil, the dominant product. In the typical oil reservoir, these fluids occur in different phases because of the variance in their gravities. Gas, the lightest, occupies the upper part of the reservoir rocks; water, the lower part; and oil, the intermediate section. In addition to occurring as a cap or in solution, gas may accumulate independently of the oil; if so, the reservoir is called a gas reservoir. Associated with the gas, in most instances, are salt water and some oil. In a condensate reservoir, the hydrocarbons may exist as a gas, but when brought to the surface, some of the heavier constituents condense to a liquid or condensate. At the surface, the hydrocarbons from a condensate reservoir consist of gas and a high-gravity crude (i.e., the condensate). Condensate wells are sometimes called gas-condensate reservoirs.

S

Safe Drinking Water Act (SDWA): The act designed to protect the nation's drinking water supply by establishing national drinking water standards (maximum contaminant levels, (MCL's), or specific treatment techniques), and by regulating UIC wells.

Salinity: The quantitative level of salt in an aqueous medium.

Salt Section: A formation, or part of a formation, which is predominately made up of salt; typically sodium chloride.

Sodium Absorption Ration (SAR): A ratio of the concentration of sodium to the square root of the sum of the concentrations of calcium and magnesium.

$$SAR = \frac{Na+}{-[Ca+ + Mg^{2}+]}$$

Where the cation concentrations are in millimoles per liter. It is a measurement frequently used in soil analysis to evaluate a soil's ability to sustain plant growth.

Solid Waste: Any garbage; refuse; sludge from a wastewater treatment plant, water supply treatment plant, or air pollution control facility; and other discarded material, including solid, liquid, semisolid or contained gaseous material resulting from industrial, commercial, mining, and agricultural operations and from community activities. For the purposes of hazardous waste regulation, a solid waste is a material that is discarded by being either abandoned, inherently waste-like, a certain waste military munition, or recycled.

Solids Separation Equipment: Equipment used in drilling and workover/completion operations to remove drill cutting or formation solids from the drilling or workover/completion fluid. May include liquid/solids separation devices such as shale shakers, hydrocyclones, centrifuges, and filtration units.

SPCC: Spill prevention Control and Countermeasures. Regulations establishing spill prevention procedures and equipment requirements for non-transportation related facilities with certain above-ground or underground storage capacities (e.g., crude oil tanks) that could reasonably be expected to discharge oil into or upon the navigable waters of the United States or adjoining shorelines.

Spent Materials: Materials that have been used and can no longer serve the purpose for which they were produced without processing.

State Implementation Plan (SIP) – The body of air quality rules including, but not limited to, enforceable source-specific emissions limitations, monitoring plans, and permit programs established by each state which are designed to either attain or maintain the NAAQS and to implement other requirements established by the Clean Air. Each state's SIP must include, at a minimum, the elements prescribed under CAA section 110(a)(2), 42 U.S.C. § 7410(a)(2), and must be approved by EPA before it becomes effective.

Subtitle C: That portion of the Resource Conservation and Recovery Act (RCRA) which defines and legislates the management of hazardous wastes.

Sweetening – The removal of hydrogen sulfide and other organosulfur compounds from "sour" natural gas. Natural gas is considered "sour" if it contains hydrogen sulfide in amounts greater than 5.7 milligrams per normal cubic meters.

T

Tank Bottoms: Produced sand, formation solids, and/or emulsions that settle-out in production operation process vessels.

Title V Permit Program – A federally mandated operating permit program under the CAA that requires implementation by the states. *See generally* 42 U.S.C. §§ 7661-7661f; 40 C.F.R. Parts 70 and 71. The Title V permit program applies to: all "major sources" as that term is defined in CAA section 501(2), 42 U.S.C. § 7661(2); sources subject to a standard or regulation under the NSPS program, 42 U.S.C. § 7411, or the NESHAP program, 42 U.S.C. § 7412; "affected" sources under the Acid Rain Program; sources required to have a PSD or NSR permit; and any other sources as designated by EPA. *See* 40 C.F.R. § 70.3 (applicability of Title V program). Title V permits consolidate all of these applicable CAA requirements into one legally enforceable document.

Topography: The physical features of a district or region, such as are represented on maps, taken collectively; especially the relief and contour of the land.

Toxicity: The characteristic which identifies wastes that are likely to leak dangerous concentrations of toxic chemicals into groundwater. The hazardous characteristic of toxicity for purposes of RCRA is defined in 40 CFR 261.24 and includes eight metal and thirty-one organic compounds. The toxicity characteristic is determined in accordance with a prescribed test procedure (the toxicity characteristic leaching procedure -TCLP).

Toxicity Characteristic Leaching Procedure (TCLP):A lab procedure designed to predict whether a particular waste is likely to leach chemicals into groundwater at dangerous levels.

Transporter: A person engaged in the off-site transportation of waste.

Treatment: Any method, technique, or process designed to physically, chemically, or biologically change the nature of a hazardous waste.

Treatment, Storage and Disposal Facilities:Facilities engaged in the treatment, storage, or disposal of hazardous waste. These facilities are the last link in the cradle-to-grave hazardous waste management system.

U

Underground Source of Drinking Water (USDW): An aquifer which supplies drinking water for human consumption or for any public water system, or contains fewer than 10,000 mg per liter total dissolved solids, and does not contain minerals or hydrocarbons that are commercially producible, and is situated at a depth or location which makes the recovery of water for drinking water purposes economically or technologically practical. While EPA defines an USDW as containing less than 10,000 mg per liter TDS, certain states, such as California and Texas, have adopted a 3,000 mg per liter TDS definition for the Class II UIC injection well programs.

Universal Wastes: Commonly referred to as recycled wastes with special management provisions intended to facilitate recycling. There are three categories of universal wastes; hazardous waste batteries; hazardous waste pesticides that have been recalled or collected in waste pesticide collection programs; and hazardous waste thermostats.

Used Oil: Any oil that has been refined from crude or synthetic oil that has been used, and as a result of such use, is contaminated by physical or chemical impurities.

V

Vadose Zone: A subsurface soil zone that contains suspended water. The vadose zone is above the zone of continuous water saturation.

W

Waste Minimization: The reduction, to the extent feasible, in the amount of waste generated prior to any treatment, storage, or disposal of the waste. Because waste minimization efforts eliminate waste before it is generated, disposal costs may be reduced, and the impact on the environment may be lessened.

Waterflood: A method used to enhance oil recovery in which water is injected into a reservoir to remove additional quantities of oil that have been left behind after the primary recovery. Usually, a waterflood involves the injection of water into strategically placed wells so that it sweeps through the reservoir and moves remaining oil to the producing wells.

Workover: One or more of a variety of remedial operations performed on a producing well to try to increase production. Examples of workover operations are deepening, plugging back, pulling and resetting the liner, squeeze-cementing, perforating additional horizons, etc.

Workover Fluid: A special fluid used to keep a well under control when it is being worked over. A workover fluid is composed carefully so it will not cause formation damage. Also used to stimulate a well to enhance productive capacity such as a frac fluid, acid, etc.

Workover Wastes: Wastes resulting from well workover operations. The wastes usually include workover fluids, similar to drilling fluids and could include various small volume wastes such as tubing scale, wax/paraffin, and cleaning or painting wastes.