

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.

