SECTION 1

INTRODUCTION

1.1 Background

The Interstate Oil Compact Commission (IOCC) is the organization of the governors of the 29 oil and gas producing states. The IOCC has been assisting states in developing their oil and gas regulatory programs since 1935. More than 99 percent of the oil and gas produced in the United States onshore is produced within the borders of and is regulated by member states of the IOCC. In recent years, with the creation of an environmental affairs committee, the IOCC has become increasingly involved in environmental issues related to oil and gas production.

1.2 EPA's Regulatory Determination for E&P Wastes

The federal government's increasing interest in environmental and potential human health impacts associated with exploration and production of crude oil and natural gas arose from a two-year study of exploration and production (E&P) wastes and their associated waste management practices by the U.S. Environmental Protection Agency (EPA) in 1986 and 1987. The results of that study were documented in a December 1987 Report to Congress (EPA 1987), which was required by 1980 amendments to the federal Resource Conservation and Recovery Act (RCRA). Based on the findings of the Report to Congress and on oral and written comments received during public hearings in the spring of 1988, EPA on June 30, 1988, 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 Federal Register 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 IOCC's Council on Regulatory Needs

IOCC formed a Council on Regulatory Needs in January 1989 to assist EPA with the second prong of the agency's approach for E&P wastes. Funded by a two-year, $300,000 grant from EPA, the Council is comprised of 12 state regulatory agency members. The Council is supported in its efforts by a nine member advisory committee, of whom three represent state regulatory agencies, three represent industry, and three represent public-interest/environmental groups. The Council is assisted by five representatives of EPA, two from the U.S. Department of Energy, and two from industry, who act as official observers. Governors George Sinner of North Dakota and Garrey Carruthers of New Mexico are co-chairs of the Council.

In 1989, the Council met in February, June and December. An organizational meeting of the Council was held in February, 1989 in Denver, Colorado. At that meeting, a committee structure was formed with the Technical Committee consisting of three subcommittees; Pits, Land, and Commercial, and the Administrative Committee consisting of four subcommittees; Personnel and Resources, Organization and Coordination, Statutory Authority, and State and Federal Relations. At the Council meeting in June, 1989, in Reno, Nevada, the Technical Subcommittees submitted initial criteria for discussion by the full Council. The Administrative Committees presented their first draft reports to the Council at its meeting in Tulsa, Oklahoma in December 1989.

In early 1990, the separate committee reports were revised and combined into a single document. This document was presented as a draft final report at the June, 1990 IOCC meeting in Bismarck, North Dakota. During the summer of 1990, the draft report was circulated to over 300 interested parties for review and comment.[1] In August, 1990, final changes were made to the document so that the Council could present its final report at the December, 1990 IOCC meeting in Phoenix, Arizona.

The purpose of the Council is to recommend effective regulations, guidelines, and/or standards for state-level management of oil and gas production wastes (IOCC 1989). EPA has concurred in this purpose, stating that " . . . IOCC is leading an effort . . . that will use . . . information gathered by EPA to develop IOCC guidelines for state oil and gas waste management regulations" (Lowrance 1989). The technical and administrative criteria proffered by the Council on Regulatory Needs will be published and disseminated to the states as examples of the range of "elements" necessary for effective state regulatory programs for E&P wastes. The criteria by themselves are not intended to form the sole basis of any future federal statutory or regulatory authorities that may be sought by EPA for oil and gas production wastes.

1.4 Implementation Strategy

a. This report represents IOCC's initial effort to help the states and EPA improve E&P waste management programs. This report:

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[1] *Mail list and comments are available upon request.*

- Demonstrates the commitment of the governors of oil and gas producing states, EPA, state agencies, environmental groups and industry to work together for environmental change and improvements;

- Serves as a model for future efforts and substantiates IOCC's position as an appropriate forum to develop comprehensive approaches to multifaceted and complex oil and gas related environmental issues; and

- Establishes a baseline of performance that can be used for both the administrative and technical aspects of E&P waste management. This baseline is useful to federal and state regulators, legislators, and oil and gas operators.

b. To achieve successful implementation, the Council recommends the following strategy:

- Secure grants and encourage individual states to provide adequate funding for implementation of followup recommendations and continued active participation of all affected parties.

- Communicate the criteria of this report to EPA, state agencies, operators, and other interested parties through direct contact, at E&P waste management conferences and symposia, in a series of one-day workshops hosted by state agencies and involving regional EPA offices, state and tribal agencies, oil and gas operators, trade associations, environmental groups, and through other mechanisms as may be appropriate.

- Continue to build consensus and improve this document. To this end, IOCC plans to widely circulate it to federal agencies (EPA, DOE, DOI), state oil and gas agencies, state environmental agencies, national and regional trade associations, and other interested parties seeking endorsement or qualified endorsement. The Council further recommends updating this document every three years. The Council also recommends updates include status reports from participating states that address, (1) progress of the states in using and implementing the report's criteria, and (2) any unresolved or new issues.

- Use this document as a basis for conducting IOCC coordinated reviews of state E&P waste management programs and as a basis for review of federal agency programs. Teams of senior state regulatory personnel should visit agencies and review programs using this document as a baseline of performance and for making recommendations for improvement.

- Use IOCC as a clearinghouse for changes and revisions to state and federal regulatory and legislative programs.

- Pursue improvements in data management, waste characterization, and other areas identified in Section 6 of this report.

1.5 Summary of State Programs

As part of the Council's effort, a review of state E&P wastes programs was undertaken. A questionnaire was developed and sent to all oil and gas producing states. The state program summaries contained in Appendix B to these criteria were based on responses to that questionnaire, and on information contained in Appendix 3 of the EPA Report to Congress, and IOCC's Summary of State Regulations. The states provided updated information for the reprint of EPA's Appendix 3. The summaries are presented in alphabetical order.

SECTION 2

SCOPE OF THE CRITERIA

2.1 General

a. IOCC 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 associated waste. 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.

b. These criteria do not address disposal of produced water by injection or surface discharge – waste management practices that are regulated by EPA or by the states under authority of the federal Safe Drinking Water Act and federal Clean Water Act, respectively.[1] Brief descriptions of the regulatory frameworks authorized by those laws follow in Section 2.2 and 2.3. Disposal of produced water in pits, by land application or at commercial disposal facilities is addressed in the technical criteria of Sections 5.

c. In addition to a review of provisions of the Safe Drinking Water and Clean Water Acts that are applicable to E&P wastes, this section also contains definitions of solid wastes and hazardous wastes, reviews EPA's waste mixture rule, lists examples of exempt and nonexempt E&P wastes, and describes general requirements for the management of nonexempt wastes.

2.2 Class II Injection Wells

The Safe Drinking Water Act establishes a special class (Class II) of injection wells used for the disposition of oil-field fluids. Injection wells in this class are used for E&P waste disposal, enhanced oil recovery and, in some cases, storage of liquid hydrocarbons. Class II underground injection control (UIC) programs are administered directly by the states through primacy delegated by EPA or by EPA in states that have not sought or obtained primacy for the UIC program. Some states have negotiated primacy agreements with EPA and in return have received authorization and federal funding for program implementation conditional upon meeting minimum EPA standards. Primacy agreements, which may be amended with approval from the EPA, largely dictate what can be injected in Class II wells. The EPA determines which wastes can be injected in Class II wells in nonprimacy states.

Among the minimum requirements for Class II wells are:

a. Only approved E&P wastes may be injected.

b. No well may endanger an Underground Source of Drinking Water (USDW).

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[1] *Nearly 21 billion barrels of produced water – or 98 percent of all E&P wastes – were generated in the U.S. in 1985, according to American Petroleum Institute (API) figures cited by EPA (EPA 1987). Most of that produced water was disposed by injection, with much smaller volumes discharged to surface waters or disposed in pits, by land application or at commercial disposal facilities. Drilling wastes (i.e., drilling fluids and cuttings) accounted for about two percent of all E&P wastes generated in 1985, totaling 361 million barrels, according to API (EPA 1987).*

c. Unless permitted by rule, all wells must be permitted before construction.

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

EPA conducted a comprehensive review of the UIC program in 1989. IOCC will review EPA's final recommendations for possible future inclusion in its waste disposal criteria.

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 Clean Water Act 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 Clean Water Act requires NPDES permits for E&P waste discharges to surface water. Currently effluent guidelines prevent any discharge to surface waters except in the following categories:

a. Discharges to coastal areas containing brackish waters not suitable for human use;

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.

2.4 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 wastes unless and until they are discarded. Commercial products and their releases are 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[2] 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).

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[2]*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.*

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 more than 350 chemical compounds or substances that are listed as hazardous constituents. (40 CFR 261 App VIII.)

b. EPA's regulations contain four lists of hazardous wastes: (1) hazardous waste from nonspecific 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 waste to be a hazardous waste if it exhibits any one of the characteristics of ignitability, corrosivity, reactivity, or toxicity.

b. EPA has expanded the toxicity category (toxicity characteristic (TC)), and adopted a revised laboratory procedure (toxicity characteristic leaching procedure (TCLP)).

2.6 EPA's Mixture Rule

EPA's RCRA regulations provide that the commingling of any listed hazardous waste with a nonhazardous waste 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 would 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. Also, unused commercial products should not be disposed with oil-field wastes. 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 wastes for management and disposal.

2.7 EPA's List of Exempt Exploration and Production Wastes

EPA's determination found that the following wastes are exempt from RCRA hazardous waste management requirements. The list below identifies many but not all exempt wastes. In general, E&P exempt wastes are generated in "primary field operations", and not as a result of maintenance or transportation activities. (53 FR 25453-25454)

- "Produced water
- "Drilling fluids
- "Drill Cuttings
- "Rigwash
- "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 dehydration wastes, including glycol-based compounds, glycol filters, filter media, backwash, and molecular sieves
- "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 nonexempt 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."

2.8 EPA's List of Nonexempt Exploration and Production Wastes

EPA's regulatory determination (53 FR 25453-25454) for exploration and production wastes listed the following wastes as nonexempt. The list below identifies many but not all nonexempt wastes. Many of these wastes are generated during maintenance of production equipment as well as transportation (pipeline and trucking) activities. While the following wastes are nonexempt, their regulatory status as "hazardous wastes" is dependent upon a determination of their characteristics or whether they are listed as hazardous waste. Nonexempt wastes should be managed as described under Section 2.9.

- "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 nonexempt 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
- "Drums, insulation, and miscellaneous solids"

EPA did not specifically address in its regulatory determination the status of several waste streams including hydrocarbon-bearing material that is recycled or reclaimed by reinjection into a crude stream. However, under existing EPA regulations, recycled oil, even if it were otherwise hazardous, could be reintroduced into the crude stream, if it is from normal operations and is to be refined along with normal process streams at a petroleum refinery facility. See 40 CFR §261.6 (a)(3)(vi).

2.9 Requirements for Nonexempt Wastes

a. EPA's hazardous waste regulations, including the toxicity characteristic (TC), may apply to nonexempt waste generators at E&P sites.

b. Nonexempt wastes should be tested whenever there is reason to believe they may exhibit one or more of the hazardous waste characteristics. Although there is no requirement that a nonexempt 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 actual hazardous waste volume generated, stored or managed onsite, RCRA hazardous waste requirements for treatment, storage, or disposal or corrective action may apply.

d. Nonexempt waste should also be segregated whenever possible from exempt waste. If the nonexempt waste were a listed hazardous waste, EPA's mixture rule would 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 nonexempt waste should be examined closely to assure that it is not a hazardous waste.

e. Some states have adopted hazardous waste regulations which differ from those that EPA has promulgated. While different in many specific areas, those state programs, by law, still must be at least as stringent as the federal programs.

SECTION 3

GENERAL CRITERIA

3.1 General

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

a. statutory authority which 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 waste 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 wastes while maintaining an economically viable oil and gas industry and encouraging waste minimization as a means of achieving such a goal.

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, 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, areal, 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 provided the Council with a useful framework for the development of criteria for an effective state program. Such a program for E&P waste should, at a minimum, include provisions for permitting, compliance evaluation, and enforcement.

4.1.1 Permitting

A state must have a regulatory mechanism to assure that wastes generated during oil and gas E&P operations are managed 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. The regulating 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. 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 similar requirements are mandated by two or more regulatory programs, those requirements should be combined where feasible. The process for obtaining permits should also involve prompt consideration and response to permit applications, while preserving the integrity of the permit review process, including appropriate public participation.

4.1.2 Compliance Evaluation

4.1.2.1

State programs generally 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.

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

(1) the capability to make comprehensive surveys of facilities and activities subject to regulation in order to identify a failure to comply with program requirements by responsible parties;

(2) the capability to conduct periodic 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

(3) the authority to investigate information obtained regarding violations of applicable program and permit requirements.

c. Procedures to receive and assure proper consideration of information submitted by the public about alleged violations and for encouraging 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 also how the state agency will assure an appropriate and timely response.

d. Authority to enter any regulated site or premises where E&P activities are being conducted and locations in which records relevant to program operation are kept in order to inspect, monitor, copy records or otherwise investigate compliance with permit conditions and other program requirements.

e. Investigatory procedures that will produce an appropriate paper trail in support of evidence admissible in an enforcement proceeding.

4.1.2.2

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.

4.1.3 Enforcement

4.1.3.1

With respect to violations of the state program, the state agency should have the authority to take some or all of the following enforcement actions [1]:

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

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

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

h. Forfeiture of financial assurance instruments.

4.1.3.2

States should consider guidelines 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 guidelines 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

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 some or all of a variety of other administrative requirements that are discussed below.

4.2.1 Contingency Planning

The state agency should have authority to require an operator to comply with a general contingency plan approved by the state agency, or independently prepare and maintain a contingency plan for waste release prevention and control. Such a plan should describe the actions which the operator will take to prevent and respond to spills and accidental releases, including provisions for notification, remedial action, training, names of individuals to be contacted in the event of an incident, and other requirements similar to those contained in Spill Prevention Control and Countermeasure plans under the federal Clean Water Act's oil spill prevention provision.

4.2.2 Public Participation

4.2.2.1

State program legislation or regulations should require that the affected public be provided with adequate notice of the agency's intention to issue a permit that addresses E&P waste management. The public should be provided with an appropriate opportunity to comment on a permit prior to issuance. Wherever possible, this notice should be coordinated with the notice requirements of other concurrently applicable state or federal programs. For commercial or centralized disposal facilities, the operator should also be required to provide written notice to adjacent land owners of record for such area and in such manner as may be prescribed by the state agency. Agency

records related to this program should generally be available for review by the public. 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 recordkeeping time period of three years which should be automatically extended while any unresolved enforcement action regarding the regulated activity is pending.

4.2.2.2

States should provide for the dissemination of program information to the regulated industry and the public. Such efforts should be part of an on-going process through which information is exchanged in an open forum. Because E&P waste management requirements are undergoing numerous changes, states have the obligation to inform the regulated industry and the public of changes. Industry associations 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

States should use advisory groups of industry, government and public representatives to obtain input and feedback on the effectiveness of state programs for the management of E&P wastes. 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 Financial Assurance

All states should develop a 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. Most states have financial assurance programs, although they vary widely in the specific activity covered, the type of assurance allowed, the amount of assurance required, and the mechanism for forfeiture of the financial instrument.

States should evaluate the activities 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. Some states require performance bonds and some states require penal bonds. States should consider combining their financial assurance requirements to allow a single instrument to provide coverage for an operator's various activities.

States should determine the types of financial assurances that will provide reliable monetary resources to the state. Types of financial assurance include surety bonds, self-bonding, letters of credit, certificates of deposit, cash, federal, state, or municipal bonds, and other forms of collateral. 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 consider those financial assurance options which facilitate an operator's compliance with bonding requirements. For example, 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.

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 is unable to 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.

4.2.4 Waste Hauler Certification

The appropriate state agency should have authority to require the training of drivers of trucks which 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 recordkeeping, 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.

4.2.5 Waste Tracking

Unless the state agency is utilizing an alternative method which achieves comparable results, the waste tracking requirements of these criteria (Section 5.7.2.3) should be used by the agency to regulate the transportation (other than by pipeline) of E&P waste to a commercial or centralized disposal facility. The waste generator, waste hauler and operator of the disposal facility should retain and make available for regulatory agency inspection all required waste tracking information for a minimum of three (3) years from the date of shipment. This record retention period should be automatically extended while any unresolved enforcement action regarding the regulated activity is pending.

4.2.6 Location of Closed Disposal Sites

In response to RCRA Section 3001(b)(2)(A)(i), 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 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 which is within the discretion of the state.

4.2.7 Data Management

Effective data management systems should be maintained due to the amount of information that states compile. Such systems should include permitting, operating, 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 and other users. The IOCC and federal government should assist the states in developing and maintaining effective data management systems.

4.3 Personnel and Funding

4.3.1 Personnel

For a state program to function effectively, it must have sufficient, properly trained personnel to accomplish the goals and objectives of the program.

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 consider 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 must 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 and management are also key elements of program administration. The conduct of public hearings, the coordination of enforcement activities and the referral of cases to legal personnel for follow-up action should also be administration functions.

4.3.1.2 Legal

Legal support for an E&P waste management 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 must receive 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 Inspectors

Field inspectors should be responsible for conducting routine inspections of regulated facilities and activities to assure compliance with program requirements. In addition, field inspectors 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 inspectors also should be involved in the assembly of evidence for enforcement actions and in the state agency's community relations. Field inspectors generally should be high school graduates or have equivalent experience and otherwise be knowledgeable about oil and gas field-related work and waste management practices. The ongoing training of field inspectors should emphasize 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. In addition, field inspectors must be skilled in the handling of hazardous materials and in all aspects of personnel safety.

4.3.2 Funding

An effective E&P waste management program should be funded at a level sufficient to allow it to accomplish its goals and objectives. While most state agencies will be funded through a general appropriation from that state's legislature, each state agency should evaluate such other sources of funding 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 the management of E&P wastes have their roots in oil and gas conservation programs that were established during the early part of this 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 wastes. Different agencies are often responsible for the regulation of oil and gas wells, pits and impoundments, disposal wells, surface water discharges, and disposal of drill cuttings and muds. Each agency has its own administrative requirements relating to permitting and financial assurance and develops it own budget priorities. Each has its own inspection and enforcement authorities. Unless a high level of formal interagency coordination exists, such unilateral program 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 permitting, inspection, enforcement, training, and other regulatory activities. Where multiple state agencies have jurisdiction over the management of E&P wastes, budget development should be coordinated.

The review of the state programs (Appendix B) showed that many do not have formal agreements providing for the coordination of activities among agencies. The coordination of permitting, inspection, enforcement and training provides an economic benefit to the agencies and assures that no regulatory gaps occur in the regulation of the industry. The Council did not review the adequacy of individual memorandums of agreement or memorandums of understanding. States with multiple agencies having jurisdiction for E&P waste management should develop formal coordination mechanisms. Additionally, states should review existing agreements to assure that they are current and effective. They should hold regularly scheduled meetings among or between involved agencies and should share information so that each agency can more fully carry out its program responsibilities.

4.5 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. Peer review-based evaluation mechanisms have demonstrated the need for establishment of a performance baseline by which E&P waste management programs can be evaluated. Those mechanisms have led to the identification of strategies that will improve relations between the states and the federal government.

4.5.1 Background

4.5.1.1 Initiatives

Initiatives that have been undertaken to explore relations between state and federal agencies and which are relevant to the Council's efforts include:

a. the Mid-Course Evaluation of state and federally implemented Class II UIC programs;

b. a federal/state enforcement and compliance steering committee which addresses timely and appropriate enforcement in EPA regulatory programs;

c. the Keystone Center National Waste Management Strategies Project which addressed, among other things, state and federal relations; and

d. the peer review process of state UIC programs being conducted by the Underground Injection Practices Council.

4.5.1.2 Results

Results of these initiatives included:

a. the recognition that there may be differing program and enforcement expectations and priorities among states, EPA headquarters and EPA regions;

b. the recognition that variable approaches to regulation may be necessary or beneficial;

c. the need to establish a baseline of performance by which state and federal agencies can judge the effectiveness of their programs;

d. the need for continued dialogue between various regulatory parties; and

e. the recognition that programs and priorities may need to change as knowledge increases.

4.5.2 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. To address these gaps, the focus of future efforts should be to utilize information developed through EPA studies and investigations, and augmented by the criteria and information developed by the Council. Given that information, EPA, working through the IOCC, can meet with and provide guidance and assistance to states that need to improve their programs.

The Council has identified 10 interrelated strategies that, if implemented, would enhance state and federal relations and promote effective management of oil and gas wastes.

a. Commitment to Work Cooperatively. State and federal agencies should take steps to encourage open communications among state and federal agencies, the regulated industry and other interested parties on issues pertaining to the management and regulation of E&P wastes.

   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.

b. Recognition of Different Priorities. States should recognize the interest of federal agencies in achieving national goals and objectives and assuring adherence to federal and state 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. Each of the federal statutes governing protection of the environment (e.g., RCRA, the Clean Water Act, Safe Drinking Water Act) has provisions for state implementation of certain provisions and for 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 Safe Drinking Water Act, variable approaches to the management of E&P wastes are necessary. These variable approaches are partly a result of the varying geologic, hydrologic or historic conditions in different states and in different 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 the IOCC, should be sufficiently flexible to permit states to take into account these varying conditions.

e. Baseline of Performance. The criteria developed by the Council should be used by any federal or state agency that is responsible for any portion of the 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. The criteria and the process by which they may be implemented by the states is similar in concept to Section 1425 UIC programs under the Safe Drinking Water Act. In these programs, state underground injection control programs demonstrate adherence to the goal of protecting underground sources of drinking water, rather than adherence to a detailed checklist of quantitative standards. The baseline contained in this report can be used in a similar fashion by EPA, Congress and others who may evaluate E&P waste management programs such as in the state program review process described below.

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 IOCC should initiate a state program review process that would provide states with an independent evaluation of their E&P waste management programs using criteria developed by the Council. An advisory panel to develop the review process should include representatives of state oil and gas and environmental agencies, federal agencies, industry and the public. The review process would also increase the knowledge of participating states as to the content and operation of other state E&P waste management programs.

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 another section of the Council's report. However, each state should recognize that coordination between 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. Federal oversight of a state E&P waste management program could be a condition of such assistance.

SECTION 5

TECHNICAL CRITERIA

5.1 General

These technical criteria for E&P waste management practices address pits, land applications, centralized and commercial facilities. In most cases, these criteria are general in scope. The states are encouraged to 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 ground and surface water, soil and air, protect public health, safety and the environment, and prevent property damage.

b. Facilities and sites operated for the storage or disposal of 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. 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.

d. Disposal of drilling muds and drilling fluids into municipal waste landfills should not be considered when better disposal options are available. However, drilling muds and drilling fluids with no free liquids that are not mixed with any other wastes may be disposed of in municipal waste landfills only when such landfills are designed to contain such wastes. Low volume E&P wastes, such as oily rags and drained filters, and any other E&P wastes that are similar in composition to routine municipal solid waste streams may be disposed of in municipal solid waste landfills.

e. As in any aspect of waste management, there are some general, sound practices that should be employed. These practices, which include 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. As a rule-of-thumb, the choice of a waste management option should be based upon the following hierarchy of preference:

  i. Source Reduction -- reduce the quantity and/or toxicity of waste generated;

  ii. Recycling -- reuse or reclaim as much of the waste generated as possible, and whenever possible, hydrocarbons should be combined with crude oil, condensate or natural gas liquids;

  iii. Treatment -- employ techniques to reduce the volume or the relative toxicity of waste that has been unavoidably generated;

  iv. Proper Disposal -- dispose of remaining wastes in ways that minimize adverse impacts to the environment and that protect human health.

f. Nothing in these criteria mandates onsite testing for every hazardous constituent that may be present in E&P wastes. Rather, these criteria call for appropriate onsite testing of E&P wastes prior to disposal

for such characteristics as organic content, pH, salinity, hydrogen sulfide content, and ignitability--the chemical characteristics that are thought to be of primary concern in E&P wastes. The Council recognizes, however, that waste management practices, and regulatory requirements, would be improved by obtaining a more complete knowledge through testing and analysis of the range of hazardous and toxic constituents in E&P wastes.

5.2 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 protection described in Section 5.1.a. and in the goals statement of Section 3.2.

5.3 Technical Criteria for Pits

5.3.1 Definitions

a. Reserve Pits

Pits used (a) to store additional drilling fluids for use in drilling operations, and/or (b) to dispose of wastes generated by drilling operations and initial completion procedures.

b. Production Pits

i. Skimming/Settling--pits used to provide retention time for settling of solids and separation of residual oil.

ii. Produced Water--pits used for storage of produced water prior to injection or offsite transport.

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

iv. 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 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.

5.3.2 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 part of an operational permit or program.

b. Pits may be permitted by rule based upon specific requirements in areas where geologic, topographical, hydrological 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.

5.3.3 Siting

General siting guidelines or restrictions should be included in area or state-wide regulations to address issues such as: fluid makeup, depth to and quality of groundwater, wetlands, flood plains, surface contour, and proximity to drinking water supplies and wells, surface water, residential or commercial buildings, geologic hazards, or other environmentally sensitive areas.

5.3.4 Construction

General standards for construction of pits should be included in area or state-wide regulations and should address the following items:

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 does not penetrate groundwater 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 shallow 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 base muds are used during a drilling program, reserve pits should be designed to accommodate those fluids.

e. Tanks or liners should be required in certain instances based on type of fluid and site-specific characteristics (e.g., unconsolidated soils and/or hydrogeologic conditions that create a potential for adverse impact to surface water or groundwater, and proximity to environmentally sensitive areas). Liners can be natural or constructed of natural or synthetic materials, provided

that they are installed according to accepted engineering practices and are compatible with expected pit contents.

f. Fencing, flagging and caging requirements should be set by area or state-wide regulations as may be necessary to protect the public, domestic animals, wildlife and waterfowl.

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.

h. Unlined skimming/settling pits can be used in areas where groundwater either is not present or is unusable or is naturally protected from the threat of contamination.

5.3.5 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 state-wide regulations. Restrictions should consider salinity, hydrocarbon content, pH, or other characteristics which 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 unpermitted discharges.

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

e. Inspections should be conducted at regular intervals or as needed by operators to ensure pits meet all cperating and structural integrity requirements.

f. Hydrocarbons which inadvertently accumulate in an unlined reserved 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 unlined skimming/settling pits.

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

i. Percolation pits should be used only for disposal of produced waters and only when area or state-wide restrictions established under Section 5.3.5.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. Fluids diverted to emergency pits should be removed as quickly as practical and the regulatory agency notified promptly of the use of those pits.

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

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

5.3.6 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 or within 12 months after cessation of drilling operations.

c. Pit liquids should have free oil removed and when appropriate should be sampled prior to closure for salinity, hydrocarbon content, pH, or other characteristics which may be detrimental to the environment. Onsite disposal of pit contents should be conducted in accordance with the landspreading, burial and landfilling criteria of Sections 5.4 and 5.5, or by NPDES or UIC permit.

d. Liquid and nonliquid materials not satisfying the onsite criteria for landspreading or burial (Sections 5.4 and 5.5) must be disposed in federal or state approved disposal facilities.

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

f. Records should be kept at the regulatory agency of all pit locations and should be available to the public for inspection and copying.

5.4 Technical Criteria for Landspreading

5.4.1 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 5.7.

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 5.7.

5.4.2 Regulatory Requirements

When landspreading practices are used at E&P sites, they should be conducted consistent with lease and landowner obligations and 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 5.4.3.

5.4.3 Operational Requirements

a. Free oil should be removed from the wastes by mechanical means such as skimming or filtration before the wastes are landspread.

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

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

d. Liquids should be applied at a rate that will not result in pooling, ponding or runoff.

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 adsorption 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.[1]

g. After landspreading of hydrocarbon containing waste, the waste-soil mixture should not exceed one percent by weight oil and grease.

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 shall delay any requirement for erosion control and/or site reclamation or revegetation.

i. Soil analyses should be performed prior to landspreading and again upon closure of the site.

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 maintained of all waste analyses.

5.5 Technical Criteria for Burial and Landfilling

5.5.1 Definitions

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.

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[1] *A study prepared for the American Petroleum Institute determined safe limits for agricultural purposes as follows: EC less than 4 mmhos/cm, ESP less than 15, and SAR less than 12. Lloyd E. Deuel, Jr., Ph.D., "Evaluation of Limiting Constituents Suggested for Land Disposal of Exploration and Production Wastes" (March 1990).*

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 5.7.

5.5.2 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 state regulations and should address the operational requirements in Section 5.5.3.

5.5.3 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 5.4 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, pipe scale with low levels of naturally occurring radioactive materials (NORM), gas plant catalyst or molecular sieve. Closure should be consistent with Section 5.3.6.a and 5.3.6.e.

b. A protective bottom liner, solidification, fixation or encapsulation method should be required for burial or landfilling of wastes whose salt and/or hydrocarbon content exceeds the landspreading criteria of Section 5.4.3. 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.

5.6 Technical Criteria for Roadspreading

5.6.1 Definition

Roadspreading is the placement on roads of wastes that exhibit properties similar to commercial road oils, mixes, dust suppressants or road compaction brines.

5.6.2 Regulatory Requirements

When roadspreading is used, it should be conducted consistent with lease and landowner obligations and local, state, and federal regulations. General standards for roadspreading should be included in area or state regulations and address the operational requirements in Section 5.6.3.

5.6.3 Operational Requirements

a. Exempt wastes such as tank bottom, emulsions, heavy hydrocarbons and crude oil-contaminated soil may be used for road oil, road mix, or asphalt if they are not ignitable (40 CFR §261.21) and have a mixed density and metal content consistent with approved road oils or mixes.

b. Hydrocarbon wastes or produced waters should be applied at loading rates that prevent pooling and surface runoff. Appropriate buffer zones should be established to protect waters of the state and water wells.

c. The produced water should be tested and should exhibit properties similar to commercial roadspreading products that are regulated by states or local agencies.

5.7 Technical Criteria for Commercial and Centralized Disposal Facilities

5.7.1 Definitions and Exemptions

a. Commercial Disposal Facility – a facility whose owner(s) or operator(s) receives compensation from others for the temporary storage, treatment, and disposal of produced water, drilling fluids, drilling cuttings, completion fluids, and any other exempt E&P waste, and whose primary business objective is to provide these services.

b. Centralized Disposal Facility – a facility, other than a commercial disposal facility, that is (1) used exclusively by one owner or operator, or (2) used by more than one operator under an operating agreement, and which receives for collection, treatment, temporary storage, or disposal of produced water, drilling fluids, drill cuttings, completion fluids and any other 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. This definition covers the storage and disposal facilities (i.e., lined or unlined pits or ponds, and below grade or underground tanks) that are present at Class II disposal well sites.

c. Exemptions – The definitions and technical criteria of Section 5.7 shall not apply to Class II produced water injection wells and to wells used in enhanced oil recovery or "waterflood" projects, or to the above-ground storage tanks at Class II injection well sites, waterflood project sites, and produced water gathering sites, where E&P wastes are stored temporarily prior to disposal. The definitions and technical criteria of Section 5.7 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.

5.7.2 Technical Standards and Regulatory Requirements

Commercial and centralized offsite 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 5.7.2.1.a. Recognizing that commercial disposal facilities use advanced methods of treatment and disposal of wastes, the regulatory agency is encouraged to establish numerical requirements for the design of pond liners and leachate collection systems, for landfarming operations (i.e., repeated land applications), and for waste-oil reprocessing. 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 or public health impact once the facility has commenced operations and following its closure.

The regulatory agency may adjust or exempt from these requirements for 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.

5.7.2.1 Regulatory Agency Responsibilities in Permitting

a. Permits. The regulatory agency should authorize off-site commercial and centralized disposal facilities for E&P wastes by permit. A permit should be in force for a finite period, to be determined by the agency. 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.

b. Acceptable Wastes. The agency should prescribe the range of E&P wastes which can be disposed at commercial and centralized facilities and at municipal waste landfills.

c. 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. This information should be used by the agency to match a given disposal apparatus (e.g., a lined evaporation pond with a leak detection system) with a particular waste stream. 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 5.7.2.2.c.v. and vi.

5.7.2.2 Permitting Requirements

a. Any new or existing commercial or centralized facility must obtain a permit from the regulatory agency to commence operation or to continue to operate. 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 5.7.2.2a, b, and c in light of the volume and characteristics of wastes received by the facility.

b. Siting Plan. The specific site for a commercial facility, or to the extent possible the site for a centralized facility, should have natural features (such as isolation from or considerable depths to groundwater, protection against flooding, presence of low-permeability soils and rocks, and topography conducive to protection against wind erosion) that prevent or minimize release of pollutants to offsite waters, lands and air. Additional safeguards may be required by the regulatory agency for centralized facilities that are located on sites that do not exhibit natural protective features. An application for a permit to site a commercial or centralized facility should contain the following information:

i. Names, addresses and telephone numbers of owners and the operators of the facility, the owner(s) or 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;

ii. Topographic map showing the location of the site and any highways or roads that abut or traverse through the site, and that depict all water courses, water wells, and dwellings located within one mile of the site;

iii. 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;

iv. Average annual precipitation and evaporation rate at disposal site;

v. Proximity of disposal facilities to surface water courses (priority in net-precipitation climates);

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

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

viii. 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.

c. 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. 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.

d. 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 Operating Plan should contain the following information:

i. Volume, rate 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.);

ii. 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;

iii. Plan for routine inspection, maintenance, and monitoring to ensure and demonstrate compliance with permit requirements;

iv. Specific engineering plans for preventing or minimizing the generation and emission of hydrogen sulfide gas;

v. A plan, including consideration of on-site sampling and testing, to assure that RCRA Subtitle C or other prohibited wastes are not disposed of at the facility.

vi. Centralized and commercial waste disposal facilities must submit a plan to characterize wastes received for disposal. Larger facilities may require more testing requirements.

Waste characterization requirements for small centralized facilities may be more limited than far large facilities, based on the limited types and volumes of wastes received. At a minimum, waste characterization must consist of testing for organics, pH, salinity, hydrogen sulfide content, and ignitability. States should determine additional minimum testing criteria applicable to their regions. Testing for organics must be appropriate for the type of waste, method of disposal, and the potential for health and environmental hazards posed by that situation.

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

viii. Security plan for the facility.

e. 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 shall comply with the general requirements of Section 5.1 and the burial requirements of Section 5.5 of these criteria, 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 shall be used to establish a financial surety level for the facility prior to permit approval.

5.7.2.3 Waste Tracking Requirements

To assure that only wastes derived from the exploration and production of oil or natural gas 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. Three-Part Form Required. A three-part form 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 the Form. The form should be maintained by the generator (producer), hauler and operator of the disposal facility for inspection by the regulatory agency. The forms should be maintained for a period of three years after the shipment date.

c. Attest to No Illegal Dumping. The hauler and the operator of the disposal facility should certify in writing on the three-part form that no wastes were dumped illegally or at a location or facility not designated by the generator or permitted to receive exempt E&P waste, and that no prohibited oil-field or hazardous wastes were mixed with the exempt wastes during transport.

d. Reporting of Discrepancies. The operator of the disposal facility shall immediately report to the regulatory agency and the generator any discrepancy in waste descriptions, volumes or place of origin based on personal observations or information contained in the three-part form.

e. Permitting of Waste Haulers. Waste hauling companies should be permitted by the regulatory agency based on a showing of minimum 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.

5.7.2.4

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

RECOMMENDATIONS FOR FUTURE WORK

1. The Council encourages industry, individual states and federal government to increase their efforts to characterize chemical constituents and naturally occurring radioactive materials (NORM) of exploration and production wastes.

2. The Council encourages research by industry, the federal government, state-affiliated academic institutions, and public-interest groups into effective ways of minimizing and reusing wastes generated in the nation's oil and gas fields.

3. The Council recognizes that contamination problems exist from the use of past management practices and from violation of regulations and laws. As such, it recommends that IOCC, EPA, states, the regulated industry and the public work together to evaluate and recommend remediation approaches.

4. The Council recommends that IOCC review and act upon EPA's recommendations that may result from the agency's mid-course review of state UIC programs. IOCC should incorporate in these technical criteria any changes that may be needed to address problems or improvements in state-administered UIC programs.

5. The Council encourages the state and federal governments to examine the benefits and economic and energy impacts of changes in E&P waste managements requirements.

6. The Council encourages EPA to work with all interested parties in the development of any regulations on guidance that affect E&P activities.

SECTION 7

REFERENCES

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