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Revisiting RCRA's Oilfield Waste Exemption as to Certain Hazardous Oilfield Exploration and Production Wastes

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Few areas of environmental concern generate as much criticism and controversy as does the question of how to manage the vast quantities of waste generated by our nation's oilfield exploration and production operations. According to a recent study conducted by the American Petroleum Institute (API), in 1995, U.S. onshore and coastal oilfield exploration and production (E&P) operations generated approximately 20.5 million barrels of associated wastes. Although these wastes pose significant hazards to human
health and the environment, they are largely unregulated under existing state and federal regulatory schemes.

The "regulatory void" that surrounds the management of wastes associated with E&P operations is the result of a myriad of factors, including numerous political and historical influences. There is no doubt that this void is largely the result of intense industry lobbying by the oil-and-gas industry that has occurred over the decades since our nation first began to codify environmental law. Nor is there any question that the oil-and-gas production industry enjoys unique regulatory exemptions that result in significant risks to human health and the natural environment. These risks have nevertheless been tolerated in the name of protecting the economic viability of an industry whose solvency can hardly be seen as being threatened.

This article traces the history of the exemption of certain oil-and-gas E&P wastes from coverage under Resource Conservation and Recovery Act of 1976 (RCRA). It will then discuss the characterization of certain oil-and-gas E&P wastes that are particularly hazardous to human health and the environment. Finally, the article will critique the Environmental Protection Agency's (EPA) justifications for not regulating E&P wastes, and suggest that it is time to revisit the exemption allowed under RCRA as to certain types of E&P waste.

II. HISTORY AND SCOPE OF THE RCRA OILFIELD WASTE EXEMPTION

Congress enacted RCRA on October 21, 1976. "RCRA is a comprehensive environmental statute that empowers the Environmental Protection Agency to regulate hazardous wastes from cradle to grave, in accordance with the rigorous safeguards and waste management procedures of Subtitle C." Under that subtitle, "EPA has promulgated standards governing hazardous waste generators and transporters, and owners and operators of hazardous waste treatment, storage, and disposal facilities." Under the statute:

Congress directed EPA to develop criteria to identify hazardous wastes and authorized the agency to list particular
wastes as hazardous according to the . . . criteria. Generally wastes are considered hazardous under Subtitle C if the Administrator lists them as hazardous, or they are found to have one of four technical characteristics of hazardousness.\(^5\)

Wastes that are exempt from Subtitle C and "[n]onhazardous wastes are regulated much more loosely under Subtitle D."\(^6\)

By 1980, there had been intense lobbying by the oil-and-gas industry in order to secure exemptions from Subtitle C's strict requirements.\(^7\) As a result, Congress amended the statute to exclude from regulation "drilling fluids, produced waters, and other wastes associated with the exploration, development, or production of crude oil or natural gas or geothermal energy."\(^8\) Under the amendments, these wastes would be subject to existing programs, rather than Subtitle C, unless and until EPA determined that regulation was needed.\(^9\)

In order to facilitate a determination of whether to regulate oil and gas industry associated wastes under Subtitle C, the 1980 amendments directed EPA to conduct a study of the hazardous nature of E&P wastes and the industry's practices for managing them. In its study, EPA was to include a review of the cost and availability of managing these wastes separately from the exploration, development, or production of crude oil or natural gas or geothermal energy.\(^{(1)}\)

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5. Id. (citations omitted) (citing 40 C.F.R. §§ 261.11, .30-.33 (2002)). The hazardous "characteristics" defined by the agency include ignitability, corrosivity, reactivity and EP toxicity, where the latter characteristic is determined by the amount and type of toxic residues that have leached into surrounding liquid. See id. (citing 40 C.F.R. §§ 261.20-24).

6. Id. at 331 (citations omitted). For a more complete discussion of Subtitle D, see infra notes 125-49 and accompanying text.

7. See Oil Groups Rap Hazardous Waste Rules, OIL & GAS J., Mar. 19, 1979, at 51, 51. "U.S. petroleum industry groups have stormed the Environmental Protection Agency with objections to the agency's proposed rules for implementing hazardous waste management section of the Resource Conservation and Recovery Act." Id.


9. See id. According to that provision, E&P wastes:

(A) [S]hall be subject only to existing State or Federal regulatory programs in lieu of subtitle C until at least 24 months after the date of enactment of the Solid Waste Disposal Act Amendments of 1980 . . . .

(B) Not later than six months after completion and submission of the study required by [42 U.S.C. § 6982(m)], the Administrator shall . . . determine either to promulgate regulations under this subtitle for drilling fluids, produced waters, and other wastes associated with the exploration, development, or production of crude oil or natural gas or geothermal energy or that such regulations are unwarranted . . .

(C) [S]uch regulations shall take effect only when authorized by Act of Congress.

Id.
of alternative disposal options.10 Once it had completed the required study, EPA was to report its findings to Congress and make the "regulatory determination" required by 42 U.S.C. section 6921(b)(2)(B).

EPA did not immediately conduct the study required by section 6982(m). Instead, it delayed action on the matter until 1985, when the Alaska Center for the Environment (ACE) sued EPA in an attempt to force it to comply with the statute.11 As a result of the suit, EPA and ACE entered into a consent decree in which EPA agreed to perform the required study.12 In April 1987, EPA obtained revised deadlines under the ACE consent decree requiring EPA to submit its final report to Congress by December 31, 1987, and to make the requisite regulatory determination by June 30, 1988.13 EPA submitted its technical report on December 28, 1987.14

10. See 42 U.S.C. § 6982(m). According to that provision, EPA was required to conduct a detailed and comprehensive study and submit a report on the adverse effects, if any, of drilling fluids, produced waters, and other wastes associated with the exploration, development, or production of crude oil or natural gas... on human health and the environment, including, but not limited to, the effects of such wastes on humans, water, air, health, welfare, and natural resources and on the adequacy of means and measures currently employed by the oil and gas... drilling and production industry, Government agencies, and others to dispose of and utilize such wastes and to prevent or substantially mitigate such adverse effects. Such study shall include an analysis of:

(A) the sources and volume of discarded material generated per year from such wastes;

(B) present disposal practices;

(C) potential danger to human health and the environment from the surface runoff or leachate;

(D) documented cases which prove or have caused danger to human health and the environment from surface runoff or leachate;

(E) alternatives to current disposal methods;

(F) the cost of such alternatives; and

(G) the impact of those alternatives on the exploration for, and development and production of, crude oil and natural gas or geothermal energy.

Id.


12. See id. at 25,447-48 (agreeing that EPA will determine to promulgate regulations under Subtitle C for wastes from oil, gas and geothermal exploration, development, and production, or that regulations are unwarranted).

13. See id. at 25,447.

14. See id.
On July 6, 1988, following a second round of intense lobbying by the oil-and-gas industry, EPA made its final determination to continue to exempt oilfield wastes from regulation under RCRA's hazardous waste provisions. EPA made its determination for continued exemption even though its study revealed that the mismanagement of oil-and-gas E&P wastes had resulted in widespread damage to the environment and significant risks to human health. According to its findings:

[D]amage cases [from 14 states] were extensively reviewed by the States, industry, and third parties. On the basis of all available information, the study found that wastes from crude oil and natural gas operations have endangered human health and caused environmental damage when managed in violation of State and Federal requirements. In some instances damage occurred where wastes are managed in accordance with currently applicable State and Federal requirements.

In its Regulatory Determination, EPA summarized the specific categories of damage it had observed in making its assessment. Included in those observations were indications of significant damage to land and groundwater as a result of “roadspreading” or “landspreading” of production wastes, as well as leakage and seepage from production pits. Despite these findings, EPA determined that regulation of E&P wastes under RCRA Subtitle C was “unwarranted because of the relatively low risk of these wastes and the presence of generally effective state and federal regulatory pro-

15. See Mark E. Teel, IPAA and OTC Underscore Industry Optimism, WORLD OIL, July 1991, at 27 (stating, “[the Independent Petroleum Association of America] was proud of recent Washington lobbying efforts that culminated in exemptions for oil and gas operations in recent environmental legislation, and it is determined to continue efforts on the political front in coming months.”); James O’Byrne, Political Muscle Helped Keep Toxic Pools Legal, TIMES-PICAYUNE (New Orleans), Oct. 15, 1989, at A-16.
16. See Regulatory Determination, supra note 11, at 25,446.
17. Id. at 25,449 (emphasis added).
18. See id. at 25,448-49. Specifically, according to the report, EPA identified:
   - Degradation of soil and ground water from runoff and leachate from central treatment and disposal facilities, reserve pits, and unlined disposal pits;
   - Potential for endangerment of human health from consumption of contaminated fish and shellfish and from ground water contaminated by seepage from storage and disposal pits; [and]
   - Potential damage to tundra on the Alaska North Slope from roadspreading and seepage and discharges from reserve pits . . . .

Id. at 25,449.
In support of its determination, EPA offered its findings that: Subtitle C was too inflexible to allow a consideration of costs and economic impacts; the wastes would strain Subtitle C facility capacity; permitting delays would hinder the search for new oil and gas reserves; and, in any event, existing regulatory programs were "generally adequate."20

In order to define the precise scope of the continued oilfield waste exemption under RCRA, EPA listed those materials that it considered to be encompassed within the original, interim statutory exemption. These materials included tank bottoms, pit sludges, produced water, drilling fluids and other wastes associated with oil-and-gas drilling and production.21

In 1993, EPA published a "clarification" of the scope of the exemption in which it determined that in order for wastes to be subject to the exemption, they "must be intrinsic to and uniquely associated with" E&P operations.22 For crude oil E&P operations,

19. Id. at 25,459.
20. Id. at 25,447. Specifically, EPA found regulation unwarranted because:
   (1) 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;
   (2) Existing State and Federal regulatory programs are generally adequate for controlling oil, gas, and geothermal wastes ... [T]he 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;
   (3) Permitting delays would hinder new facilities, disrupting the search for new oil and gas deposits;
   (4) Subtitle C regulation of these wastes could severely strain existing Subtitle C facility capacity;
   (5) 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 . . . .

Id.

   [F]or a waste to be exempt from regulation as hazardous waste under RCRA Subtitle C, it must be associated with operations to locate or remove oil or gas from the ground or to remove impurities from such substances and it must be intrinsic to and uniquely associated with oil and gas exploration, development or production operations . . . [and] must not be generated by transportation or manufacturing operations.

Id. at 15,284.

EPA further notes that the off-site transport of exempt waste from a primary field site for treatment, reclamation, or disposal does not negate the exemption. . . . Thus, the off-site transport and/or sale of exempt oilfield wastes to crude oil reclaimers for treatment does not terminate the
EPA clarified that the end-point of primary field operations, and thus the end-point of the exemption, occurs when custody is transferred from the producer to the transporter. EPA therefore established a "rule-of-thumb," holding that all E&P wastes "intrinsic to and uniquely associated with primary E&P operations" are those generated by operations occurring before the transfer of custody, or the last separation point. Accordingly, under EPA's interpretation of the statute, RCRA exempts from regulation under Subtitle C all intrinsic E&P wastes generated prior to the transfer of custody or last separation point.

The following section examines several varieties of wastes that are produced in conjunction with primary E&P operations, as to which risks are far from negligible, and as to which existing state and federal regulatory programs are clearly inadequate.

III. WASTE CHARACTERIZATION AND RISK ASSESSMENT OF E&P ASSOCIATED WASTES

A proper understanding of the necessity for reform in the realm of federal regulation of oilfield E&P wastes requires general familiarity with the nature and extent of such wastes, and of the identities of their toxic constituents.

The American Petroleum Institute (API) divides E&P wastes into three broad categories: produced water, defined as "the saline water brought to the surface with oil and gas"; drilling waste, defined as "the rock cuttings and fluids that are produced from drilling a new wellbore into the subsurface"; and associated wastes, defined as "a broad category of a variety of small volume waste streams that encompasses all other types of wastes 'associated' with oil and natural gas production."
API further subcategorizes "associated wastes" into completion fluids, workover/stimulation fluids, tank bottoms/oily sludges and dehydration/sweetening wastes. API defines "tank bottoms/oily sludges" as "[t]ank sediment and water, produced sand and other tank bottoms."25 "Tank bottoms" consist of oily sediments and water that settle to the bottom of a crude oil tank and are frequently removed from the tank and disposed.26 This article is concerned primarily with wastes consisting of tank bottoms and oily sludges because of their particular hazards and the relatively discrete nature of their generation and transport.

A. Toxicity of Tank Bottoms and Oily Sludges

A study of associated wastes conducted by EPA found oilfield E&P tank bottoms and sludges to contain organic and inorganic constituents that posed significant health risks. According to EPA:

For crude oil and natural gas wastes, EPA sampled liquids and sludges from several locations. . . . The Agency found that organic pollutants at levels of potential concern (levels that exceed 100 times EPA's health-based standards) included the hydrocarbons benzene and phenanthrene. Inorganic constituents at levels of potential concern included lead, arsenic, barium, antimony, fluoride, and uranium.27

Tank bottoms, an associated waste sampled and analyzed by the Agency, contained significant levels of contaminants of concern, with some levels exceeding the reference doses (RFDs) for noncarci-

25. Id. at 14.
26. See Cose v. Getty Oil Co., 4 F.3d 700, 702 (9th Cir. 1993) (holding that crude oil tank bottoms did not fall within petroleum exclusion found in Comprehensive Environmental Response, Compensation and Liability Act [hereinafter CERCLA]). The court in Cose described the formation of crude oil tank bottoms:

When crude oil is stored in tanks, suspended sedimentary solids in the crude oil settle to the bottom. Because water is heavier than oil, it separates from the oil and also collects at the bottom of the tank. The bottom layer of the tank is known as basic sediment and water, or "crude oil tank bottoms."

Crude oil tank bottoms are typically drained from the crude oil storage facilities and disposed of in nearby sumps.

27. Regulatory Determination, supra note 11, at 25,448 (emphasis added). This report of the existence of uranium in oilfield E&P wastes is anomalous. Most studies addressing the radiological constituents of E&P wastes identify the existence, concentration and/or specific activity of uranium's daughter product, radium. For a discussion of radium in oilfield wastes, see infra notes 35-39 and accompanying text.
nogens or the risk-specific doses (RSDs) for carcinogens (health-based standards) for these contaminants.28

Studies and treatises that report the existence of benzene in tank bottoms and production sludges often refer to the existence of other light volatile hydrocarbons, including the so-called “BTEX” parameters (benzene, toluene, ethyl benzene and xylene) or a range of constituents called polycyclic aromatic hydrocarbons (PAHs).29 These constituents are listed as hazardous substances under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA).30

Of the light volatile hydrocarbons found in tank bottoms and production sludges, benzene is among the most toxic.31 Of the nonradiological inorganic constituents, cadmium and lead are among the most hazardous.32 CERCLA also lists these metals as

28. Regulatory Determination, supra note 11, at 25,448 (emphasis added).
29. See, e.g., R. Lee Vail, Refiner Biodegrades Separator-Type Sludge to BDAT Standards, OIL & GAS J., Nov. 11, 1991, at 53, 53 (discussing composition of oily sludge found at bottom of stormwater surge basin at oil refinery in Louisiana).
31. See Agency for Toxic Substances & Disease Registry, HazDat database at http://www.atsdr.cdc.gov/tfacts3.html (Last Updated Sept. 16, 2003). According to the Agency for Toxic Substances and Disease Registry [hereafter ATSDR]: Breathing very high levels of benzene can result in death, while high levels can cause drowsiness, dizziness, rapid heart rate, headaches, tremors, confusion, and unconsciousness. Eating or drinking foods containing high levels of benzene can cause vomiting, irritation of the stomach, dizziness, sleepiness, convulsions, rapid heart rate, and death. The major effect of benzene from long-term (365 days or longer) exposure is on the blood. Benzene causes harmful effects on the bone marrow and can cause a decrease in red blood cells leading to anemia. It can also cause excessive bleeding and can affect the immune system, increasing the chance for infection.

*   *   *

The Department of Health and Human Services (DHHS) has determined that benzene is a known human carcinogen. Long-term exposure to high levels of benzene in the air can cause leukemia, cancer of the blood-forming organs.

Id.

Long-term exposure to lower levels of cadmium in air, food, or water leads to a buildup of cadmium in the kidneys and possible kidney disease. Other long-term effects are lung damage and fragile bones.

*   *   *

The Department of Health and Human Services (DHHS) has determined that cadmium and cadmium compounds may reasonably be anticipated to be carcinogens.

hazardous substances. The tendency of aquatic biota to bioaccumulate lead and other heavy metals resulting from petroleum production and processing is well documented in scientific literature.

Oilfield tank bottoms and production sludges also contain the radioactive isotopes radium-226 and radium-228. Radium is a radionuclide whose daughter products— which include radon gas—emit radioactive alpha particles, beta particles and gamma rays. In the subsurface, radium separates from its parent isotopes, uranium and thorium, and enters the production stream with produced water. On the surface, radium deposits such as radioactive scales and sludges are classified as technologically enhanced naturally

As to lead, the ATSDR notes:

Lead can affect almost every organ and system in your body. The most sensitive is the central nervous system, particularly in children. Lead also damages kidneys and the reproductive system. The effects are the same whether it is breathed or swallowed.

At high levels, lead may decrease reaction time, cause weakness in fingers, wrists, or ankles, and possibly affect the memory. Lead may cause anemia, a disorder of the blood. It can also damage the male reproductive system. The connection between these effects and exposure to low levels of lead is uncertain.


33. See 40 C.F.R. § 302.4 app. A.
34. See, e.g., Mary B. Anderson et al., Metal Accumulation in Crayfish, Procambarus Clarkii, Exposed to a Petroleum-Contaminated Bayou in Louisiana, 37 ECOTOXICOLOGY & ENVTL. SAFETY 267, 267 (1997) (reporting that "accumulation of nonessential metals in crayfish tissues in wetland environment contaminated by mixed pollution (metals and hydrocarbons) reflects the concentrations of metals in sediment.").
35. For an indication of EPA's finding of uranium rather than radium in oilfield wastes, see supra note 27 and accompanying text. Although EPA reported the existence of uranium in its study of oilfield E&P wastes, such an observation is anomalous. While numerous studies have reported the existence of uranium's daughter products, including radium, in oilfield scales and sludges, few have reported the existence of uranium itself. Compare R.L. Erickson et al., Association of Uranium and Other Metals with Crude Oil, Asphalt, and Petroliferous Rock, 38 BULL. AM. ASSN. PETROLEUM GEOLOGISTS 2200 (Oct. 1954); Anthony Gibbon, Uranium from Oil Field Flood Waters, WORLD OIL, May 1956, at 61; Regulatory Determination, supra note 11, at 25448; with Rogers & Assoc. Engineering Corp., U.S. ENVTL. PROTECTION AGENCY, DIFFUSE NORM: WASTE CHARACTERIZATION AND PRELIMINARY RISK ASSESSMENT (1993) (draft); Rogers & Assoc. Engineering Corp., U.S. ENVTL. PROTECTION AGENCY, A PRELIMINARY RISK ASSESSMENT OF MANAGEMENT AND DISPOSAL OPTIONS FOR OIL FIELD WASTES AND PIPING CONTAMINATED WITH NORM IN THE STATE OF LOUISIANA (1993).
37. See id. at 1201.
occurring radioactive materials (TENORM). Radium is a known carcinogen that is listed as a hazardous substance by CERCLA.

B. Characterization of Disposal Practices and Extent of Contamination

Having presented an overview of the toxicity of oilfield E&P tank bottoms and oily sludges, the discussion will now turn to an examination of the nature and extent of E&P-waste contamination. As will be seen, because very few comprehensive, independent studies of the extent of E&P-waste contamination have been conducted, conclusions regarding the extent of such wastes must rely on industry-generated surveys drawn from voluntary reports and other anecdotal evidence.

API estimates that tank bottoms and oily sludges account for 10% of all associated E&P wastes, or about two million barrels per year. Approximately 35% of those wastes, representing about 686,000 barrels, are disposed of by simply landspreading or roadspreading the materials onto or near oilfield production sites, waste dumps and lease roads. A separate category of disposal, denoted as “other” and accounting for 2% of associated wastes, or 40,000 barrels per year, consists of onsite burial, placement in disposal pits or use of “other commercial disposal” methods. Alternative disposal methods include disposal by injection (24%), recycling/reclamation (37%), and disposal at commercial E&P waste facilities (2%).

Attempts to characterize the extent and distribution of oil and gas associated wastes that have historically been disposed of by open dumping, onsite burial and landspreading are certain to meet with a great deal of futility. Few states’ regulatory schemes contain provisions addressing these wastes, and those that do often merely contain broad prohibitions against “waste,” defined as “unnecessary
surface loss." There is a similar scarcity of recordkeeping and reporting provisions. Industry-generated surveys are unreliable at best, as they are the product of unsupervised self-reporting by industry operators whose interest is not served by the unveiling of contamination conditions that may subject them to liability.

Even if one credits the work of an industry-sponsored survey like the one conducted by API, some interesting observations come to light. For example, API reports that in Virginia, 100% of all associated wastes are landspread within the field of origin. In West Virginia and Kentucky, the figures decline to 84% and 82%, respectively. Mississippi operators report the unlikely disposal of 98% of their oilfield associated wastes by crude oil reclamation contractors. Similarly, operators in North Dakota and Pennsylvania indicate that 100% and 81% of their wastes, respectively, are disposed at commercial E&P waste disposal facilities. Furthermore, a comparison of the volume of associated wastes reported by production facilities in California with those in Texas shows that the California facilities - which, in 1995, produced slightly more than half the oil production of Texas and one-twentieth the volume of natural gas produced 457,962 barrels of associated wastes. In contrast, Texas facilities produced only 68,674 barrels of such wastes. This vast discrepancy is far more likely to be the result of California’s more stringent waste-management and reporting provisions than of any perceived cleanliness of California’s oil.

Perhaps the most frustrating exercise, when attempting to characterize the extent and nature of oilfield E&P associated wastes, involves the identification of production pits. These pits

46. See id.
47. See id. Notably, the state with the next highest percentage is Texas at 14%; reclamation rates of all other states are below 7%.
48. See id.
49. See id. app. A, tbl. A.2, at 32 (listing oil production estimates); Id. app. D., tbl D.1, at 42 (listing associated waste volumes).
50. See John A. Vail, Offsite Oil Field Waste Disposal Varies Across U.S., OIL & GAS J., Nov. 17, 1997, at 79, 84 (indicating that California is one of few states that do not exempt oilfield wastes from hazardous management regulations).
51. See API OVERVIEW, supra note 1, at 7. API euphemistically describes this type of pit as follows:
Production pits include all types of pits operated except those associated with drilling operations. Examples of production pits include evaporation, blowdown, produced water, percolation, workover, and emergency pits. These types of pits are used when needed to enhance the safety or efficiency of field operations . . . .
are used to dispose of wastes such as tank bottoms, heater-treater wastes and other associated wastes at production facilities. 52 API has attempted to estimate the number of active production pits that exist in the nation's oilfields:

Survey respondents reported a total of 2,444 production pits of which 97 percent are active and 59 percent are lined. Several states have encouraged operators to close production pits and phase out the use of many types of pits in E&P operations. . . . Texas and Oklahoma report a very small number of pits relative to the size of the E&P industry in these states and none of the respondents from Appalachian states report production pits.

Generally, one production pit is assumed per oil production facility. . . . Due to relatively low survey response rates on this question, the extrapolated number of pits for individual states is highly uncertain. The estimated total numbers of pits . . . are best interpreted as an estimate of the potential order of magnitude of production pits in an individual state. Nationwide, an estimated 55,000 pits are associated with production operations. Based on the survey data reported . . . 97 percent of the 55,000 estimated pits are assumed to be active pits . . . . 53

Although the API study attempts to establish an "order of magnitude" estimate of active and inactive production pits, no attempt is made to quantify the number of buried pits. 54 Even assuming the validity of API's estimates that in today's regulatory climate, thirty-five percent of these pits are buried or landspread onsite, 55 one can surmise that in past decades, an even greater number of such pits were buried and spread. When considering the impact of production pits on groundwater protection issues, buried pits are likely to present even greater threats to water resources because (1) the contents are likely to have greater exposed surface area; (2) their volatile fractions are likely to have more difficulty escaping to the atmosphere; (3) they are closer to the groundwater than are sur-

52. See id. A heater-treater is a device that is used to separate the oil, water, and natural gas from the natural crude product. See, e.g., Moulder v. Brown, 664 P.2d 1060, 1061 (N.M. Ct. App. 1982).

53. API OVERVIEW, supra note 1, at 7 (emphasis added) (presenting 'data' on production pits).

54. See id. (defining active pits as pits currently in service, whether or not they contain fluids, and inactive pits as pits no longer part of field operating system but not yet closed).

55. See id. at 17.
face pits; and (4) their locations are unknown and unobservable other than through inspection of historical maps and aerial photographs, or through subsurface sampling.

The tendency of oilfield production pits and saltwater disposal pits to contaminate surface and groundwater resources is well-documented. In EPA's Report to Congress that accompanied the publication of its Regulatory Determination, EPA observed a number of instances in which groundwater had become contaminated by the contents of oilfield waste pits. For example:

In July 1985, a study was undertaken [in New Mexico] to analyze the potential for unlined produced water pit contents, including hydrocarbons and aromatic hydrocarbons, to migrate into the ground water. . . . Upon analysis, the study group found volatile aromatic hydrocarbons were present in both the soil and water samples of test pits downgradient, demonstrating migration of unlined produced water pit contents into the ground water.

* * *

Benzene was found in concentrations of 0.10 ppb. . . . Concentrations of ethylbenzene, xylenes, and larger hydrocarbon molecules were [also] found. . . . Physical signs of contamination were also present . . . including black, oily staining of sands above the water table and black, oily film on the water itself. Hydrocarbon odor was also present.

EPA also found similar evidence of widespread contamination of water resources as a result of a U.S. Coast Guard (USCG) study of the Allegheny Forest in Pennsylvania. According to that study:

In the Allegheny Forest alone, USCG identified over 500 sites where oil was leaking from wells, pits, pipelines, or...


58. REPORT TO CONGRESS, supra note 57, at IV-62 (quoting G.A. Eiceman et al., HYDROCARBONS AND AROMATIC HYDROCARBONS IN GROUNDWATER SURROUNDING AN EARTHEN WASTE DISPOSAL PIT FOR PRODUCED WATER IN THE DUNCAN OIL FIELD OF NEW MEXICO (Sept. 16, 1985)).
storage tanks. In 59 cases, oil was being discharged directly into streams; 217 sites showed evidence of past discharges and were on the verge of discharging again into the Allegheny Reservoir. Illegal disposal of oil field wastes has had a detrimental effect on the environment . . . .

Some instances involving the migration of associated wastes into the air and groundwater have been the subject of lawsuits that have received considerable attention in the press, and have been documented as a result of incidents occurring overseas.

Upon thorough review of the numerous examples of widespread contamination of soil and groundwater resources by hazardous oilfield E&P wastes that are reported within EPA's own Regulatory Determination and in the Report to Congress that purports to support its conclusions it becomes increasingly apparent that the conclusions of the Regulatory Determination appear to contradict EPA's factual findings.

The discussion that follows will review the status of E&P wastes under CERCLA and will then present a thorough critique of EPA's justifications for recommending that oilfield E&P wastes remain outside the purview of RCRA Subtitle C.

IV. REVIEW OF THE STATUS OF OILFIELD E&P WASTES UNDER CERCLA

In order to properly assess the need for stricter regulation of oilfield E&P wastes under RCRA or other law, a review of the status of such wastes under CERCLA is instructive.

CERCLA is a remedial environmental statute with two essential purposes: (1) to provide a swift and effective response to hazardous waste sites, and (2) to place the cost of that response on those re-
sponsible for creating or maintaining the hazardous condition.\textsuperscript{62} CERCLA is a strict liability statute, imposing liability without regard to degree of care or motivation for the plaintiff’s actions in initiating a clean-up.\textsuperscript{63} In order to prove liability under CERCLA, a plaintiff must show that a defendant is within one of the four classes of covered persons enumerated in the statute;\textsuperscript{64} that there has been a release or threatened release of a hazardous substance from a facility; that the plaintiff incurred response costs as a result of the release; and that the costs were necessary and consistent with the national contingency plan.\textsuperscript{65}

Section 101(14) of CERCLA sets forth the “petroleum exclusion.”\textsuperscript{66} According to that provision, “[t]he term [hazardous substance] does not include petroleum, including crude oil or any fraction thereof which is not otherwise specifically listed or designated as a hazardous substance.”\textsuperscript{67} EPA interprets the petroleum exclusion to apply to materials such as crude oil, petroleum feedstocks, and refined petroleum products, even if a specifically listed or designated hazardous substance is present in such products. However, EPA does not consider materials such as waste oil to which listed CERCLA substances have been added to be within the petroleum exclusion.\textsuperscript{68}

In \textit{Cose v. Getty Oil Co.},\textsuperscript{69} the United States Court of Appeals for the Ninth Circuit addressed a claim for response costs as a result of the alleged contamination of plaintiffs’ property by tank bottoms

\textsuperscript{62} See, \textit{e.g.}, United States v. Mexico Feed & Seed Co., 980 F.2d 478, 486 (8th Cir. 1992) (citing Anspec Co. v. Johnson Controls, Inc., 922 F.2d 1240, 1247 (6th Cir.1991)) (emphasizing CERCLA’s goals).

\textsuperscript{63} See \textit{Johnson v. Langley}, 226 F.3d 957, 963 (8th Cir. 2001) (“CERCLA is a strict liability statute, with only a limited number of statutorily defined defenses available.”); United States v. Alcan Aluminum Corp., 964 F.2d 252, 259 (3d Cir. 1992) (“CERCLA imposes strict liability on responsible parties.”); New York v. Shore Realty Corp., 759 F.2d 1032, 1042 (2d Cir. 1985) (“Congress intended that responsible parties be held strictly liable.”).

\textsuperscript{64} See 42 U.S.C. § 9607(a) (including current and past owner; current and past operator; transporter; and anyone who arranged for transport).

\textsuperscript{65} See CERCLA, 42 U.S.C. § 9607 (requiring that covered persons be held liable for necessary response costs).

\textsuperscript{66} See CERCLA, 42 U.S.C. § 9601(14) (excluding petroleum from definition of “hazardous substance”).

\textsuperscript{67} \textit{Id.}

\textsuperscript{68} Environmental Protection Agency Notification Requirements; Reportable Quantity Adjustments, 50 Fed. Reg. 13,456, 13,460 (Apr. 4, 1985) [hereinafter Final Rule] (interpreting application of petroleum exclusion).

\textsuperscript{69} 4 F.3d 700, 702 (9th Cir. 1993).
near a crude oil pumping station. In ruling on plaintiffs' claims, the court analyzed relevant case law, the language of CERCLA and the dictionary definitions of the words "petroleum" and "fraction" to conclude that "[c]rude oil tank bottoms do not fall within the plain meaning of the definition of 'fraction' or 'petroleum.'" According to the Court:

[Crude oil tank bottoms are never "subjected to various refining processes" as required by our "petroleum" definition. Moreover, such tank bottoms are not used "for producing useful products." Rather, as evidenced at the . . . property, the substance is simply discarded waste.

Accordingly, the definitions of "fraction" and "petroleum" as adopted by our court urge a conclusion that crude oil tank bottoms do not fall within CERCLA's exclusion of "petroleum, including crude oil or a fraction thereof."

In addition to having found that crude oil tank bottoms do not fall within CERCLA's petroleum exclusion, courts have held that waste oil containing CERCLA hazardous substances also does not fall within the exclusion. For example, in *Mid Valley Bank v. North Valley Bank*, the United States District Court for the Eastern District of California addressed a claim for response costs as a result of contamination released from an underground waste-oil storage tank. The court noted the existence of evidence demonstrating that the property contained elevated levels of zinc, lead and thallium, each of which is designated as a hazardous substance under CERCLA. According to the court,

[Support for an interpretation of the petroleum exclusion which does not include waste oil may be found in a variety of cases which have addressed CERCLA in various contexts. Indeed, a number of CERCLA cases have assumed, in the course of deciding other issues, that the petroleum exclusion does not apply to waste oil or

70. Id.
71. Id. at 705.
72. Id. (footnotes omitted). See also, United States v. W. Processing Co., 761 F. Supp. 713, 722 (W.D. Wash. 1991) (holding that tank bottom sludge does not fall within petroleum exclusion in part because sludge at issue contained contaminants that were not indigenous to crude oil itself).
74. Id. at 1384-85.
Based on interpretations within EPA guidance,76 EPA correspondence,77 and caselaw addressing issues of similar wastes, the court concluded that "waste oil containing CERCLA hazardous substances does not fall under the CERCLA petroleum exclusion."78

To the extent that the foregoing cases evince a recognition by the courts in certain jurisdictions, at least that crude oil tank bottoms and waste oils generated at oilfield production sites do not fall within CERCLA's petroleum exclusion, one can argue that strict regulation of these wastes under RCRA or other law is warranted to prevent oilfield sites from becoming subject to CERCLA response actions in the first place. Without such preventative regulation, contaminated sites become subject only to CERCLA's remedial provisions. Moreover, where EPA does not expend vast resources investigating and identifying contamination among the hundreds-of-thousands of production sites located throughout the oil-producing regions clearly an impossible task under any present or foreseeable allocation of federal resources the burden is placed on landowners to expend response costs themselves, and to attempt to recover what they may at the conclusion of costly and time-consuming CERCLA cost-recovery actions.

The section that follows will build upon the arguments heretofore presented for stricter regulation of oilfield E&P wastes under RCRA or other law, by presenting a critique of EPA's own justifications for exempting E&P wastes from RCRA Subtitle C in the first instance.

75. Id. at 1384 (citing Ascon Properties, Inc. v. Mobil Oil Co., 866 F.2d 1149 (9th Cir. 1989) (finding liability as to facility used as active disposal site for waste from both industrial sources and oil field operations)); United States v. Mexico Feed & Seed Co., 729 F. Supp. 1250 (E.D. Mo. 1990) (finding liability as to tanks containing waste oil contaminated with PCBs); United States v. Bliss, 667 F. Supp. 1298 (E.D. Mo. 1987); accord Licciardi v. Murphy Oil U.S.A., Inc., 1994 WL 285051, at *4 n.6 (E.D. La. June 20, 1994), rev'd on other grounds, 111 F.3d 396 (5th Cir. 1997) (holding that "black tarry substance" and other waste materials fall outside petroleum exclusion, so long as they are discarded wastes that otherwise meet definition of hazardous substance).


77. See id. at 1383 (citing Memo from EPA General Counsel to EPA Assistant Administrator for Solid Waste and Emergency Response (July 31, 1987)). "Under the EPA Memo, a release of substances found in used oil which are not found in crude oil or refined petroleum fractions may trigger CERCLA response actions, not to the release of used oil, but to the contaminants present in the oil." Id.

78. Id. at 1384.
V. CRITIQUE OF EPA'S JUSTIFICATIONS FOR EXEMPTING ASSOCIATED WASTES

A careful review of EPA's Regulatory Determination reveals that EPA observed substandard oilfield waste-disposal practices in a number of states and identified a wide range of hazardous oilfield waste constituents. Despite these findings, EPA concluded that regulation of E&P wastes under Subtitle C is unwarranted. For this reason, the report appears to be internally contradictory per se. Therefore, a critique of the Regulatory Determination and a discussion of a few of its inconsistencies provide a good starting point for an argument in favor of repealing the exemption, at least as to certain identified wastes.

A. Perceived Relative Insignificance of Risks

Perhaps the most overt contradiction contained within EPA's Regulatory Determination relates to the finding that the risks posed by the present management of such wastes are relatively low. According to its conclusion, EPA believed that Subtitle C control for E&P wastes was unwarranted "because of the relatively low risk of these wastes."79 However, not only do the findings contained elsewhere in the Regulatory Determination contradict this conclusion, but EPA also concedes that the underlying study itself did not evaluate a predominance of the risks.

An identification of the hazardous characteristics of tank bottoms and associated wastes, as set forth in the Regulatory Determination, has already been presented above.80 A more quantitative analysis of the risks posed by associated wastes cannot be derived from EPA's study, as EPA's "risk analysis did not consider . . . landspreading, roadspreading, or disposal of associated wastes."81 This is true even though EPA concedes in its study that "associated wastes contain a wide variety of hazardous constituents," and that "[m]any associated wastes contain constituents that are similar in chemical composition and/or toxicity to other wastes currently regulated under RCRA Subtitle C."82

If EPA had decided to model the potential risks posed by E&P associated wastes, the result conceivably would be similar to that observed by EPA at sites generating drilling fluids and produced water. According to that analysis, wastes at 23% percent of the stud-

79. Regulatory Determination, supra note 11, at 25,448-49 (emphasis added).
80. See supra notes 27-39 and accompanying text.
81. Regulatory Determination, supra note 11, at 25,449 (emphasis added).
82. Id. at 25,455.
ied sample locations generating produced water contained one or more toxic constituents at levels more than 100 times greater than health-based thresholds. Moreover, EPA found that 78% of the sample sites generating drilling fluids contained chloride levels more than 1000 times greater than EPA's secondary maximum contaminant level for that pollutant. Although these findings appear to be significant, EPA notes that "[o]ther management practices such as storage of produced water in unlined pits were not modeled and may pose higher risks.

In making the giant leap from these findings to its conclusion that regulation of E&P wastes under Subtitle C is unwarranted, EPA chose to discredit the validity of reliance on its own risk-based standards. According to EPA:

*The presence of constituents in concentrations exceeding health- or environmental-based standards does not necessarily mean that these wastes pose significant risks to human health and the environment.* In evaluating the risks to human health and the environment, several factors beyond the toxicity of the waste should be considered. These factors include the rate of release of contaminants from different management practices, the fate and transport of these contaminants in the environment, and the potential for human health or ecological exposure to the contaminants.

Assuming the validity of this proposition, rather than evaluate its own factors and conduct further studies to determine whether these factors indeed militated against finding a threat to human health and the environment, EPA decided to forego further study and err on the side of maintaining the status quo.

83. Id. According to the Regulatory Determination:

Analysis of field data collected by EPA and presented in the January 1987 technical report shows that a portion of oil and gas wastes contain constituents of concern above EPA health- or environmental-based standards. . . . The constituents typically exceeding the standards in drilling fluids are fluoride, lead, cadmium, and chromium. The constituents exceeding the standards in produced water are benzene, arsenic, barium, and boron.

_Id. at 25,454-55._

84. _Id._ at 25,455.

85. _Id._ at 25,454 (emphasis added).

86. Regulatory Determination, _supra_ note 11, at 25,455 (emphasis added).
With regard to the sufficiency of data actually considered by EPA, the agency itself points to vast uncertainties and statistical inaccuracies in the studies upon which it relied. As revealed by EPA:

_On the basis of available data, EPA can only roughly estimate how much currently exempt oil and gas waste would be considered hazardous under current or proposed RCRA Subtitle C standards. It is clear that some portions of both the large-volume and associated waste would have to be treated as hazardous if the Subtitle C exemption were lifted. EPA estimates that approximately 10 to 70 percent of large-volume wastes and 40 to 60 percent of associated wastes could potentially exhibit RCRA hazardous waste characteristics under EPA's regulatory tests._

It is difficult to envision why a federal agency whose mission is to protect human health and the environment on the basis of scientific principles would attempt to draw any conclusions from data containing a range of uncertainty of 60%.

The fact that EPA found that significant percentages of associated wastes would fall under the regulatory definition of the term "hazardous waste," were it not for the applicability of the oilfield exemption, highlights an unfortunate consequence of the exemption itself. As a result of the applicability of the exemption, the industry has chosen to designate E&P associated wastes as "nonhazardous oilfield waste," or "NOW." This arguably fraudulent classification has made its way into state regulatory definitions that categorize such wastes. Moreover, this innocuous-sounding term facilitates the onsite burial of wastes having characteristics that are hazardous, even if the wastes do not bear that regulatory classification. The term also facilitates the siting of commercial waste disposal facilities in locations where the term "hazardous waste" might otherwise require the facility to overcome strong public opposition.

87. _Id._ (emphasis added).
88. _See, e.g.,_ LA. ADMIN. CODE tit. 43, pt. XIX, § 129.M (1999) ("Non-hazardous Oilfield Waste (NOW) [is defined as] waste generated by the drilling and production of oil and gas wells and which is not regulated by the provisions of the Louisiana Hazardous Waste Regulations. Such wastes include . . . production pit sludges [and] production storage tank sludges . . . .").
89. _See, e.g.,_ Guntis Moritis, _Waste Not, Oil & Gas J._, Nov. 22, 1999, at 21, 21 ("In the mid-1990s, the Texas Railroad Commission (TRC) issued permits for six . . . disposal sites for nonhazardous oil field wastes (NOW). . . . NOW streams include drilling mud, drill cuttings, produced sand, tank bottoms, contaminated soil, completion and stimulation wastes, etc.").
The section that follows will address the extent to which the perceived adequacy of existing state regulatory programs formed the basis for EPA's determination that federal regulation of E&P wastes under Subtitle C was unwarranted.

B. Perceived Adequacy of State Programs

In its Regulatory Determination, EPA placed a great deal of reliance on the adequacy of existing state programs as a basis for its decision to decline to regulate E&P wastes under Subtitle C.\textsuperscript{90} According to the agency, "EPA found that existing State and Federal regulations are generally adequate to control the management of oil and gas wastes."\textsuperscript{91} However, there are observations within EPA's Regulatory Determination that undermine its conclusions with regard to the adequacy of state programs. For example, according to EPA:

On the basis of all available information, the study found that wastes from crude oil and natural gas operations have endangered human health and caused environmental damage when managed in violation of State and Federal requirements. \textit{In some instances damage occurred where wastes are managed in accordance with currently applicable State and Federal requirements.}\textsuperscript{92}

Elsewhere in its Regulatory Determination, EPA candidly observed that a "\textit{regulatory gap for some States are controls for associated wastes. Most State regulations do not include specific controls for the management of these wastes.}"\textsuperscript{93} EPA expressed particular concern over the practice of sending associated wastes to centralized disposal facilities because these facilities contained some of the most significant environmental damage that EPA observed during the conduct of its study.\textsuperscript{94}

While purporting to support EPA's determination that regulation of oilfield E&P wastes is unwarranted, EPA's study contains evi-
dence showing that state regulations for the management and control of such wastes have been relaxed in some instances. 95 According to the study:

The Agency has examined changes in State regulatory programs over the past two years. Some States have improved their regulations, while other States have relaxed specific waste management requirements. For example, while reserve pit management has been strengthened in some States, other States have relaxed controls pertaining to land application of large-volume wastes. 96

Once again, it is difficult to comprehend how EPA, upon finding that most state regulations do not include specific controls for the management of associated wastes; that the centralized disposal of those wastes resulted in the most significant environmental damage that EPA observed during its study; and that some states actually have relaxed their controls pertaining to land application of other E&P wastes, can conclude that "[s]tate... regulations are generally adequate to control the management of oil and gas wastes." 97

The section that follows will examine the related question of the adequacy of existing non-federal enforcement mechanisms.

C. Perceived Adequacy of Existing State Enforcement Mechanisms

Closely related to the question of the adequacy of existing state programs for the management and disposal of E&P wastes is the issue of the adequacy of existing state enforcement mechanisms. In the Regulatory Determination, EPA notes that "enforcement of and compliance with State regulations vary widely from State to State." 98 The agency further acknowledges that of the sixty-two documented cases of damage that it studied, "most of these damages could have been prevented if the wastes had been managed in accordance with

95. See Regulatory Determination, supra note 11, at 25,455.
96. Id. (emphasis added).
97. Compare id. (stating that "[m]ost State regulations do not include specific controls" for management of associated wastes and that some states have relaxed waste management requirements), and id. at 25,457 (discussing EPA's concern regarding commercial facilities that have high concentrations of hazardous constituents), with id. at 25,446 (noting that EPA found "existing state and Federal regulations... generally adequate to control... management of oil and gas wastes.").
98. Id. at 25,451.
existing State and Federal requirements."\textsuperscript{99} Despite these findings, EPA considers those programs to be "generally adequate."\textsuperscript{100}

EPA's Regulatory Determination highlights the difficulties inherent in existing mechanisms to enforce widespread oilfield pollution problems.\textsuperscript{101} According to the study:

General standards are often difficult to enforce unless a specific pollution incident is discovered and can be attributed to a particular waste disposal event. However, a few States such as Texas do specifically address associated wastes and other States have general standards that provide partial control of these wastes.

. . . . Problems also remain regarding adequate State implementation and enforcement of existing regulations.\textsuperscript{102}

The Report to Congress that accompanied EPA's Regulatory Determination identified a number of alarming E&P waste-disposal practices that appear to be the result of lax enforcement. For example, EPA observed:

In Pennsylvania, disposing of oil and gas wastes into streams prior to 1985 violated the State's general water quality criteria, but the regulations were rarely enforced.

The long-term environmental impacts of chronic, widespread illegal disposal include loss of aquatic life in surface streams . . . .

Even though spills are [classified as] accidental releases, and thus do not constitute wastes routinely associated with the extraction of oil and gas under the . . . [Clean Water Act], spills in this area of Pennsylvania appear to represent deliberate, routine, and continuing illegal disposal of waste oil.\textsuperscript{103}

Pennsylvania is not the only state in which EPA found significant oilfield waste-disposal enforcement problems.\textsuperscript{104} EPA found that "[i]llegal disposal of oil and gas exploration and production

\begin{footnotesize}
\begin{itemize}
\item[99.] Regulatory Determination, \textit{supra} note 11, at 25,455.
\item[100.] \textit{See id.} at 25,446, 25,456 (noting EPA's view of existing state programs).
\item[101.] \textit{See id.} at 25,455.
\item[102.] \textit{Id.} (analyzing difficulties of existing state standards).
\item[103.] \textit{REPORT TO CONGRESS,} \textit{supra} note 57, at IV-19,-20.
\item[104.] \textit{See, e.g., id.} at IV-17 (noting illegal disposal of oil and gas waste in West Virginia).
\end{itemize}
\end{footnotesize}
Regulation of Oilfield E&P Wastes is a common problem in the Texas/Oklahoma zone.\textsuperscript{105} "Illegal disposal can take many forms, including breaching of reserve pits, emptying of vacuum trucks into fields and ditches, and draining of produced water onto the land surface."\textsuperscript{106} EPA determined that in West Virginia,

\begin{quote}
[e]nvironmental damage from illegal disposal of wastes associated with drilling and production is by far the most common type of problem . . . . Results of illegal disposal include fish kills, vegetation kills, and death of livestock from drinking polluted water. . . .
\end{quote}

Illegal disposal in this State takes many forms, including draining of saltwater holding tanks into streams, breaching of reserve pits into streams, siphoning of pits into streams, or discharging of vacuum truck contents into fields or streams.

Enforcement is difficult both because of limited availability of State inspection and enforcement personnel and because of the remote location of many drill sites . . . .\textsuperscript{107}

In its Report to Congress, EPA recognized the lack of enforcement resources among the states as evidenced by the paucity of field enforcement personnel.\textsuperscript{108} In the report, EPA tabulated the number of enforcement personnel employed in each of the states that it studied. For example, New Mexico had only ten field inspectors for its roughly 40,000 oil wells and gas wells, and its 3,900 injection wells.\textsuperscript{109} Of the total wells, 1,747 new wells had been completed in 1985.\textsuperscript{110} Given the ratio of 1,747 new wells to ten inspectors, in order to perform only one inspection at every newly completed well alone, each inspector would have to inspect a different new well approximately every two days, assuming that he or she worked 350 days per year. Similarly, West Virginia employed fifteen inspectors for its 48,000 production wells and 761 injection wells, of which 1,839 new wells were completed in 1985.\textsuperscript{111}

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\textsuperscript{105} Id. at IV-54. EPA's study of the Texas/Oklahoma zone focused primarily on Texas, with most of the damage cases located in Texas. Id. at IV-47.
\textsuperscript{106} Id. at IV-54.
\textsuperscript{107} Id. at IV-17.
\textsuperscript{108} See Report to Congress, supra note 57, tbl. VII-7, at VII-33 (comparing enforcement personnel with numbers of wells in selected states).
\textsuperscript{109} See id.
\textsuperscript{110} Id.
\textsuperscript{111} Id.
\end{flushright}
Public criticism of the states’ lack of adequate enforcement mechanisms has similarly focused on the inadequacy of available inspection resources. For example, a 1991 article appearing in *Christian Science Monitor* highlighted some of the criticisms that are typical of those leveled against state agencies charged with the regulation of oil-and-gas operations:

Exacerbating pollution problems in the oil field is a shortage of money and manpower. Oklahoma has 48 field inspectors to police some 156,000 oil, gas, and injection wells - an average of 3,250 wells per inspector. In Texas, the manpower shortage is even more acute. One hundred Texas Railroad Commission inspectors oversee 360,000 wells. Meanwhile, Texas legislators face a $4.5 billion budget deficit. And though Texas oil companies pay more than $1 billion in wellhead taxes to the state’s general revenue fund every year, Texas spends only $11.5 million a year to regulate the oil industry.112

Other criticisms of state enforcement have focused on the philanderous relationship that is perceived to exist among regulators and the industry. For example, in 1990, the Oklahoma Corporation Commission created a “special investigating unit” that was instructed to report on the adequacy of the state’s enforcement of oilfield pollution laws. This investigating unit determined that the “[c]ommission was being branded a ‘do nothing’ agency by many landowners . . . . An earlier report by the unit . . . suggested some field inspectors were more interested in protecting oil companies than in pollution control.”113

The cited examples present a mere sampling of the numerous instances of inadequate enforcement of regulations applicable to

113. Gary Percefull, *Oklahoma Considers Regulatory Reform, Oil Field Pollution*, *Oil Daily*, Feb. 26, 1991, at 5. The unit’s final report stated that “in some cases, the time from discovery or a violation to the legal resolution of that violation is much too long.” *Id.; see also* Bryce, *supra* note 112. According to that article:

The pollution found by [a special investigative] team since it started last September has put the oil and gas division of the Corporation Commission and its field inspectors on the defensive. Jack Davidson, who heads the division, says the . . . team isn’t needed. “We are very capable of handling our own business,” says Mr. Davidson, who joined the Corporation Commission after 35 years with Phillips Petroleum. “Whenever we get a report of pollution, we cause it to be corrected.”

*Id.* at 6.
oilfield E&P wastes that have been reported by EPA and others. These observances make it difficult to envision how EPA could have reached the conclusion in its Regulatory Determination that state enforcement mechanisms are "generally adequate."

D. Cost-Benefit Considerations

In evaluating the potential economic impact of regulation of oilfield E&P wastes under Subtitle C, EPA considered three waste-management scenarios, including a "baseline" scenario representing current regulatory practices; an "intermediate" scenario, in which only somewhat stricter controls than those currently existing would be implemented; and a "Subtitle C" scenario, in which all oilfield E&P wastes would be regulated under RCRA Subtitle C.\textsuperscript{114} For each scenario, EPA estimated the total annual cost of implementing the scenario and the economic impact on the industry as a whole. EPA determined that if the full range of Subtitle C protections were to be implemented, the result could be an increase of up to $0.76 in the cost of a barrel of crude oil.\textsuperscript{115} EPA's findings came at a time when West Texas Intermediate crude oil was selling for roughly $13 on the spot market; only a year earlier, prices had ranged from $26 to $28 per barrel.\textsuperscript{116} At the time of writing this article, prices are in the $28-$29 range.\textsuperscript{117}

Notably, EPA apparently did not attempt to balance the increased costs of Subtitle C regulation against the cost savings that would result under such a regime. Such cost savings might include

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\textsuperscript{114} See Regulatory Determination, supra note 11, at 25,449-50.

\textsuperscript{115} See id. at 25,450. According to EPA:

Assuming produced waters reinjected for enhanced production would not be regulated, total annual costs for additional management requirements ranged from approximately $50 million to over $6.7 billion, depending on the scenario and on assumptions regarding the fraction of wastes (10 to 70 percent) that would be handled as RCRA-hazardous under each scenario. Estimated costs for the Subtitle C scenario ranged between $1 billion and $6.5 billion without including land-ban and corrective action costs.

Production declines related to these increased waste management costs could range up to 12 percent in the year 2000. Other impacts also varied greatly under different scenario assumptions. Net impacts on oil prices per barrel could range up to $0.76 per barrel, with projected maximum costs to consumers of $4.5 billion per year, and increases in the U.S. balance of payments deficit of up to $11 billion.

\textsuperscript{116} See Lee A. Daniels, 4 Companies Cut Price Paid for Oil, N.Y. TIMES, July 12, 1986, sec. 1, at 33.

decreased damage awards and litigation costs associated with toxic-tort claims or CERCLA claims; decreased health-care costs; reduction in lost property values; decreased damages to groundwater and other natural resources; reduced monitoring and investigation costs incurred by landowners and other third parties; and other such cost savings. Nevertheless, regardless of the balance or the benchmark used, an additional $0.76 per barrel of crude oil seems a small price to pay for the protections afforded by strict Subtitle C regulation applicable to the full range of E&P wastes, especially where the price of oil currently is in the same range as it was in 1985, and where in real terms, it has decreased substantially.

VI. PROPOSALS FOR REFORM

Having presented an overview of the nature and extent of contamination resulting from onsite disposal of oilfield E&P tank bottoms and production sludges, as well as a critique of EPA’s justifications for not regulating such wastes under RCRA Subtitle C, the methods by which these wastes could be subjected to at least limited federal oversight will now be examined. The first and most obvious of the policy initiatives that could accomplish this task would be a partial revocation of the Subtitle C exemption.

A. Partial Revocation of Subtitle C Exemption

As stated, the most obvious means by which to achieve stricter regulation of oilfield tank bottoms and oily sludges would be to repeal RCRA’s oilfield exemptions, to the extent the exemption applies to those wastes. However, of the possible remedies, this option might also prove to be the most difficult to achieve politically.

Under RCRA, Congress defined the category of wastes subject to the interim exception to include “drilling fluids, produced waters, and other wastes associated with the exploration, development, or production of crude oil or natural gas or geothermal energy.” In amending the statute, Congress determined that wastes meeting this classification would not be subject to regulation under Subtitle C unless and until EPA made its report and recom-

118. See, e.g., Sandra Barbier, Family Awarded $1 Billion in Lawsuit; Exxon Mobil Hit for Radioactive Land, TIMES-PICAYUNE (New Orleans), May 23, 2001, Nat’l Sec., at 1 (demonstrating awards in toxic tort cases can be substantial).

119. Compare N.Y.TIMES, supra note 117, with Daniels, supra note 116.

120. 42 U.S.C. § 6921(b)(2)(A). For a discussion of the amendment exempting associated wastes from regulation, see supra notes 8-9 and accompanying text.
Because EPA determined that it would not regulate the wastes under Subtitle C and Congress took no further action, the classification of wastes defined by the statute remained, and still remains, exempt, from Subtitle C regulation. EPA subsequently defined the scope of the exemption in its Regulatory Determination and subsequent Clarification, but the statutory definition of the exemption remained intact.

The question remains as to what EPA might now do to partially change the scope of the Subtitle C exemption. EPA can not simply redefine the exemption to include E&P associated wastes, by rule or otherwise, because such an action is unlikely to pass the test set forth in *Chevron U.S.A., Inc. v. Natural Resources Defense Council (NRDC).* Arguably, EPA could make a new “Regulatory Determination” and include a recommendation different from the original determination as to the waste that falls within the exemption. However, the result would be the same in any event: Congress would need to take action to redefine the exemption. This hypothesis, however, ignores the political realities that make the desired outcome unlikely. The following discussion examines a more plausible scenario, in which EPA might “fill the gaps” in RCRA Subtitle D that otherwise allow harmful E&P wastes to contaminate oilfield properties.

### B. Gap-Filling Under Subtitle D

Among the justifications that EPA offered for its determination not to regulate oil-and-gas E&P wastes under Subtitle C of RCRA was the agency’s view that it needed to perform only a limited “gap-filling” function within its authority under RCRA Subtitle D in order to address oilfield waste-management issues. According to EPA, “since existing State and Federal programs already control oil and gas wastes in many waste management scenarios, EPA needs to im-

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121. See *supra* note 9 and accompanying text.

122. See *supra* notes 11 and 22 and accompanying text.

123. 467 U.S. 837 (1984). Under *Chevron,* “if [a] statute is silent or ambiguous with respect to [a] specific issue, the question for the court is whether the agency’s answer is based on a permissible construction of the statute.” *Id.* at 843. Although the precise definition for RCRA’s specification of wastes associated with the exploration, development, or production of crude oil might be seen as ambiguous, it is doubtful that such a specification could be interpreted as excluding tank bottoms and oily sludges. However, it may not be as obvious that the specification includes other wastes uniquely associated with production operations. See *Clarification,* *supra* note 22.

124. See 42 U.S.C. § 6921(b)(2)(C) (stating that EPA’s regulations, if any, “shall take effect only when authorized by Congress.”).
pose only a limited number of additional controls targeted to fill the gaps in the existing programs."125 The agency concluded that because Subtitle C's "cradle-to-grave" waste-management provisions were "not well-suited to this type of gap-filling regulation . . . it would be more efficient and appropriate to fill the gaps by . . . promulgating the remaining rules needed under RCRA under the less prescriptive statutory authorities set out in Subtitle D."126

In contrast to the "rigorous safeguards and waste management procedures of Subtitle C . . . [,] Subtitle D . . . regulates nonhazardous solid wastes and hazardous waste exempted from Subtitle C much more loosely."127 Under Subtitle D, EPA was required to establish "suggested" guidelines by "provid[ing] minimum criteria to be used by the States to define those solid waste management practices which constitute the open dumping of solid waste or hazardous waste and are to be prohibited . . . under this chapter."128 At the same time, Section 4004 of the Act required EPA to promulgate regulations containing criteria for determining which facilities shall be classified as sanitary landfills and which shall be classified as open dumps within the meaning of the Act. At a minimum, such criteria shall provide that a facility may be classified as a sanitary landfill and not an open dump only if there is no reasonable probability of adverse effects on health or the environment from disposal of solid waste at such facility.129

The statute defines an "open dump" as "any facility or site where solid waste is disposed of which is not a sanitary landfill which meets the[se] criteria."130 RCRA provides that once EPA has published its criteria defining those solid-waste disposal practices that constitute open dumping, "any solid waste management practice or disposal of solid waste or hazardous waste which constitutes the open dumping of solid waste or hazardous waste is prohibited."131 EPA is to update its regulatory criteria at least every three years.132

125. Regulatory Determination, supra note 11, at 25,447.
127. Ashoff v. City of Ukiah, 130 F.3d 409, 410 (9th Cir. 1997) (quoting City of Chicago v. EDF, 511 U.S. 328, 331 (1994)).
Primary authority for the implementation and enforcement of measures designed to prevent the open dumping of solid and hazardous wastes under RCRA Subtitle D is vested in the states. 133 Under RCRA, the Governor of each state was required to prepare a plan for implementation of regional solid waste management activities. 134 Each plan was to be submitted to EPA for approval. 135 EPA was directed to approve the plan if the Administrator found that it contained adequate provisions (1) forbidding the creation of open dumps that do not meet minimum criteria contained in EPA regulations; 136 (2) requiring the closing or upgrading of existing open dumps; 137 (3) allowing revision after notice and comment where EPA promulgates new minimum criteria, or finds that new information "demonstrates the inadequacy of the plan to effectuate the purposes of [Subtitle D]"; 138 and (4) other measures. 139 RCRA provides that "[t]he Administrator shall review approved plans from time to time and if he determines that revision or corrections are necessary to bring such plan into compliance with . . . minimum requirements . . . (including new or revised requirements), he shall, after notice and opportunity for public hearing, withdraw his approval of such plan." 140 Although primary enforcement authority for Subtitle D’s provisions is vested in the states, EPA retains authority to bring an action in federal court to enjoin the "handling, storage, treatment, transportation or disposal of any solid waste or hazardous waste [that] may present an imminent and substantial endangerment to health or the environment." 141 The statute also grants EPA broad authority to "issu[e] such orders as may be necessary to protect public health and the environment." 142 Although the scope of available injunctive relief is broad, the scope of available civil or criminal remedies under Subtitle D of RCRA is quite narrow. For example, unlike Subtitle C, Subtitle D contains no provision for the assessment of civil penalties or criminal sanctions. 143

Reference to RCRA reveals that it would not take a great deal of effort by EPA to promulgate measures designed to apply to the management and disposal of oilfield exploration and production wastes. Pursuant to its authority under Section 4004, EPA could promulgate criteria that would designate as an “open dump” any oilfield waste disposal site that did not comply with certain minimum criteria specifying maximum concentration limits for specific pollutants. EPA could similarly designate criteria for managing sites at which landfarming or landspreading had been used to dilute harmful pollutants rather than remove them. States would be required to incorporate EPA’s Section 4004 regulations into their state solid-waste plans upon EPA’s periodic review of those plans under Section 4007. If a state did not incorporate the criteria into its plan, EPA could withdraw its approval of the plan, terminating financial and technical assistance to the state and proceed with implementing the provisions of the Subtitle itself.146

As part of its justification for recommending to Congress that oil and gas exploration and production wastes not be exempt from regulation under RCRA Subtitle C, EPA stated that it believes it can design and implement a program specific to crude oil and natural gas wastes under Subtitle D of RCRA that effectively addresses the risks associated with these wastes. . . . The Agency intends to augment the Subtitle D program by developing appropriate standards and taking other actions as appropriate for crude oil and natural gas wastes.147

EPA expressed its intent to promulgate regulations under Subtitle D strengthening those measures applicable to the handling and disposal of oilfield E&P wastes with a great deal of specificity. According to the agency:

In developing these tailored Subtitle D standards for crude oil and natural gas wastes, EPA will focus on gaps in existing State and Federal regulations and develop appropriate standards that are protective of human health and the environment. Gaps in existing programs include adequate controls specific to associated wastes . . . . EPA is

144. 42 U.S.C. § 6944(a); see supra note 129.
145. See 42 U.S.C. § 6947(a); see supra note 140 and accompanying text.
146. See 42 U.S.C. § 6947(b)(3) (granting Administrator power to grant or withhold assistance to states pending approval of plan).
147. Regulatory Determination, supra note 11, at 25,457.
particularly concerned about centralized and commercial facilities that treat, store, or dispose of oil field wastes in concentrated form.\footnote{148}

Nevertheless, despite its apparent promise in its Regulatory Determination to implement measures designed to control the management of hazardous oilfield E&P wastes - and despite the procedural ease with which EPA could do so\footnote{149} - EPA has done nothing in the sixteen years since it performed its study to strengthen programs applicable to such wastes under Subtitle D. Even if it had enacted criteria under Subtitle D designed to strengthen the few existing protections against harm caused by hazardous oilfield E&P wastes, the limited range of enforcement mechanisms available to EPA under RCRA would remain a barrier to any rigorous enforcement program.

C. Strengthening of Enforcement Mechanisms Available to EPA Under Subtitle D

As stated, even if EPA were to prescribe Subtitle D criteria applicable to the management and disposal of oilfield E&P wastes, there are significant impediments to EPA's ability to enforce measures promulgated under the Subtitle. Notwithstanding EPA's limited enforcement authority under RCRA, measures promulgated by EPA under the Subtitle must be incorporated into state plans and enforced by those states in order to be effective. If a state is recalcitrant or refuses to enforce the plan's provisions, EPA must expend significant resources and capital, both real and political, in order to withdraw its approval of the plan and undertake to implement the state plan itself. In the absence of a decision to withdraw a state's plan, EPA's recourse is limited to issuance of an administrative order or the filing of a civil action seeking injunctive relief under Section 7003.\footnote{150}

EPA's enforcement authority under RCRA is not well-suited to the situation presented by the specific wastes at issue. Hazardous oily wastes and tank bottoms from oil-and-gas production locations are likely to be found at a large number of discreet locations

\footnotetext{148}{Id.}

\footnotetext{149}{See id. This discussion necessarily understates the political hurdles that EPA would face if it were to undertake to regulate oilfield E&P associated wastes under Subtitle D. Cf. supra note 15 and accompanying text (discussing industry lobbying efforts that helped to exempt E&P wastes from Subtitle C regulation).}

\footnotetext{150}{See 42 U.S.C. § 6973.}
throughout the oil-producing states. To file a civil action seeking injunctive relief under Section 7003 in each instance would present a tremendous burden to EPA and its litigators within the U.S. Department of Justice. In order to prevail in such an action, EPA would be required to demonstrate the existence of an “imminent and substantial endangerment to health or the environment.”

This standard presents an onerous and subjective threshold that must be met before EPA can prevail in an enforcement action. Moreover, for EPA to seek to remedy a contaminated site through the use of its administrative enforcement authority under Section 7003, without the benefit of a civil or criminal penalty provision, EPA might be required to oversee cleanup of the site through a protracted series of orders and resultant litigation.

Presumably, federal enforcement mechanisms under Subtitle D were allowed to remain weak because the drafters of RCRA envisioned that primary enforcement authority was to be left to the states. Nevertheless, given the apparent lax enforcement by the states of provisions applicable to the management and oversight of oilfield E&P waste-disposal activities, a wider range of enforcement options such as those available under Subtitle C is warranted.

D. Increased Funding for Characterization and Risk Assessment

One of the biggest obstacles facing those who argue for reform of regulatory programs applicable to the management and control of oilfield E&P wastes is the lack of independently acquired data relating to the nature and extent of contamination. Even EPA, in response to its statutory directive to study the adverse effects of

151. See supra notes 53-55 and accompanying text for a discussion of the number and distribution of production pits in oil-producing regions.


153. See, e.g., Petrovic v. Amoco Oil Co., 200 F.3d 1140, 1150 (8th Cir. 1999) (finding no imminent and substantial endangerment where petroleum contaminants were “located many feet below ground, and only in low concentrations”).

154. See, e.g., Cavallo v. Star Enter., 100 F.3d 1150, 1153 (4th Cir. 1996) (referring to Administrative Consent Order, subsequently superseded by Administrative Order, pursuant to which EPA resorted to assuming control of remediation efforts and ordering defendant to implement corrective measures).

155. For a discussion of the extent of state enforcement authority under RCRA Subtitle D, see supra notes 133-39 and accompanying text.

156. See 42 U.S.C. § 6928 (granting enforcement powers under Subtitle C); see supra notes 141-43 and accompanying text for a discussion of the absence of provisions for civil penalties or criminal sanctions under Subtitle D comparable to those available under Subtitle C.
oilfield E&P wastes before issuing its Regulatory Determination,157 studied only "documented cases" of damage resulting from the release or improper disposal of such wastes.158 According to EPA, "[c]ases were accepted for presentation . . . only if, prior to commencement of field work, they met the standards of the test of proof, defined as (1) a scientific study, (2) an administrative finding of damage under State of other applicable authority, or (3) determination of damage by a court."159 Thus, in response to a statutory mandate to study the effectiveness of state programs for the control of oilfield E&P wastes, EPA made the circular determination to study only documented cases of contamination meeting standards of proof arising under that law. EPA made no attempt to determine whether state enforcement mechanisms or resources were inadequate, or to determine whether the standards of proof were themselves unnecessarily onerous.

Given that an evaluation of the sufficiency of existing programs for the management of oilfield E&P wastes must rely on existing scientific data, it appears that there are virtually no scientific studies available for review other than those generated by the oil-and-gas industry itself. As discussed above, these studies must be viewed with a degree of cynicism in light of the fact that they have been generated by an industry whose best interests are not served by its revealing to regulators evidence of widespread damage caused by its activities.160

Arguably, EPA was required by Congress to do more than merely collect existing reports of incidents of damage found in industry studies and documented enforcement actions under state law. Section 8003 of RCRA enjoins the EPA Administrator to

*develop, collect, evaluate, and coordinate information on –*

. . . .

(2) solid waste management practices, including data on the different management methods and the cost, operation, and maintenance of such methods;

. . . .

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157. See 42 U.S.C. § 6982(m) (requiring EPA to conduct "detailed and comprehensive study and submit a report on the adverse effects, if any," of E&P wastes).

158. See Report to Congress, supra note 57, at I-7 (discussing limited scope of EPA's study).

159. Id.

160. See Percefull, supra note 113 (advocating skepticism of industry-generated data).
(6) hazardous solid waste, including incidents of damage resulting from the disposal of hazardous solid wastes; inherently and potentially hazardous solid wastes; [and] methods of neutralizing or properly disposing of hazardous solid wastes . . . .161

Contrary to the requirements of this provision, EPA did not conduct its own studies as to the nature and extent of contamination by hazardous E&P associated wastes in the oilfield, but simply collected and reported existing data.162

RCRA contains several provisions that are designed to provide technical and financial assistance to states that are implementing solid-waste management plans that have been approved under the Act.163 The limitations contained within at least one of those provisions appear to have been drafted broadly enough to permit a state to request assistance for the purpose of evaluating the extent and nature of oilfield contamination.164 A separate provision requires EPA to provide technical assistance regarding solid-waste management practices including the services of teams of technical experts to states without charge, upon request.165 A third provision authorizes grants to states and municipalities for the purpose of developing new and improved solid waste disposal facilities.166

163. See 42 U.S.C. § 6948 (discussing federal financial assistance); 42 U.S.C. § 6986 (explaining Administrator’s authority to make grants to states). But see 42 U.S.C. § 6947(b)(3) (requiring Administrator to withdraw assistance from states without EPA approval).
164. See 42 U.S.C. § 6948(a)(2)(A). According to that section: (“The Administrator is authorized to provide financial assistance to States, counties, municipalities, and intermunicipal agencies . . . for implementation of programs to provide solid waste management . . . and hazardous waste management. Such assistance shall include assistance for facility planning and feasibility studies; expert consultation; [and] surveys and analyses of market needs . . . .”).
165. See 42 U.S.C. § 6913. According to that provision: The Administrator shall provide teams of personnel, including Federal, State, and local employees or contractors . . . to provide Federal agencies, States and local governments upon request with technical assistance on solid waste management, resource recovery, and resource conservation. Such teams shall include technical, marketing, financial, and institutional specialists, and the services of such teams shall be provided without charge to States or local governments. Id.; see also 42 U.S.C. § 6948(d) (allowing Administrator to provide technical assistance to state and local governments for implementing state plans).
166. See 42 U.S.C. § 6986.
Although RCRA appears to provide mechanisms for the provision of assistance to states that desire to study the nature and extent of contamination by hazardous oilfield E&P wastes, there are enormous practical and political impediments to the development of such information-gathering programs. Oil and gas industry operators possess significant financial and political muscle vis-a-vis state legislators and regulatory bodies, and any attempt to engage in a comprehensive program of data collection would be certain to face strong opposition. These considerations urge implementation of a broad federal program of information-gathering with respect to the characterization of oilfield E&P wastes.

VII. Conclusion

The foregoing discussion has presented ample evidence with which to conclude that much more needs to be done to control the management and disposal of hazardous oilfield exploration and production wastes. The studies of the nature and extent of oilfield contamination conducted by API and EPA, though cursory, reveal sufficiently widespread contamination and sufficiently high levels of hazardous constituents to warrant alarm. Considering the fact that each of these entities relied predominantly on self-reported data and known incidents of contamination, one must wonder what a well-funded, comprehensive and independent study of oilfield contamination might reveal.

Even without more study, the revelations of API and EPA alone provide a sufficient basis from which to conclude that stricter regulation of oilfield E&P associated wastes is warranted. Indeed, upon reviewing EPA’s Regulatory Determination and its accompanying Report to Congress, one is left with the observation that the studies’ conclusions are rebuked by the very assumptions upon which they are founded.

The framework for stricter regulation of oilfield E&P wastes already exists within Subtitle C of RCRA. The costs of bringing such wastes within the purview of Subtitle C, as estimated by EPA, would not be prohibitive, and would be balanced by savings in future cleanup costs as mandated by CERCLA and other laws and by the preservation of precious groundwater resources. Certainly the most prohibitive barrier to more stringent regulation of oilfield wastes would be the current political climate, in which any proposal seen as burdening domestic oil-production enterprises is sure to be fiercely opposed. Nevertheless, even if regulation under Subtitle C might prove to be less than politically expedient under present cir-
cumstances, there remains no sound reason to postpone the issuance of waste-specific regulations under Subtitle D. Such regulations could be narrowly tailored to address the most hazardous scenarios that currently exist. Moreover, such regulations could be phased-in over time to lessen the burdens to operators and consumers. Indeed, in its Regulatory Determination, EPA relied in part on its promise to regulate E&P wastes under Subtitle D in support of its conclusion that regulation under Subtitle C was unwarranted.

In conjunction with the issuance of regulations under Subtitle D, EPA should be granted broader authority to oversee state programs, and to intervene in specific instances with a wide range of available remedies. EPA should not have to revoke a state's entire Subtitle D program and implement that program itself, in order to effectuate more stringent enforcement in certain areas like the realm of oilfield E&P waste enforcement.

Finally, there is no good reason why regulators must rely on guesswork and extrapolations in support of their decisions regarding whether, and to what extent, to regulate oilfield waste-disposal practices. Observance of the extraordinarily tenuous assumptions and broad margins of error found within the only available data leads one to the inescapable conclusion that sound science is sorely lacking, insofar as the nature and extent of oilfield contamination is concerned. For this reason, at a minimum, proponents of a cleaner and less hazardous oilfield environment should argue strenuously for the funding of comprehensive independent studies of the problem. Without these studies, state and federal regulators will continue to turn a blind eye to the oilfield, as arguably they have done for decades.