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CURRENT EMISSION STANDARDS, REFINING, AND THE PETROLEUM INDUSTRY*

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The operant structure of the petroleum industry is underpinned by four essential functions: exploration and production, refining, transportation, and marketing. Of the four, the refining or manufacturing function has experienced the major thrust of state and federal environmental legislation directed toward the regulation of petroleum industry emissions. The compass of this article is directed toward the pollution problems relating to petroleum refining,[1] but it should be noted that many of the laws, restrictions, and policies analyzed herein are equally applicable to users of other industrial processes begetting emissions.[2]

I. WATER POLLUTION

Investigation of effluent discharge by refineries into neighboring waterways is an appropriate initial consideration because it was in this area that the federal government first immersed itself. The baptism took place with the enactment of the Rivers and Harbors Acts of 1890[3] and 1899.[4] Section 13 of the latter Act has gained independent recognition as the Refuse Act. Ironically, this nineteenth century legislation, passed to combat not pollution but impediments to navigation,[5] has today become a major weapon in the federal arsenal to protect our waterways

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1. The various components of the petroleum business are, of course, closely related, and where a complete discussion of refining requires it, aspects of the other functions will be considered. For example, marketing requirements for low sulphur fuel oils clearly affect refinery operations and have led to the implementation of processes such as catalytic hydrogen-desulphurization to reduce the fuel's sulphur levels.

2. Although the word "emissions" is generally thought of, in an environmental context, as applying to discharges into the air, when used in the context of petroleum refining its meaning must be expanded to include effluent discharges into water, noise, odors, and other receptor effects.

3. Act of Sept. 19, 1890, ch. 907, § 6, 26 Stat. 453.

4. Refuse Act, 33 U.S.C. § 407 (1970) (originally enacted as Act of Mar. 3, 1899, ch. 425, § 13, 30 Stat. 1152).

5. *See generally* Willamette Iron Bridge Co. v. Hatch, 125 U.S. 1, 8 (1888) (holding an Act of Congress was necessary to bring obstructions of navigable waterways within federal jurisdiction).

against environmental threats.[6] The irony is more striking yet in that as long ago as 1948 Congress began enacting laws specifically aimed at water pollution. The original Water Pollution Control Act of 1948,[7] has been supplemented by additional legislation on the same subject in 1956,[8] 1961,[9] 1965,[10] 1966,[11] 1970,[12] and 1971.[13] Bills pending at the time this paper was being prepared may well add further regulatory refinements in 1972.[14] Over a period of more than twenty years there has been no dearth of legislative attention directed toward resolving the problem of water pollution.[15] With all of this activity, it is a rather sad commentary that a law from the last century designed to stop the clogging of navigable channels[16] has been dusted off for use in the

6. In recent years the government has filed lawsuits against various corporations for water polluting acts. The defendant corporations include Georgia-Pacific Corp., Bellingham, Wash.; Olin Corp., Niagara Falls, N.Y.; Oxford Paper Co., Rumford, Me.; Weyerhaeuser Co., Longview, Wash.; Olin Corp., Augusta, Ga.; Diamond Shamrock Corp., Delaware City, Del.; Diamond Shamrock Corp., Muscle Shoals, Ala.; Allied Chemical Co., Solvay, N.Y.; International Mining and Chemical Co., Chlor-Alkali Division, Orrington, Me.; and Pennwalt Chemical Co., Calvert City, Ky. 1 B.N.A. ENVIRONMENT REP., CURRENT DEVELOPMENTS 349 (1970).

7. Water Pollution Control Act, ch. 758, 62 Stat. 1155 (1948) (codified at 33 U.S.C. §§ 1151-75 (1970)).

8. Water Pollution Control Act Amendment of 1956, ch. 518, § 1, 70 Stat. 498, *amending* Water Pollution Control Act, ch. 758, 62 Stat. 1155 (1948) (codified at 33 U.S.C. §§ 1151, 1153-55, 1157-60, 1171-74 (1970)).

9. Water Pollution Control Act Amendments of 1961, Pub. L. No. 87-88, 75 Stat. 204, *amending* Water Pollution Control Act, ch. 758, 62 Stat. 1155 (1948) (codified at 33 U.S.C. §§ 1151, 1153-55, 1158-60, 1171-73 (1970)).

10. Water Quality Act of 1965, Pub. L. No. 89-234, 79 Stat. 903, *amending* Water Pollution Control Act, ch. 758, 62 Stat. 1155 (1948) (codified at 33 U.S.C. §§ 1151-60, 1171-74 (1970)).

11. Clean Water Restoration Act of 1966, Pub. L. No. 89-753, §§ 101-210, 80 Stat. 1246, *amending* Water Pollution Control Act, ch. 758, 62 Stat. 1155 (1948) (codified at 33 U.S.C. §§ 1153, 1155-58, 1160, 1173, 1175 (1970)).

12. Water and Environmental Quality Improvement Act of 1970, Pub. L. No. 91-224, 84 Stat. 91, *amending* Water Pollution Control Act, ch. 758, 62 Stat. 1155 (1948) (codified at 33 U.S.C. §§ 1152, 1155-56, 1158, 1160-75 (1970)).

13. Federal Water Pollution Control Act—Extension, Pub. L. No. 92-50, 85 Stat. 124 (1971). This law is merely an extension of funding authorization for a three-month period, but a substantive enactment should be expected when this extension terminates.

14. S. 523 and S. 1014, 92d Cong., 1st Sess. (1971). Senate Bill 523 is sponsored by Senator Muskie of Maine and Bill 1014 is sponsored by Senator Cooper of Kentucky. Senate hearings on both bills were held March 15 through March 24, 1971.

15. Even more attention may be focused on environmental protection in 1972, an election year.

16. Several early cases which interpreted the Refuse Act only found the Act to be violated when refuse interfered with navigation. *See, e.g.*, United States v. Republic Steel Corp., 362 U.S. 482 (1960); Longstrean v. Owen McCaffrey's Sons, 95 Conn. 486, 111 A. 788 (1920); Brush v. Lehigh Valley Coal Co., 290 Pa. 322, 138 A. 860 (1927).

modern struggle against pollution. The anomaly of using an 1899 navigational law to deal with non-navigational 1971 pollution will be further discussed following a brief review of the current federal laws enacted to deal with pollution itself.

Federal water pollution legislation, instead of reposing complete authority in either the states or the national government, provides for a partnership arrangement.[17] The law seemingly promotes the states to senior partner status as a result of the congressional declaration that the national policy is "[t]o recognize, preserve and protect the primary responsibilities and rights of the States in preventing and controlling water pollution. . . ."[18] Actually, however, the federal voice is as strong, if not stronger, than that of the states. In the main this can be attributed to two factors. First, Washington controls the purse strings.[19] Second, the senior rights of the states establish palpably no more than an initial opportunity for states to create water quality standards for all interstate waters within their boundaries,[20] since any promulgated standards, together with plans for their implementation and enforcement, must be approved in Washington.[21] When a state does not exercise this opportunity or if, having done so, its proposals are not countenanced by the federal government, the latter has the discretion to prescribe standards applicable to the interstate waters in that state.[22]

The federal law allowing states to establish standards was couched,

17. *See* Pollution Control of Navigable Waters Act, 33 U.S.C. §§ 1151-75 (1970).
18. *Id.* § 1151.
19. *Id.* § 1157.
20. *Id.* § 1160(c)(1).
21. *Id.*
22. While the states have the initial opportunity to set water quality standards, the power to enforce the standards and proceed against violators is vested in the Administrator of the Environmental Protection Agency. Reorganization Plan No. 3 of 1970, §§ 2(a)(1), (3), 35 Fed. Reg. 15623, 3 U.S. CODE CONG. & ADM. NEWS 6322 (1970) [hereinafter cited as Reorganization Plan]. The enforcement procedure begins with a conference between federal government authorities and state and interstate water pollution agencies at which the various water pollution violations, as well as present abatement procedures, are reviewed. At the conclusion of the conference remedial measures are agreed upon and presented to the state. If after six months the pollution violations continue, the Administrator is required to call a public hearing during which interested parties, including the alleged polluters, are allowed to testify. Following the hearing, the Hearing Board recommends abatement measures to the Administrator, who then notifies the alleged polluters of the findings and issues notification that violations must be abated within a specified time, not less than six months. If the violations continue, the Administrator may request the attorney general to seek legal action if the violation concerns interstate pollution. If intrastate pollution is involved, the Administrator must have the consent of the state's governor in order to initiate the request. 33 U.S.C. §§ 1160(d)-(g) (1970).

as first propounded, in language touching only upon the quality of the receiving waters.[23] There was no obligation upon the states to establish any standards governing the quality of the effluents spewed into those waters.[24] It is indeed possible that this omission may impede the administration of a sound pollution abatement program.[25] Pending legislation would close this gap, however, by directing the addition to state water quality standards of effluent requirements imposing specific limitations on individual sources of pollution.[26] More importantly, these proposals would broaden the ambit of water quality standards to include not only interstate waters, as the law now provides, but also all navigable waters.[27] This broadened concept was utilized in the 1970 amendment to the Water Pollution Control Act in provisions dealing specifically with oil spills and measures to remove such discharges.[28] This 1970 legislation, which affects all refiners, bears upon their liability for the discharge of oil into the navigable waters of the United States in quantities determined to be harmful under federal regulations.[29]

Oil spills,[30] as well as discharges of designated hazardous polluting substances other than oil,[31] are areas wherein the federal government has intervened directly without first, as in the case of water quality standards, providing the states an opportunity to act. The federal intrusion into this field is in large part the result of such mishaps as occurred in the grounding and subsequent breaking up of the tanker *Torrey*

23. 33 U.S.C. § 1160(c)(1) (1970). *See also* Water Pollution Control Act, ch. 758, 62 Stat. 1155 (1948) (codified at 33 U.S.C. §§ 1151-75 (1970)).

24. The states could, however, obtain federal funding for construction of sewage treatment works. 33 U.S.C. § 1158 (1970).

25. If effluents may be freely discharged until the receiving waters are just short of qualifying as polluted, not only will the quality of the waterway be changed but the risk of an accidental "over-discharge" which may permanently damage the waterway is magnified considerably.

26. S. 523, 92d Cong., 1st Sess. (1971); S. 1014, 92d Cong., 1st Sess. (1971).

27. *Id.*

28. Water and Environmental Quality Improvement Act of 1970, Pub. L. No. 91-224, 84 Stat. 91.

29. 33 U.S.C. § 1161(b)(2) (1970) provides:

> The discharge of oil into or upon the navigable waters of the United States, adjoining shorelines, or into or upon the waters of the contiguous zone in harmful quantities as determined by the President under paragraph (3) of this subsection, is prohibited, except (A) in the case of such discharges into the waters of the contiguous zone, where permitted under article IV of the International Convention for the Prevention of Pollution of the Sea by Oil, 1954, as amended, and (B) where permitted in quantities and at times and locations or under such circumstances or conditions as the President may, by regulation, determine not to be harmful. Any regulations issued under this subsection shall be consistent with maritime safety and with marine and navigation laws and regulations and applicable water quality standards.

30. *Id.*

31. *Id.* § 1162.

Canyon[32] and the Santa Barbara Channel oil leak.[33] The 1970 enactment is designed to cope with similar spills by providing for their containment and cleanup and by establishing financial responsibility for resulting costs.[34] But the states are not precluded from legislating in this area unless they attempt either to usurp an exclusive federal domain such as maritime law or to establish rules that are inconsistent with federal practice. Several states have in fact enacted laws and regulations of their own dealing with discharges of oil and other hazardous substances.[35] Moreover, pending federal legislation would authorize the additional establishment of federal effluent standards for hazardous substances designated by regulations.[36] Although state machinery and procedures would be shunted thereby, states would remain free to fashion their own standards should they so choose.

The existing regulations specifying what quantities of oil[37] are deemed harmful when discharged into navigable water of the United States are quite brief.[38] They contain two prohibitions. One declares unlawful the discharge of any quantity of oil which would violate applicable water quality standards.[39] The other, and potentially more troublesome restriction for the petroleum industry, provides that any discharge is harmful if it causes a film or sheen, or causes a sludge or

32. See Nanda, *The "Torrey Canyon" Disaster: Some Legal Aspects*, 44 DENV. L.J. 400 (1967), for a discussion of the magnitude of this unfortunate accident.

33. See Krueger, *Offshore Petroleum, Pollution and Politics: The Impact of Santa Barbara on Continental Shelf Development*, 15 THE LANDMAN, Aug. 1970, at 14.

34. 2 U.S. CODE CONG. & ADM. NEWS 2691 (1970).

35. *See, e.g.*, Maine Oil Discharge Prevention and Pollution Control Act, MAINE REV. STAT. ANN. tit. 38, §§ 541-57 (Supp. 1972); Massachusetts Clean Waters Act, MASS. GEN. LAWS ANN., ch. 21, §§ 50-50B (Supp. 1972); Florida Oil Spill Prevention and Pollution Control Act, FLA. STAT. ANN. §§ 376.011-376.21 (Supp. 1970). The Florida law has been declared unconstitutional because it intruded into the exclusive federal jurisdiction over maritime matters and because it was in conflict with the Federal Water Pollution Control Act. American Waterways Operator v. Askew, 3 BNA ENVIRONMENT REP., DECISIONS 1429 (M. D. Fla. 1971).

36. S. 523, 92d Cong., 1st Sess. (1971); S. 1014, 92d Cong., 1st Sess. (1971).

37. "'Oil' means oil of any kind or in any form, including, but not limited to, petroleum, fuel oil, sludge, oil refuse, oil mixed with ballast or bilge, and oil mixed with wastes other than dredged spoil." 18 C.F.R. § 610.1(a) (1971).

38. The federal legislation directed toward oil pollution extends the jurisdictional scope beyond navigable waters to include waters of the contiguous zone. 33 U.S.C. § 1161(b)(1) (1970). This zone in effect extends 12 miles from the low water line along the coast. The contiguous zone presents various perplexing problems which necessarily do not affect land based oil refineries. See Keener, *Federal Water Pollution Legislation and Regulations with Particular Reference to the Oil Industry*, 4 NAT. RESOURCES LAW. 484, 491-94 (1971).

39. 18 C.F.R. § 610.3(a) (1971).

emulsion to be deposited beneath the surface of the water.[40] Sheen is defined as "an iridescent apearance on the surface of the water."[41] " 'Sludge' means an aggregate of oil or oil and other matter of any kind in any form other than dredged spoil having a specific gravity equivalent to or greater than water."[42]

Literal application of these definitions of sludge and sheen could lead to implausible results unless further interpretations are forthcoming. Under certain conditions, such as very calm, stationary waters, an effluent containing an eye-dropper of oil could cause, at least for a brief period, a discernible sheen. A single particle of coke or other hydrocarbon material heavier than water seems to fall within the definition of sludge. If the language of the regulation is to be given its literal English meaning, such discharges violate the law. As so construed, any person in charge of a facility, such as a refinery, where a discharge of this kind occurs and who has acquired knowledge of the discharge is subject to a fine of $10,000 or a year in jail or both unless he immediately reports it to an appropriate governmental agency.[43] In addition, if the oil was knowingly discharged, the owner of the facility may be assessed a civil penalty up to $10,000 for each separate offense.[44] The application of the foregoing sanction to a continuous refinery discharge of water containing tiny globules of oil in such quantities as to be perfectly harmless as a practical matter but nevertheless discernible as a sheen taxes the imagination. In an around-the-clock refinery operation just what is a separate offense—each drop, quart, gallon or barrel of effluent or each second, minute, hour or day of discharge? In this state of perplexity some refiners are trying to work out practical arrangements with their local Coast Guard personnel and this author can at this time offer no better solution.

Besides minimal discharges of refinery effluents that may cause sheens or sludge but are in no other sense really harmful, oil refineries must be concerned with the possibility of substantial spills of oil due to accidents or negligence. The owner or operator of an onshore facility from which such a discharge occurs will be liable for the cleanup costs, up to $8,000,000, unless he can maintain the affirmative defense

40. *Id.* § 610.3(b).
41. *Id.* § 610.1(*l*).
42. *Id.* § 610.1(m).
43. 33 U.S.C. § 1161(b)(4) (1970).
44. *Id.* § 1161(b)(5). Proposed legislation by Senator Muskie of Maine would define each day as the definition of a separate offense. It would also provide that the federal government would not purchase goods and services of a person convicted of a knowing water pollution violation until the condition is corrected. S. 523, 92d Cong., 1st Sess. (1971).

that the spill was caused solely by an act of God, act of war, negligence by the federal government, or an act or omission of some third party.[45] Moreover, if the government can carry the burden of proving that the spill was the result of willful negligence or misconduct, the refinery owner or operator will be liable for the full amount of the cleanup costs.[46]

All of this may come as a shock to many refinery managers. Others may shrug it off as not being applicable to their refineries located far inland, hundreds of miles away from anything a reasonable man would construe as a navigable waterway. A man from Colorado may say with some practical justification that the South Platte flowing or trickling through Denver is hardly a navigable waterway of the United States when he cannot float a canoe or rowboat on it. He is in store for a shock. The South Platte and perhaps most, if not all, waterways in this country on which a refinery is located or into which its effluents are channeled or piped are navigable waters of the United States.

Although it is not defined in the statute, the term "navigable waters" has a well-understood and very broad legal meaning. It is not limited to our coastal waters and broad rivers—such as the Mississippi, the Missouri, the Ohio, the Hudson—where the constant sight of marine traffic clearly makes them navigable. The phrase "navigable waters of the United States" includes as a matter of law, as distinguished from actual practice, bodies of water that have not floated a vessel of any kind for a hundred or more years. The guidelines our courts have established for determining navigability are interesting both to lawyers and laymen; moreover, they are so broad that sometimes both are amazed.

A body of water is navigable if it meets any one of three tests. The first and most obvious standard includes waterways which are currently being used for the transportation of persons or property in interstate or foreign commerce.[47] A second test provides that a waterway is navigable if it can be made suitable for the above-mentioned commerce by reasonable improvements or artificial aids even though such alterations have not yet been proposed.[48] The third criterion includes waterways that were once used as navigable waterways although such use has

45. 33 U.S.C. § 1161(f)(2) (1970).

46. *Id.*

47. The Daniel Ball, 77 U.S. (10 Wall) 557, 563 (1870).

48. United States v. Appalachian Elec. Power Co., 311 U.S. 377, 407-08 (1940). The court stated that "Congress has recognized this in § 3 of the Water Power Act by defining 'navigable waters' as those 'which either in their natural or improved condition' are used or suitable for use." *Id.* at 407.

long since been abandoned.[49] For example, a branch of a river which had been used for transporting furs in canoes and light boats was held to be navigable in 1921 even though it had not been so used since 1825.[50]

Navigability need not be continuous either in time or in distance to make an entire stream a navigable waterway.[51] Even if only a portion of its course is actually navigable, and then only for a part of the year, that is enough to make the entire river a navigable water of the United States. This is true although falls, shallows or rapids may compel portage over a portion of its route.[52] Tributaries, even though non-navigable themselves, are includable within the definition if their obstruction would affect the navigability of the waterways which they feed.[53] Federal jurisdiction may still attach even though the waterway involved is contained entirely within the boundaries of a single state with no external water connection crossing state lines.[54] It is enough if the body of water in conjunction with other modes of transportation, such as a railroad, provides a means for the continuous portage of goods in interstate commerce.[55] Under these principles the only body of water that can possibly escape classification as part of the navigable waters of the United States would be a stream, pond or lake which has no connection with other navigable waters, as previously defined, and which is not used, never was used and could not with reasonable expenditures be used as part of a chain in an interstate or foreign movement, by water or otherwise, for the carriage of goods or people. It is difficult to imagine any body of water serving a petroleum industry installation, whether it be a refinery, a marketing facility or an oil or gas well, that is not a navigable waterway of the United States.[56]

Returning to the Refuse Act of 1899, an attempt is being made to

49. Economy Light & Power Co. v. United States, 256 U.S. 113, 123-24 (1921); Rochester Gas & Elec. Corp. v. Federal Power Comm'n, 344 F.2d 594, 596 (2d Cir. (1965).

50. Economy Light & Power Co. v. United States, 256 U.S. 113, 117 (1921).

51. United States v. Appalachian Elec. Power Co., 311 U.S. 377, 409-10 (1940).

52. *Id.* at 409.

53. United States v. Rio Grande Dam & Irrig. Co., 174 U.S. 690, 709 (1899); Appalachian Elec. Power Co. v. Smith, 4 F. Supp. 6, 16-17 (W.D. Va.), *rev'd on other grounds*, 67 F.2d 451 (4th Cir. 1933).

54. The Katie, 40 F. 480, 492 (S.D. Ga. 1889).

55. *Id.* at 489.

56. An exception would be an off-shore drilling rig on the outer continental shelf beyond the three-mile limit. That limit marks the seaward boundary of the navigable waters of the United States. Employers Mut. Cas. Co. v. Samuels, 407 S.W.2d 839 (Tex. Civ. App. 1966). Oil spills from shelf rigs are, however, covered by regulations promulgated under the Outer Continental Shelf Lands Act., 43 U.S.C. §§ 1331-43 (1970).

employ a little-used permit section of that law to control discharges of pollutants into navigable waters.[57] In light of the current emphasis being placed on this statute, it is helpful to review briefly the judicial background and construction of the Refuse Act. Although the Act was aimed at impediments to navigation,[58] its confusing syntax has produced results having no relationship to navigation. The Act contains two basic prohibitions separated by a semicolon.[59] The first prohibition makes unlawful the discharge of any refuse matter, other than liquid sewage, into navigable waters; the second outlaws the depositing of any material on the banks of navigable waters where it may be washed into such waters. Following these two prohibitions is the phrase "whereby navigation . . . may be impeded." Because a semi-colon separates the first from the second prohibition, each has been construed to stand alone and, consequently, the navigation impediment language modifies only the second prohibition.[60] Thus, refuse dumping covered by the first prohibition is unlawful, regardless of its effect on navigation.[61] The term "refuse" has been held to include particles of industrial solid wastes suspended in water[62] and materials of commercial value not commonly

57. Refuse Act, 33 U.S.C. § 407 (1970).

58. *See* note 5 *supra* and accompanying text.

59. 33 U.S.C. § 407 (1970) provides:

> It shall not be lawful to throw, discharge, or deposit, or cause, suffer, or procure to be thrown, discharged, or deposited either from or out of any ship, barge, or other floating craft of any kind, or from the shore, wharf, manufacturing establishment, or mill of any kind, any refuse matter of any kind or description whatever other than that flowing from streets and sewers and passing therefrom in a liquid state, into any navigable water of the United States, or into any tributary of any navigable water from which the same shall float or be washed into such navigable water; and it shall not be lawful to deposit, or cause, suffer, or procure to be deposited material of any kind in any place on the bank of any navigable water, or on the bank of any tributary of any navigable water, where the same shall be liable to be washed into such navigable water, either by ordinary or high tides, or by storms or floods, or otherwise, *whereby navigation shall or may be impeded or obstructed* . . . . (emphasis added)

60. United States v. Ballard Oil Co. of Hartford, Inc., 195 F.2d 369 (2d Cir. 1952).

61. *Id.* at 370. In La Merced, 84 F.2d 444 (9th Cir. 1936), the Court stated that refuse was not limited to matter impeding or obstructing navigation and held that oil was refuse within the meaning of the Act. Even under the second prohibition where navigation must be impeded in order for jurisdiction under the Refuse Act to attach, the increased broadening of the definition of "navigable" (see text accompanying notes 46-56 *supra*) had had a positive effect on the applicability of the Act. The Fort Fetterman v. South Carolina Highway Dep't, 261 F.2d 563 (4th Cir. 1958); United States v. Romard, 89 F. 156 (2d Cir. 1898); Armory v. Commonwealth, 321 Mass. 240, 72 N.E.2d 549 (1947).

62. United States v. Republic Steel Corp., 362 U.S. 482, 490-91 (1960). There, the deposits were held not to be within the exception language of the Act which excludes matters which flow from streets and pass therefrom in a liquid state. The Court narrowly construed the wording of the Act and held that only "sewage" was meant to be included within the exception.

considered discards or waste, such as aviation gasoline accidentally discharged into a navigable river.[63]

The act provides further that any discharge of refuse into the navigable waters of the United States is unlawful unless authorized by a permit obtained from the Army Corps of Engineers.[64] The Army is authorized to issue permits for the discharge of refuse when no impediments to anchorage or navigation are created.[65] Until recently, no refiner had applied for a permit covering his effluent discharges because these discharges were not considered threats to anchorage or navigation. There have been such applications for physical installations such as outfalls, conduits or other facilities carrying refinery discharges into navigable waters that might constitute impediments to navigation.[66] Now, however, this permit provision is being applied to require comprehensive licensing of all who would discharge any pollutants into any navigable waters.[67] It is estimated that 40,000 such permits will be needed for existing installations.[68]

An amusing but perplexing paradox in this scheme arises from

63. United States v. Standard Oil Co., 384 U.S. 224 (1966). In *Standard Oil* Justice Douglas, writing for the majority, confirmed the view that the phrase "whereby navigation shall or may be impeded or obstructed" applied only to the second prohibition of section 407. As such, Justice Douglas determined that commercially valuable aviation gasoline was included within the Act, stating: "Oil is oil and whether usable or not by industrial standards it has the same deleterious effect on waterways. In either case, its presence in our rivers and harbors is both a menace to navigation and a pollutant." *Id.* at 226.

64. Refuse Act § 13, 33 U.S.C. § 407 (1970). Violation of the Refuse Act is a criminal offense and criminal penalties may be imposed. Violators can be fined up to $2500 and sentenced to jail for not more than one year. *Id.* § 411. In addition, equitable remedies have been allowed by the courts in the past for violation of the Act. In United States v. Republic Steel Corp., 362 U.S. 482 (1960), the Supreme Court of the United States allowed the government's petition for injunctive relief. Other cases affirming the right of civil redress under the Refuse Act include United States v. Perma Paving Co., 332 F.2d 754 (2d Cir. 1964); United States v. Donaldson-Schultz Co., 148 F. 581 (4th Cir. 1906).

65. 33 U.S.C. § 407 (1970). A court recently held that, under the language of the Refuse Act, the Army Corps of Engineers may not issue permits, as it has done in the past, for discharges into non-navigable waters. Kalur v. Resor, 335 F. Supp. 1 (D.D.C. 1971). Subsequent to this decision the Army has discontinued the practice. Proposed amendments to the federal Water Pollution Control Act (S. 2770), however, incorporate the permit system and make it applicable to all waters. 40 U.S.L.W. 1098 (Jan. 4, 1972).

66. Such installations appear to come directly under the purview of regulations formulated by the Army. 33 C.F.R. § 209.120 (1971).

67. Exec. Order No. 11574, 3 C.F.R. 188 (1971), 33 U.S.C. § 407 (1970).

68. White House Fact Sheet accompanying President Nixon's statement of Dec. 23, 1970, on initiation of a permit program under the Refuse Act. 21 BNA ENVIRONMENT REP., FEDERAL LAWS 292 (1971).

the attempt of the Army to coordinate and dovetail its rejuvenated permit authority with the Environmental Protection Agency's (EPA) regulations formulated under authority granted by the Water Pollution Control Act.[69] Since these latter EPA regulations prohibit the discharge of oil in harmful quantities,[70] the Army has indicated it will issue no permits for this type of discharge.[71] This seems like a rational accommodation with a law specifically covering such discharges. But having carved out that exception, the Army seems to be saying that if an oil discharge is not prohibited by the Water Pollution Control Act because it is harmless and, therefore, not unlawful under that statute, it nevertheless is unlawful under the Refuse Act unless a permit is obtained from the Army.[72]

From the perspective of a refiner having an operation which employs continuous water discharges, he is placed in an almost impossible position. The effluent contains miniscule particles of oil that either cannot under known technology be completely removed or, if they can, the cost of removal far outweighs any of its possible benefits. If such particles cause a sheen or sludge, the refiner is a violator of the Water Pollution Control Act and he can expect no help from the Army by way of a permit. But even if he does not violate the Water Pollution Control Act because the oil globules in his refinery effluent do not cause a sheen or sludge, the refinery may still be in trouble under the Refuse Act unless a permit can be obtained from the Army for such harmless discharges. This type of administrative regulation is currently being challenged in a pending lawsuit. It is being urged that if oil discharges are to be covered by regulations under the Water Pollution Control Act, then that Act must necessarily preempt the Refuse Act and its accompanying permit system.[73]

II. AIR POLLUTION

Until recently the federal government moved more slowly on the

69. 33 U.S.C. § 1161(1) (1970).

70. 18 C.F.R. §§ 610.1-.9 (1971).

71. Proposed Army Corps Eng'r Reg. 209.131(d)(7), 35 Fed. Reg. 20006 (1970).

72. *Id.* § 209.131(d)(1), 35 Fed. Reg. 20005 (1970). If a discharge is not prohibited under the F.W.P.C.A., the Army Corps of Engineers may still, under the Refuse Act, deny a permit in three different situations:

(1) If the discharge will impair anchorage or navigation; (2) if the District Engineer, after consultations required by the Fish and Wildlife Coordination Act, determines that the discharge will have a harmful effect on fish or wildlife resources; and (3) if the issuance of the permit would be inconsistent with the purposes of the Refuse Act. *Id.* § 209.131(d)(2), 35 Fed. Reg. 20005.

73. United States v. Mobil Oil Corp., Civ. No. 70-V-6 (S.D. Tex., filed 1970).

air pollution front than it had in connection with polluted waters.[74] It was not until 1955—seven years after the Water Pollution Control Act of 1948—that Congress legislated the federal government into the field of air pollution regulation.[75] By 1967, a series of federal laws enacted in 1964,[76] 1965,[77] and 1967,[78] had made applicable to air much of the philosophy and procedural arrangements previously written into the water program, including the issuance of criteria by the federal government[79] and an opportunity to the states to adopt their own standards in light of those criteria.[80] This was in recognition of the principle that "the prevention and control of air pollution at its source is the primary responsibility of States and local governments. . . ."[81]

As in the case of water, however, if a state failed to exercise its prerogative by adopting standards or if those adopted were found inadequate by Washington, the latter was authorized to promulgate federal standards for that state.[82] An exception to this concept of placing primary responsibility on state and local government was made with respect to automobiles. The inpracticability of compelling car manufacturers to comply with fifty different state laws on automotive emissions caused Congress to preempt the field by authorizing the federal govern-

74. Due to the alarming increase in air pollution Congress was forced to enact legislation attempting to deal with the problem. The regulatory scheme adopted has been approved by the federal courts. United States v. Bishop Processing Co., 287 F. Supp. 624 (D. Md. 1968), *aff'd*, 423 F.2d 469 (4th Cir.), *cert. denied*, 398 U.S. 904 (1970).

75. Act of July 14, 1955, ch. 360, 69 Stat. 322 (codified at 42 U.S.C. § 1857 (1970)).

76. Clean Air Act, Pub. L. No. 88-206, 77 Stat. 392, *amending* Act of July 14, 1955, ch. 360, 69 Stat. 322 (codified at 42 U.S.C. § 1857 (1970)).

77. Clean Air Act, Pub. L. No. 89-272, 79 Stat. 992, *amending* Clean Air Act, Pub. L. No. 88-206, 77 Stat. 392 (codified at 42 U.S.C. § 1857 (1970)).

78. Air Quality Act of 1967, Pub. L. No. 90-148, 81 Stat. 485, *amending* Clean Air Act, Pub. L. No. 89-272, 79 Stat. 992 (codified at 42 U.S.C. § 1857 (1970)).

79. 42 U.S.C. § 1857c-2(b) (1970).

80. *Id.* § 1857d(c).

81. *Id.* § 1857(a)(3).

82. *Id.* § 1857d(c)(2). Air quality standards can be established by state action if the governor of a state files with the Secretary of Health, Education and Welfare, within 90 days after receiving air quality criteria promulgated by the Secretary, a letter expressing the state's intent to adopt air quality standards within 180 days. If within 180 days after the establishment of standards the state augments them with a plan for their implementation, maintenance and enforcement, and if the standards and plans are consistent with the air quality criteria issued by the Secretary, the standards then become officially established for that state.

If a state does not file a letter of intent or establish air quality standards, the Secretary is enabled to propose regulations setting forth needed air quality standards consistent with the designated criteria and recommended control techniques. The Secretary's standards become applicable to the state if within six months after their proposal the state has not adopted its own standards. 42 U.S.C. § 1857d(c)(1), (2) (1970).

ment to establish national standards for emissions from new motor vehicles[83] and by disallowing the states from adopting their own standards relating to the control of emissions from motor engines.[84] An exception to this exception was engrafted for California. Its longer experience in the southern part of the State with smog problems, particularly from automobile emissions, and its earlier laws and regulations applicable to these emissions justified granting California permission to enforce its own stricter standards.[85]

In another important respect the air statute went beyond its water counterpart. The latter contemplated only the establishment of standards for the receiving waters into which effluents are discharged, not for the effluents themselves. Under the air law, however, the implementation plans to be formulated by each state in support of its ambient air standards must contain emission limitations applicable to the source or classes of sources of various discharges.[86] As previously noted, pending legislation would provide for similar source controls in the case of effluent discharges into our waterways.

Major additions were made to the body of federal air legislation by the Clean Air Amendments of 1970.[87] Of particular interest to refiners are the provisions authorizing the EPA, which has recently assumed air and water pollution jurisdiction from the Department of the Interior and the Department of Health, Education and Welfare,[88] to issue criteria for pollutants emitted from numerous or diverse mobile or stationary sources having an adverse effect on public health or welfare.[89] The EPA was directed, based upon its evaluation of these criteria, to promulgate regulations prescribing not only a national primary ambient air quality standard with respect to each pollutant injurious to public health but also a national secondary standard to protect public welfare.[90] This approach greatly increases the power and authority of the federal government to cope with air pollution on a national level by giving it, instead of the states, the principal responsibility in estab-

83. *Id.* § 1857f-1.

84. *Id.* § 1857f-6a(a).

85. *Id.* § 1857f-6a(b).

86. H.R. REP. No. 728, 90th Cong., 1st Sess. 2 (1967); S. REP. No. 403, 90th Cong., 1st Sess. 2 (1967).

87. Clean Air Amendments of 1970, Pub. L. No. 91-604, 84 Stat. 1676 (codified at 42 U.S.C. § 1857 (1970)).

88. Reorganization Plan, *supra* note 22, § 2(a)(3). *See* Manaster, *The Development of Federal Water Pollution Control: The Present and the Future*, 1971 U. ILL. L.F. 36, 48-49.

89. Clean Air Amendments of 1970, Pub. L. No. 91-604, § 4, 84 Stat. 1676.

90. *Id.*

lishing standards for major pollutants. This enlargement of national jurisdiction at the expense of the states was, however, coupled with the reiteration that the basic premise of the earlier underlying legislation that "each State shall have the primary responsibility for assuring air quality within the entire geographic area comprising such State,"[91] is to be maintained. What is left to the states under this type of division is nothing more than the opportunity to promulgate implementation plans for the achievement of the federal standards. The attainment of such standards must be accomplished in the case of primary standards within a maximum of three years after the EPA has approved a state's plans.[92] If a state fails to take advantage of this opportunity, or if its implementation plan is unacceptable, the EPA is authorized to promulgate a federal implementation plan of its own.[93]

The 1970 amendments clarify with greater particularity than did earlier provisions what the necessary contents of the state implementation plans must be in order to meet the federal standards. To be included are provisions establishing emission limitations, land-use and transportation controls and monitoring devices.[94]

Under the federal standard-setting authorization, the EPA has issued criteria and has published proposed national standards of maximum allowable levels for six major pollutants—sulphur oxides, particulate matter, carbon monoxide, photochemical oxidants, hydrocarbons and

91. *Id.* Before establishing the national standards, the EPA is required to allow a reasonable time, not to exceed 90 days, for comment by interested parties. *Id.* Thus, in reality, this opportunity for comment is the only means by which the states involved can attempt to assist in setting the applicable air quality standards.

92. 42 U.S.C.A. § 1857c-5(a)(2)(A)(i) (Supp. 1972).

93. Clean Air Amendments of 1970, Pub. L. No. 91-604, § 4, 84 Stat. 1676. In order for the state to adopt its own implementation plans it must, within 90 days following the establishment of the national standards, hold public hearings regarding the plans and submit the plans to the Administrator. It has been suggested that the required public hearings offer a possible opportunity for effective participation by citizens in the establishment of implementation plans. Comment, *Federal Pollution Control: Participation by States and Individuals Enhances the National Pollution Control Effort*, 16 VILL. L. REV. 827 (1971).

94. Clean Air Amendments of 1970, Pub. L. No. 91-604, § 4, 84 Stat. 1676. If any federal standards are violated, including the emission standards, the Administrator has the authority either to order abatement and later seek judicial relief if the polluter fails to comply or to petition directly for a court order requiring the defendant to abate his pollution-causing activity. *Id.* Polluters, however, are not only subject to civil sanctions but are also subject to criminal penalties. If a person is found to have knowingly violated a requirement of the implementation plan, he may be fined not more than $25,000 per day or imprisoned for not more than one year or both. *Id.* § 113(c)(1)(A).

nitrogen oxides.[95] Other pollutants, including fluorides, polycyclic organic matter and odorous substances, are currently being evaluated for national treatment and the list may well be increased.[96]

Based upon the comments presented at public hearings conducted with respect to these federal standards, it would appear, at least for some industrial establishments, that compliance is going to be difficult and costly.[97] It seems certain that if the standards are to be met, state implementation plans must impose strict limitations on industrial emissions at particular sources or classes of sources.[98] These limitations may have to go beyond what has heretofore been proposed as acceptable emission levels.

This stricter level of compliance plus express statutory direction that implementation plans be revised when necessary to reflect changes in the standards themselves or improvements in control methods[99] clearly foretells ever-increasing costs for all industries in fighting pollution.[100]

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95. In the introductory notice of the proposed standards, it is explained that (1) sulphur oxides arise primarily from the combustion of sulphur containing fossil fuels; (2) particulate matter refers to solid or liquid matter dispersed in the air which is smaller than 500 microns. Matter smaller than 1 micron in diameter is formed principally through condensation and combustion, while larger particles arise principally through erosion and abrasion; (3) carbon monoxide is the product of incomplete combustion of carbonaceous fuels; (4) photochemical oxidants are produced in the atmosphere when reactive organic substances, principally reactive hydrocarbons, and nitrogen oxides are exposed to sunlight (these oxidants result in the formulation of photochemical smog); (5) hydrocarbons are molecules made up of hydrogen and carbon; they are primarily associated with the processing, marketing, and use of petroleum products; and (6) nitrogen oxides result from the fixation of nitrogen and oxygen at high temperatures and are usually associated with the combustion process. 36 Fed. Reg. 1502 (1971).

In explaining the strictness of the standards, EPA Administrator William D. Ruckelshaus stated:

> The legislative history of the Clean Air Act makes it plain that when we talk about protecting the public health against polluted air we are talking about protecting those citizens who are particularly sensitive to it—in other words, those citizens already afflicted with cardio-respiratory problems. If we have erred at all in setting these standards, we have erred on the side of public health. L.A. Times, May 1971, at 1, col. 5.

96. 36 Fed. Reg. 1515 (1971).

97. 1 BNA ENVIRONMENT REP., CURRENT DEVELOPMENTS 1264 (1971).

98. *Id.* at 1161.

99. Clean Air Amendments of 1970, Pub. L. No. 91-604, § 4, 84 Stat. 1676.

100. The President's Council on Environmental Quality estimates that industry must invest 8 billion dollars in air pollution control between 1970 and 1975. The EPA estimates that $3.1 billion will be required for new waste water treatment facilities by 1975. Wall Street Journal, Aug. 9, 1971, at 4, col. 1 (Midwest ed.).

For a discussion concerning industry's ability to solve pollution problems internally see Van Doren, *Air Pollution: Expanding Citizens Remedies*, 32 OHIO ST. L.J. 16, 17-21 (1971). Professor Van Doren cites not only the inability of industry to control pollu-

An industry spokesman in a recent speech said that this cost "pill will be bitter in varying degrees and may be very serious for marginal operations."[101] He graphically emphasized the necessity of top management's involvement by saying that "pollution sits as a director on all corporate boards in 1971 and for the future."[102]

A further encroachment on state jurisdiction results from another 1970 amendment[103] which provides for the establishment of federal standards of performance for new stationary sources falling within categories determined by EPA to be significant contributors to air pollution endangering public health or welfare.[104] Such standards of performance are to reflect emission limitations achievable by the application of the best system of emission reduction, taking into account the cost.[105] New sources are those upon which construction or modification is started subsequent to the date of publication of proposed regulations prescribing standards of performance.[106] Modification means any physical or operational change, made after said publication date, in any existing source which increases or adds any air pollutants.[107]

Additionally, the amendment increases federal authority to deal with hazardous air pollutants which are not regulated by present air quality standards and which may cause an increase in illness or mortality.[108] Cadmium and beryllium probably fall within this category. The EPA is directed to compile a list of such pollutants and to formu-

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tion without legal assistance, but also expresses skepticism concerning the effectiveness of administrative agencies. In his view a responsive judiciary offers the most promising means of accomplishing pollution control. *Id.* at 21-25. The New York case of Boomer v. Atlantic Cement Co., 26 N.Y.2d 219, 257 N.E.2d 870, 309 N.Y.S.2d 312 (1970), exemplifies, in Professor Van Doren's opinion, the reluctance of the courts to look beyond the private litigation to broad public objectives. In *Boomer*, while the court affirmed a finding of nuisance and damage to plaintiff's property from defendant's cement plant which emitted dirt, smoke, and vibrations, it denied the granting of an injunction which would have closed down the plant until the condition was abated. For an analysis of the *Boomer* decision, see Comment, *Air Pollution, Nuisance Law, and Private Litigation*, 1971 UTAH L. REV. 142. *Compare Boomer with* Renkin v. Harvey Aluminum Inc., 226 F. Supp. 169 (D. Ore. 1963) (injunction granted prohibiting defendant from emitting harmful fluorides onto plaintiff's land and trees).

101. Robert D. Reed, Vice President of John Zink Co. of Tulsa, Oklahoma, in an address before the Natural Gas Processors Assn. on air pollution. Platt's Oilgram News Service, March 17, 1971, at 4.

102. *Id.*

103. 42 U.S.C.A. § 1857c-6 (Supp. 1972).

104. *Id.*

105. *Id.* § 1857c-6(a)(1).

106. *Id.* § 1857c-6(a)(2).

107. *Id.* § 1857c-6(a)(4).

108. *Id.* § 1857c-7.

late federal emission limitations for each.[109]

The furor over lead in gasoline resulted in authorization to the EPA, under both the earlier law and the 1970 amendments, to require registration of any fuel or fuel additive designated by it.[110] To register such a fuel the refiner must submit its commercial name, the name of the manufacturer of any additive, and the additive's range of concentration and purpose.[111]

Under the earlier law, registration was automatic upon compliance with these requirements.[112] Under the 1970 amendments, however, the EPA may also require the refiner to conduct tests to determine public health effects and to submit such other information as EPA may deem reasonable and necessary to identify the emissions resulting from the use of the fuel or additive and the effect thereof on vehicular emission control equipment and on public health or welfare.[113] The agency may control or prohibit the use of any fuel or additive if its emission will endanger health or welfare or will interfere with the performance of emission control devices.[114] After the EPA has taken any action controlling or prohibiting the use of any fuel or additive, the states are precluded from similarly regulating fuel composition unless their regulations are identical with those of the federal government or unless their regulations are approved by the EPA as necessary to achieve national air quality standards.[115] As in the case of motor vehicle emissions, California was given a similar exemption which permits it to impose stricter standards with respect to fuel composition.[116]

III. Noise Pollution

Whether noise[117] is, strictly speaking, an emission or a pollutant, there is no doubt that its contribution to our environment is a major one. In addition to being held responsible for loss of hearing, increased mental stress and heart attacks, noise also may have permanently damaging effects on unborn babies.[118]

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109. *Id.*
110. *Id.* § 1857f-6c.
111. *Id.* § 1857f-6c(b).
112. *Id.*
113. *Id.*
114. *Id.* § 1857f-6c(c).
115. *Id.*
116. Clean Air Amendments of 1970, Pub. L. No. 91-604, § 9, 84 Stat. 1676.
117. "Noise" may be defined as sound that is not wanted by those who hear it. Handbook on Noise Control 1-11 (Harris ed. 1957).
118. N.Y. Times, Dec. 29, 1969, at 1, col. 1.

Actions for nuisance[119] have long been the common law approach to the control of land usage and emissions.[120] Nuisance actions have been allowed in situations where the plaintiff-receptors complained of loud noises,[121] unpleasant odors,[122] excessive light,[123] or high temperature emissions.[124] A plaintiff seeking relief[125] must show that the defendant-emitter is using his land unreasonably and that this activity interferes with the use and enjoyment of the plaintiff's land.[126] The issue of unreasonableness is generally a question of fact[127] which necessitates a consideration of fluctuating factors such as the locality in which the act occurred, the character of the surroundings, and the social value of the emitter's activities.[128] The application of these factors could give rise to the anomalous situation wherein the receptor suffers egregious effects from the emissions but is denied relief by the trier of fact's finding that the emitter's use is reasonable.[129] Because large

119. For a discussion of the law of nuisance see W. PROSSER, THE LAW OF TORTS 571-612 (4th ed. 1971); 1 F. HARPER & F. JAMES, THE LAW OF TORTS 64-92 (1956).

120. The action for private nuisance, as a tort, goes back at least to the thirteenth century. 1 F. HARPER & F. JAMES, THE LAW OF TORTS 64 (1956).

121. Guarina v. Bogart, 407 Pa. 307, 180 A.2d 557 (1962). *See also* Spater, *Noise and the Law*, 63 MICH. L. REV. 1373 (1965).

122. Sarraillon v. Stevenson, 153 Neb. 182, 43 N.W.2d 509 (1950); Johnson v. Drysdale, 66 S.D. 436, 285 N.W. 301 (1939).

123. Shelburne, Inc. v. Crossan Corp., 95 N.J. Eq. 188, 122 A.2d 749 (1923).

124. Grady v. Wolsner, 46 Ala. 381 (1871).

125. The traditional remedy for nuisance consisted of an award for damages as compensation for the loss or injury sustained. Equity courts required a plaintiff to establish his rights in the property in an action at law before they would consider granting an injunction to abate the nuisance. Today, however, one may seek both damages and an injunction in one action. In deciding whether to grant an injunction, the court will balance the relative hardship to the defendant against the probable benefit to the plaintiff. Oftentimes, damages will be awarded and an injunction denied. 1 F. HARPER & F. JAMES, THE LAW OF TORTS 90-91 (1956).

In Maitland v. Twin City Aviation Corp., 254 Wis. 541, 37 N.W.2d 74 (1949), the plaintiff received damages for the decrease in his property value caused by low flights from a private airport. Substantial damage awards for personal injury are not common, but the plaintiff in Dixon v. N.Y. Trap Rock Corp., 293 N.Y. 509, 58 N.E.2d 517 (1944), received a verdict of $2000 for drugs, medical bills and demonstrated general loss of health in addition to the award for property damage which resulted from continuous blasting at the defendant's quarry. Cases where injunctions were granted include: Swetland v. Curtis Airports Corp., 55 F.2d 201 (6th Cir. 1932); Anderson v. Souza, 38 Cal. 2d 825, 243 P.2d 497 (1952); Maitland v. Twin City Aviation Corp., 254 Wis. 541, 37 N.W.2d 74 (1949). *But see* McCarthy v. Bunker Hill & Sullivan Mining & Concentrating Co., 164 F. 927 (9th Cir. 1908).

126. *See, e.g.*, Louisville Refining Co. v. Mudd, 339 S.W.2d 181 (Ky. 1960).

127. *Id.*; RESTATEMENT OF TORTS §§ 826-31 (1939).

128. W. PROSSER, THE LAW OF TORTS 596-602 (4th ed. 1971).

129. "The plaintiff may be required to submit to a minor annoyance, such as . . . a

industrial emitters may be in a position to stress the ameliorative economic impact they have on the locality as a factor to be weighed in their favor,[130] they may, in effect, be able to discount the magnitude of their emissions and thus escape liability.

While nuisance actions are adequate in determining relative rights in land, as a noise abatement instrument they produce random relief since emitter use evaluations remain largely subjective. What is needed today is a tangible and convenient physical measurement of sound. This calibration would facilitate the establishment of absolute maximum emission regulation. More importantly, this measurement would minimize the need to rely upon opinion evidence in assessing whether emissions are excessive. Several measurement procedures have been developed in an effort to predict the human response to varying quantities and qualities of noise. The fundamental measurement of sound is its loudness, which is expressed in decibel units.[131] The placing of limits on decibel emission levels as a method of regulating noise is gaining legislative and administrative support.[132]

In May, 1969, the Department of Labor issued standards under the Walsh-Healy Public Contracts Act limiting noise levels on the premises of government contractors to specific decibel ratings.[133] Later in the same year the Federal Aviation Administration promulgated aircraft noise standards using the decibel scale.[134] The Occupational Safety and Health Act, enacted at the close of 1970, authorized the Department of Labor to promulgate occupational safety and health standards applicable to all employees of employers engaged in interstate or foreign commerce.[135] Noise certainly falls within the ambit of this statute and

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slight amount of noise and smoke, . . . where a greater one would be considered a nuisance." *Id.* at 597.

130. *Id.* at 597-98.

131. A decibel is equal to one tenth of a bel. As explained in Beranek, *Noise*, SCIENTIFIC AMERICAN, Dec. 1966, at 69:

> Zero on the decibel scale indicates the barely audible sound produced by a pressure of 0.0002 microbar (one microbar equals one dyne per square centimeter, or about a millionth of a standard atmosphere) alternating at the rate of 1,000 cycles per second. Sound intensity increases exponentially and a 10-decibel sound is only twice as loud as a one-decibel sound, but a 20-decibel sound is four times louder and a 100-decibel sound is 1000 times louder.

Other measurement procedures include the perceived noise level (PNdb) and the composite noise response (CNR), and are intended to reflect increased psychological responses to high frequency and long duration emissions.

132. *See generally* Greenwald, *Law of Noise Pollution*, 1 BNA ENVIRONMENTAL REP., CURRENT DEVELOPMENTS, Monograph No. 2 (1970).

133. 41 C.F.R. § 50-204.10 (1971).

134. 14 C.F.R. § 36.1 (1971).

135. Occupational Safety and Health Act of 1970, Pub. L. No. 91-596, 84 Stat. 1590.

when standards are issued they undoubtedly will encompass noise. The language of the Act indicates that, wherever practicable, tangible criteria and the performance desired should be expressed in the standard.[136]

On a broader scale, the Clean Air Amendments of 1970 established within the EPA an Office of Noise Abatement and Control which was given the directive to conduct a complete investigation of noise and its effects upon public health and welfare.[137] The emphasis of the study is on objectivity with the goal of identifying and classifying causes and sources of noise and determining their effects at various levels and on humans, wildlife and property.

This study program would be implemented by a federal standard-setting procedure under an Administration bill now pending in Congress.[138] Its immediate aim would be the development of noise criteria reflecting the scientific knowledge most useful in identifying effects on public health and welfare from noise.[139] If such criteria identify construction equipment, transportation equipment or equipment powered by internal combustion engines as major sources of noise, the EPA would be authorized to prescribe federal standards to limit their noise-generating characteristics.[140] This type of enactment would have little, if any, effect on normal refinery operations. In fact, such operations apparently cause few problems under either the common law reasonableness test or the emerging physical measurement test based on decibel levels. Exceptions may exist, however, particularly when refineries are close to residential areas. Furthermore, refiners should expect that noise standards, like so many others in the environmental field, will probably become stricter.[141]

IV. Odor Pollution

Although the Federal Clean Air Act contains no definition of air pollutants, the courts have held that the term includes offensive odors.[142] The EPA obviously shares this view as indicated by its recent announcement that it is evaluating odorous substances for possible coverage by

136. *Id.* § 6(b)(5).

137. Clean Air Amendments of 1970, Pub. L. No. 91-604, § 14, 84 Stat. 1709.

138. S. 1016, 92d Cong., 1st Sess. (1971).

139. *Id.* § 5.

140. *Id.* § 6.

141. For an interesting compilation of articles dealing with the various legal quiddities of noise pollution, see Noise Pollution and the Law (Hildebrand ed. 1970).

142. *E.g.*, United States v. Bishop Processing Co., 423 F.2d 469 (4th Cir.), *cert. denied*, 398 U.S. 904 (1970).

national standards.[143] Odors, like noise, have been held to be nuisances under both statutory and common law definitions.[144] Damages will be awarded or injunctions issued if the odors are so noxious or offensive that they render the enjoyment of life or property uncomfortable to people of ordinary sensibilities.[145] It is not necessary for such people to prove that they became physically ill or were literally driven from their homes. The question in a nuisance case, as one court framed it, is whether the odor polluted the air so that the plaintiff's property was rendered substantially unfit for comfortable enjoyment.[146]

Unlike noise, however, which can be objectively and scientifically measured on a decibel scale, no comparable method exists for measuring odors.[147] Some success has been reported with an odor unit evaluator called a scentometer but a nose is still required to evaluate the results.[148] Therefore, in litigation and in administrative proceedings involving odors, measurements of offensiveness are typically made subjectively by panels, odor evaluators, by governmental inspectors, or by citizen witnesses.[149] Attempts have been made to calibrate odors in accordance with threshold level tables which denominate the point at which a particular scent is barely perceptible. Higher concentrations are tabulated in terms of odor units, which are defined as the number of dilutions of odor-free air required to reduce a particular odorous concentration to its threshold value. From this type of measurement, experts are able to express in unitary figures the acceptable odor levels for residential areas. With all of these attempts at objectivity, however, the very subjective human nose is still needed to evaluate the dilution strength required to reduce an odor down to its threshold level. Certainly, no instrument

143. Reorganization Plan, *supra* note 22.

144. *See* note 122 and text accompanying notes 119-130.

145. *Id.*

146. Bohan v. Port Jervis Gas Light Co., 122 N.Y. 226, 25 N.E. 246 (1890).

147. *See* NATIONAL CENTER FOR AIR POLLUTION CONTROL, U.S. DEP'T OF HEALTH, EDUC. AND WELFARE, AIR POLLUTION ENGINEERING MANUAL 861 (J. Danielson ed. 1967).

148. *Id.* A scentometer is an apparatus filled with small granules of charcoal which act as a filtering media. The device is equipped with holes of decreasing areas and has a connection through which a person operating it may inhale ambient air which has passed into the holes and through the charcoal filter. The number and size of the holes which must be closed until the person operating the machine can no longer detect an odor correlates to a scale of odor intensity. While results of such tests are somewhat unreliable due to the varying degrees of sensitivity of its users, it should be remembered that particular compounds producing odor such as hydrogen sulfide and sulphur dioxide may be measured more exactly using chemical analysis. *See* Huey, Broering, Jutze & Gruber, *Objective Odor Pollution Control Investigations,* 10 J. AIR POLLUTION CONTROL ASS'N 442 (1960).

149. *Cf. id.* at 441.

is as readily available, needs so little replacement, is as portable, and is as completely tied into a computer, as the human nose.

Because the sensitivity of the nose varies from person to person, almost any industrial enterprise runs the risk of having complaints made against its operations because of alleged noxious odors. This has happened and will continue to happen to petroleum refiners although major odor problems are apparently not a serious issue in the refining industry. Odors associated with minor releases from refineries of unusual compounds sometimes prompt such complaints from nearby residents. The best protections against sensitive noses are good maintenance and operating practices designed to control odors which might be emitted from leaking equipment.

V. Flare and Glare Pollution

Flare at refinery locations can be a nighttime annoyance during starting-up operations or when process upsets occur, resulting in pronounced flame increases.[150] General refinery illumination may also be a neighborhood inconvenience after dark.[151] Neither may be serious enough to warrant successful attacks as nuisances, although in a recent 1970 case it was held that floodlights illuminating a neighborhood playground until 10 o'clock at night may be a nuisance if under the same tests applicable to noises and odors, they annoy or disturb others in the free use, possession or enjoyment of their property or render its ordinary use or occupation physically uncomfortable.[152] Therefore, shielding of nighttime illumination and locating flares on those portions of refinery premises removed from residential areas may be good insurance.

VI. Thermal Pollution

Finally, there is the growing problem of thermal pollution.[153] Although this is primarily a concern of the power-generating industry, particularly nuclear plants, other industrial operations also contribute waste heat to our waterways.[154] The disposal of refinery cooling-tower

150. The National Petroleum Council, Environmental Conservation—The Oil and Gas Industries 94-95 (1971).

151. *Id.*

152. Rogers v. City of Miami Springs, 231 So. 2d 257 (Fla. Dist. Ct. of App. 1970).

153. In New Hampshire v. Atomic Energy Comm'n, 406 F.2d 170, 171 (1st Cir.), *cert. denied*, 395 U.S. 962 (1969), the court stated that the term "'[t]hermal pollution' is used to designate the effects on a river—its water, flora and fauna—of the injection of heated water."

154. Bloom, *Heat—A Growing Water Pollution Problem*, 1 BNA Environment Rep., Current Developments, Monograph No. 4 (1970).

water may in some cases present minor problems. The recent temperature standards for the Mississippi River agreed upon by the EPA and the states bordering on the river may be of interest. They list maximum monthly temperatures for designated stretches of the river and provide that increases in water temperature from industrial discharges shall be limited to 5°F. above the usual temperature for the season of the year or to the maximum monthly standard, whichever is lower.[155] Similar regulations dealing with thermal pollution either already exist or can be anticipated in other parts of the country.[156]

VII. CITIZENS' SUITS

The vogue in environmental enforcement circles is the encouragement of private citizens to act as prosecutors in our courts against alleged polluters.[157] The State of Michigan was the pioneer in this endeavor. It enacted a law in 1970 authorizing any person to sue alleged pollution violators, including the State itself or any political subdivision, in order to enforce compliance with applicable environmental standards.[158] Under a law of this sort the plaintiff need not meet the requirement that would otherwise be imposed of proving that he suffered some personal injury or property damage. He can sue merely for the fun of it, although the fun may be somewhat mitigated by a provision in the Michigan law authorizing the court to require a bond up to $500 to protect the defendant against court costs if the plaintiff loses.

A similar type of citizen-suit authorization is contained in the federal 1970 Clean Air Amendments.[159] The federal provisions are, however, somewhat more restrictive; they require the plaintiff to give 60 days' notice of his intention to sue and forbid him from filing a separate compliance proceeding if an official one has been started and is being diligently prosecuted.[160] Even as so restricted, this federal enactment raises serious questions because under the United States Constitution a litigant has no standing to sue unless the action he challenges has caused him

155. 1 BNA ENVIRONMENT REP., CURRENT DEVELOPMENTS 1232 (1971).

156. For a comprehensive analysis of the problem of thermal pollution, see Comment, *Thermal Discharges: A Legal Problem*, 38 TENN. L. REV. 369 (1971).

157. Moorman, *Primer for the Practice of Federal Environmental Law*, 1 BNA ENVIRONMENTAL REP., CURRENT DEVELOPMENTS 892 (1971). See Comment, *Quo Warranto To Enforce a Corporate Duty Not To Pollute the Environment*, 1 CALIF. ECOLOGY L.Q. 653 (1971), for a novel application of an ancient writ.

158. Michigan Environmental Protection Act of 1970, 10 MICH. STAT. ANN. §§ 14.528 (201-07) (Supp. 1971).

159. 42 U.S.C. § 1857h-2 (1970), originally enacted as Clean Air Amendments of 1970, Pub. L. No. 91-604, § 15(a), 84 Stat. 1706.

160. 42 U.S.C. § 1857h-2(b)(1)(A) & (B) (1970).

actual injury, economic or otherwise.[161] The word "otherwise" has been liberally construed to include aesthetic, conservational and recreational values,[162] but it may still be constitutionally necessary for a private plaintiff to show that in trying to protect those values he personally comes within the zone of interests protected by them.[163] To put this issue in concrete terms, can a private plaintiff residing say in Florida sue an industrial enterprise in the State of Washington for alleged pollution of Puget Sound? Under the 1970 law he can, subject to the conditions previously discussed. However, the United States Constitution may impose the further condition that the Florida plaintiff first show how the alleged pollution in Washington personally affects him—economically or otherwise. As a practical matter, this constitutional limitation probably will be of little significance since the private citizens most likely to sue under this type of statutory authorization will be those directly affected as a result of residency in the vicinage of the questionable activity.

More fearsome from the refiner's point of view are the laws giving private informers a share of any fines or penalties assessed against convicted polluters. Looking at this development from an historical perspective, the Refuse Act becomes important once again. In proscribing any discharge of refuse into navigable waters, regardless of intent or actual harm to navigation, it authorizes the convicting court to impose a fine up to $2500, "one-half of said fine to be paid to the person or persons giving information which shall lead to conviction."[164] This

161. U.S. CONST. Art. III, § 2. *See generally* Rheingold, *A Primer on Environmental Litigation*, 38 BROOKLYN L. REV. 113, 115-19 (1971); Comment, *Standing on the Side of the Environment: A Statutory Prescription for Citizen Participation*, 1 CALIF. ECOLOGY L.Q. 561, 603-06 (1971).

162. Association of Data Processing Serv. v. Camp, 397 U.S. 150, 154 (1970), *citing* Scenic Hudson Preservation Conf. v. FPC, 354 F.2d 608, 616 (2d Cir. 1965); Office of Communication of United Church of Christ v. FCC, 359 F.2d 944, 1000-06 (D.C. Cir. 1966).

163. Alameda Conservation Ass'n v. California, 437 F.2d 1087 (9th Cir. 1971), *cert. denied*, 402 U.S. 908 (1971). *See* Sierra Club v. Morton, 40 U.S.L.W. 4397 (U.S. Apr. 19, 1972) (plaintiff organization held to lack standing to sue because of failure to assert individualized harm to itself or members); Fisherman's Protective Union v. St. Helens, 160 Ore. 654, 87 P.2d 195 (1939). Regarding standing as a problem in constitutional law, *see Lutz v. McCaffrey, Standing on the Side of the Environment: A Statutory Proscription for Citizen Participation*, 1 CALIF. ECOL. L.Q. 561 (1971); Rheingold, *A Primer on Environmental Litigation*, 38 BROOKLYN L. REV. 113, 115 (1971). *See* Comment, *Federal Pollution Control: Participation by States and Individuals Enhances the National Pollution Control Effort*, 16 VILL. L. REV. 827, 840-41 (1971), for a discussion of possible class action law suits under FED. R. CIV. P. 23.

164. 33 U.S.C. § 411 (1970).

fine-splitting provision, which is mandatory, has been interpreted by one federal judge as requiring payment of one-half of the penalty to an informer-employee who was himself involved in the activity that was penalized.[165] This type of encouragement to private citizens should, once knowledge of it is widespread, produce more litigation since dollars, and not injunctions, may be put in the bank.[166]

CONCLUSION

The drafting of legislation dealing with pollution is fraught with com-

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165. United States v. Mobil Oil Co., Crim. No. 70-58 (S.D. Me. 1970).

166. Using 33 U.S.C. § 411 (1970), ingenious plaintiffs can be expected to bring suit under the ancient common law writ of *qui tam*. A *qui tam* action is defined as:

> An action brought by an informer, under a statute which establishes a penalty for the commission or omission of a certain act, and provides that the same shall be recoverable in a civil action, part of the penalty to go to any person who will bring such action and the remainder to the state or some other institution. BLACK'S LAW DICTIONARY 1414 (4th ed. 1968).

The *qui tam* action has "been in existence for hundreds of years in England, and in this country ever since the foundation of our Government." Marvin v. Trout, 199 U.S. 212, 225 (1905) (holding, *inter alia*, that an informer has the right to recover the penalty under a state statute expressly providing that persons who lose money while gambling may recover the same within 6 months); *see* United States *ex rel.* Marcus v. Hess, 317 U.S. 537, 540-42 (1943) (upholding validity of federal statute which expressly allowed persons who instituted suit under a sister statute prohibiting fraudulent bidding to collect one-half of the criminal fine). Nevertheless, while some writers have expressed their belief that individual citizens can utilize section 41 to bring *qui tam* actions against polluters and on behalf of the government (*e.g.*, Puro, *Water Pollution Legislation and the Rivers and Harbors Act of 1899: The Environmentalists Point of View*, 16 ST. LOUIS L.J. 63 (1971)), this private right of action has been forcefully denied by the federal district courts. Gerbing v. I.T.T. Rayonier, Inc., 332 F. Supp. 309 (M.D. Fla. 1971); Bass Anglers Sportsman's Soc'y of America v. Scholze Tannery, Inc., 329 F. Supp. 339, 346 (E.D. Tenn. 1971):

> [T]he plaintiffs have no standing to maintain this action pursuant to §§ 407 and 411 nor to recover the penalty provided by § 411 short of a successful criminal prosecution. These statutes create and define crimes which may not be prosecuted by private civil action. The designation of the action as a *qui tam* action does not circumvent the conclusions reached for § 413 provides explicitly that the power to enforce the provisions of §§ 407 and 411 lies exclusively in the Department of Justice, thereby precluding any private civil action for the recovery of the informer's moiety.

Thus, since private citizens have no power or authority to institute a civil action for the enforcement of a penal statute, unless expressly so stated by the statute (*cf. Marcus* and *Marvin, supra*), no right exists to enforce the Refuse Act. *Accord*, Enquist v. Quaker Oats Co., 327 F. Supp. 347 (D.C. Neb. 1971); Bass Anglers Sportsman's Soc'y of America v. United States Plywood-Champion Papers, Inc., 324 F. Supp. 302 (S.D. Tex. 1971).

For a discussion concerning potential private actions for nuisance as a means of combating water pollution, see Davis, *Theories of Water Pollution Litigation*, 1971 WIS. L. REV. 738. In his article Professor Davis suggests that greater utilization of legal actions alleging riparian rights would be of significant assistance in dealing with water pollution.

plexities. Meaningful and lasting laws require that significant expenditures of time be devoted to the study of both legislative and technical factors.[167] Skill is required to define pollutants adequately with understandable criteria and to devise meaningful standards and methods of measuring industrial discharges.[168] These technical problems associated with pollution regulation are compounded when it is realized that no single resource such as air or water is independent from the other components of the environment. Care must be exercised so that the proscriptions of one enactment do not work a cure worse than the disease. For example, some precipitators designed to remove particulate matter from exhaust gases produce high noise levels in addition to solid waste which must be disposed of in a proper manner.[169] Another very real problem which makes legislation in the field difficult is the impact of environmental regulations on the ability of industry to supply energy. Laws which require removal of wastes far below harmful levels clearly represent a misallocation of our nation's resources.[170]

The uncertainty of environmental standards is itself delaying pollution abatement. A concomitant of the fact that much environmental legislation is yet to be passed is the marked decrease in manufacturing construction while anti-pollution laws are being made firm. In spite of a rising demand for petroleum products, the value of new construction contracts in the industry plummeted to less than $300 million in 1970,

167. *Cf.* text accompanying notes 3-16 *supra* (noting that despite recent congressional enactments over the past twenty years the Refuse Act of 1899 is still the major piece of federal legislation in the field of water pollution).

168. A bill proposed by President Nixon and recently considered by Congress illustrates the importance and interplay of these legislative and scientific factors. The proposed bill would have taxed sulfur emissions on a weight basis. Opponents of the bill argued that criteria such as stack height, gas temperature, and exit velocity (which determine ground elevation concentration levels) were not considered by the measure. Other arguments propounded were that the tax could be passed to the consumers without eliminating pollution and that a manufacturer might be required to pay the tax while meeting federal standards defining pollution in all ways except on a weight basis. 1 BNA ENVIRONMENT REP., CURRENT DEVELOPMENTS 1097 (1971).

169. A striking example of solid waste accumulation involves the lime dolomite process for removing sulfur oxides from power plant stack gases. While the process meets the letter of the law, and has in fact formed the basis for some recent regulations, it creates two pounds of solid waste for every pound of pollutant removed. Teller, *Pollution Control 1972: Soft Talk, But a Big Stick*, in CHEMICAL ENGINEERING, Jan. 24, 1972, at 54.

170. Dr. Laird, Director of the Interior's Office of Oil and Gas, in a speech on March 8, 1971, stated that one of the most important tasks of the immediate future is to educate the public about the correlation between energy and the environment. He noted that the public must understand the impact of environmental concerns on the ability to supply energy and the rising costs of supply to meet the required needs. 1 BNA ENVIRONMENT REP., CURRENT DEVELOPMENTS 1246 (1971).

compared with $360 million in 1969.[171] The petroleum industry has shown itself willing to expend vast sums of money to reduce pollution,[172] but the construction of more modern facilities which are relatively emission free is often held in abeyance pending legislative decision.[173]

A coordinate of abatement legislation is the prospective use of our courts as the vehicle to redress violation of anti-pollution laws through the award of damages or injunctions. Much time will be lost and uncertainty will result if the courts are not given clear statutory guidelines within which to operate. Moreover, although remedies for environmental abuse must be substantial enough to deter future conduct which is similar in nature, they must not render uneconomic continued operation of an industry.

The media today is developing in Americans a national consciousness of the necessity to take action to preserve our ecology. Although additional anti-pollution legislation should be expected to flow from this new awareness, the EPA already possesses the power and authority to tackle our environmental problems. Any extant federal-state conflict in laws does not permit much concern since these difficulties will ultimately be ironed out through mutual accommodation by assessing priorities in acordance with the needs of each sovereign entity. The efficient enforcement of pollution laws will remain, as it now is, a direct function of money, manpower and competing societal interests.

171. The bulk of the 1970 expenditures by the petroleum industry was for modernization of existing facilities rather than new installations, Los Angeles Times, June 13, 1971, § 1, at 1, col. 1.

172. The petroleum industry is spending more than $1.5 million per day to reduce air and water pollution, according to the American Petroleum Institute. 1 BNA ENVIRONMENT REP., CURRENT DEVELOPMENTS 1426 (1971).

173. The quandry confronting Jim Carson, Chief Environmental Engineer of Ohio Edison Company, is worthy of mention. As soon as a $2 million electrostatic precipitator was completed to remove 98% of their Newcastle, Pennsylvania plant's soot and ash in compliance with Pennsylvania Air Pollution Regulation No. 4, Regulation No. 5 was passed. It requires 99% removal of soot and ash. Mr. Carson feels he could junk the 98% precipitator and complete the 99% equipment (at a cost of $4 million) by 1973, but fears that Pennsylvania will have sulfur emission regulations by then.

Precipitators use sulfur to pick up an electric charge that attracts the soot and ash. The enactment of sulfur standards would render the 99% equipment unusable. The company would then be forced to utilize a more sophisticated system costing $8 million to $15 million, depending on the strictness of the future regulation. Ohio Edison is presently asking the state for a variance at its Newcastle plant until the sulfur and particulate matter restrictions are clarified. Wall Street Journal, Dec. 23, 1970, at 1, col. 6 (midwest ed.).