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MORE HEAT THAN LIGHT: THERMAL POLLUTION VERSUS HEAT ENERGY UTILIZATION

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MORE HEAT THAN LIGHT: THERMAL POLLUTION VERSUS HEAT ENERGY UTILIZATION*

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Electric generating plants, both fossil-fueled and nuclear, use enormous amounts of water to cool their turbines, producing both electric and heat energy in the process. Heat energy, absorbed by the cooling water, and usually discharged back into the source waters unused, has been traditionally viewed as waste. These waste heat discharges, because of their tendency to adversely affect aquatic ecology,[1] have become known as "thermal pollution."[2] To grasp the existing and potential magnitude of the waste heat problem, consider that: (1) the electric utility industry now accounts for seventy per cent of the waste heat discharged into the country's waters;[3] (2) the demand for electricity has doubled every ten years since 1945, and is expected to continue doing so every ten years through 1990;[4] (3) the use of nuclear power plants, which produce about fifty per cent more waste heat than fossil-fueled plants, is increasing;[5]

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1. For a comprehensive bibliography on the effects of temperature in the aquatic environment see *Hearings on Thermal Pollution Before the Subcomm. on Air and Water Pollution of the Senate Comm. on Public Works*, 90th Cong., 2d Sess., pt. 1, at 471-568 (1968). *See also* U.S. DEP'T OF THE INTERIOR, FEDERAL WATER QUALITY ADMINISTRATION, HEAT CAN HURT (1970); C. WIRTZ & C. RENN, WATER TEMPERATURE AND AQUATIC LIFE (1965); Brock, *Life at High Temperatures*, 158 SCIENCE 1012 (1967).

2. As of 1965 over 1200 studies of the thermal pollution problem have been made. *Hearings, supra* note 1, at 471. *See generally* Note, *Thermal Pollution: The Electric Utility Industry and Section 21(b) of the Federal Water Pollution Control Act*, 22 HASTINGS L.J. 685 (1971); Comment, *Thermal Pollution: The "Dishonorable Discharge" — New York's Criteria Governing Heated Liquids*, 34 ALBANY L. REV. 539 (1970); Comment, *Thermal Discharges: A Legal Problem*, 38 TENN. L. REV. 369 (1971).

3. U.S. DEP'T OF THE INTERIOR, *supra* note 1.

4. FEDERAL POWER COMM'N, REPORT ON PROBLEMS IN THE DISPOSAL OF WASTE HEAT FROM STEAM ELECTRIC PLANTS 7 (1969). The 1970 generating capacity of 272 million kilowatts is expected to increase to about 1100 million kilowatts by 1990. S. MATHUR, WASTE HEAT FROM STEAM — ELECTRIC GENERATING PLANTS USING FOSSIL FUELS AND ITS CONTROL (Federal Water Pollution Control Administration, 1968); F. WARREN, ELECTRIC POWER AND THERMAL OUTPUT IN THE NEXT TWO DECADES (Federal Power Comm'n, 1969).

5. Comment, *Thermal Electric Power and Water Pollution: A Siting Approach*, 46 IND. L.J. 61, 63-64 (1970).

and (4) by 1990 almost 850 billion gallons of water will be required daily for cooling purposes.[6]

This article will examine the legal framework within which the problem of balancing the benefits of power output against the damage from the resultant heat discharges must be worked out. An examination of the legal ability to combat thermal pollution will be followed by a discussion of the legal tools available for encouraging the beneficial use of thermal discharges.

Legal Tools To Control Thermal Pollution

Under the English common law "natural flow doctrine," which originally governed most fresh water discharges interfering with the use of water courses and lakes in the Eastern United States, lakes and streams were to be left substantially unchanged except for the minor effects of domestic uses.[7] Since the doctrine developed when water was used primarily for domestic purposes, there was scant litigation over water usage. Each proprietor had the privilege of using the water to satisfy his "natural" wants and of making any "artificial" uses on or in connection with his land that did not materially affect the natural quantity or quality of the water.[8] Applying the natural flow doctrine to waste heat discharge controversies, several early English cases held that returning water to a stream in a heated state was an actionable violation of the rights accorded a lower riparian owner.[9] In one instance, an injunction was granted even though the plaintiff failed to prove any damage from the temperature increase.[10]

In the early development of the Eastern United States the natural flow doctrine protected the use of streams by small mills which temporarily detained the water behind dams, ultimately passing it on to the next user unchanged in quantity and quality.[11] As American industry grew, steam replaced the streams as a power source, freeing the mills from the river banks. However, with emerging industrial demands for water, stream pollution became a problem. Since the natural flow theory was ill-suited to meet these demands, a number of Eastern states eventually adopted the "reasonable use" rule. Under this doctrine each riparian owner on a watercourse had a right to be free only from unreasonable uses interfering with his reasonable use of the water.[12] This rule, therefore, withdrew the absolute protection previously accorded lower owners and substituted a utilitarian system that promoted beneficial uses by riparians along the length of the stream. The gradual switch from the natural flow to the reasonable use doctrine thus provided for consumptive use, but weakened the legal basis for pollution control. Courts facing pollution suits began to determine the reasonableness of the discharge by balancing the relative interests of the plaintiff and defendant using the same factors considered in determining the existence of a nuisance.[13] Indeed, the considerations became so similar that the American Law Institute, in rewriting the *Restatement of Torts*,[14] has relegated interference with water quality to the field of nuisance, no longer considering it a problem of riparian rights.[15]

Applying these common law doctrines, courts have shown a growing awareness that waste heat discharges may be harmful. Initially some jurisdictions reasoned that thermal discharges did not pollute water because there was no change in chemical content.[16] However, today such discharges are universally deemed pollution.[17] As such, they may be subject to abatement as a private nuisance if they interfere unreasonably with the actual or proposed use of the water by other riparians,[18] or as a public nuisance if the interference is with the rights of the public.[19] Injunction is the preferred relief against pollution, since relief is provided before a threatened violation occurs. Additionally, against continuing violations, the injunction may be the only effective sanction, especially where the injury is small and a damage claim would serve only to prevent the defendant from acquiring a prescriptive right.[20] However, an injunction will be granted only if the traditional prerequisites to equitable relief are met.[21] Thus, the plaintiff must show not only that the defendant's use is unreasonable, but also that injunctive relief is necessary

6. S. Mathur, *supra* note 4, at 54.

7. *See generally* H. Coulson & U. Forbes, Waters and Land Drainage 191 (6th ed. 1952).

8. *Id.* at 323.

9. *E.g.*, Mason v. Hill, 110 Eng. Rep. 692 (K.B. 1833); Tipping v. Eckersley, 69 Eng. Rep. 779 (Ch. 1855).

10. Tipping v. Eckersley, 69 Eng. Rep. 779 (Ch. 1855).

11. *See, e.g.*, Mann v. Willey, 51 App. Div. 169, 64 N.Y.S. 589 (3d Dep't 1900). *See also* Note, *Statutory Treatment of Industrial Stream Pollution*, 24 Geo. Wash. L. Rev. 302, 306 (1956).

12. *E.g.*, Tampa Waterworks Co. v. Cline, 37 Fla. 586, 595, 20 So. 780, 782 (1896); Strobel v. Kerr Salt Co., 164 N.Y. 303, 320, 58 N.E. 142, 147 (1900). *See* F. Maloney, S. Plager & F. Baldwin, Water Law and Administration: The Florida Experience 322 (1968).

13. *See, e.g.*, Sandusky Portland Cement Co. v. Dixon Pure Ice Co., 221 F. 200 (7th Cir.), *cert. denied*, 238 U. S. 630 (1915).

14. Restatement (Second) of Torts, Assoc. Rep. Note §849, at 16 (Tent. Draft No. 13, 1971).

15. *Id.*, Scope Note §850A, Topic 3.

16. *See* Florida Water Resources Study Comm'n, Report to the Governor of Florida and the 1957 Legislature 66 (Dec. 1966).

17. *See* note 2 *supra*.

18. *See, e.g.*, Urie v. Franconia Paper Corp., 107 N.H. 131, 218 A.2d 360 (1966); Cook v. Town of Mebane, 191 N.C. 1, 131 S.E. 407 (1926); Rose v. Socony Vacuum Corp., 54 R.I. 411, 173 A. 627 (1934).

19. *See, e.g.*, People v. Glen-Colusa Irrigation Dist., 127 Cal. App. 30, 15 P.2d 549 (1932). *See also* Maloney, *Judicial Protection of the Environment: A New Role for Common-Law Remedies*, 25 Vand. L. Rev. 145, 146-49 (1972).

20. *See, e.g.*, Bunten v. Chicago, R.I. & Pac. Ry., 50 Mo. App. 414 (1892). Although no prescriptive right to maintain a public nuisance can be acquired, Corby v. Ramsdell, 48 F.2d 701 (2d Cir. 1931), an upper riparian owner may acquire a prescriptive easement to dump refuse in a stream even though the dumping amounts to a private nuisance. Anneberg v. Kurtz, 197 Ga. 188, 28 S.E.2d 769 (1944).

21. Bissel Chilled Plow Works v. South Bend Mfg. Co., 64 Ind. App. 1, 111 N.E. 932 (1916).

because the threatened injury is irreparable,[22] cannot be adequately compensated by damages at law,[23] or that a multiplicity of suits would result from a failure to grant the injunction.[24]

Even assuming these requisites are shown, a court may deny the injunction if the public interest in permitting the activity outweighs the harm suffered by the plaintiff.[25] This weighing of conflicting interests is sometimes referred to as the "balance of equities" or "balance of convenience" doctrine.[26] A combination of laissez-faire propensities to overprotect property rights and an inability to foresee the ecological consequences of pollution usually led earlier courts to balance the equities in favor of the accused polluter. This result was justified either by denying the existence of the nuisance[27] or weighing heavily the economic importance of the polluter's operation.[28]

Not all of the early courts treated the environment harshly. Indeed, in 1913 the New York court of appeals in *Whalen v. Union Bag & Paper Co.*[29] ordered the closing of a multi-million dollar pulp mill to prevent the destruction of a small waterway. Although *Whalen* is cited as an early attempt to protect the environment, the primary motivation may well have been the protection of the agricultural industry using the waterways.[30] In any event, *Whalen* represented a minority position, even in New York, for many years.[31]

Recently, courts have begun to reexamine the weight given to factors used in the balance of convenience doctrine. In *Renken v. Harvey Aluminum*,[32] for example, a federal court in Oregon ordered the abatement of fluorine gas emissions from a $40 million aluminum plant. The plant had a gross annual payroll of $3.5 million and was causing less than 10,000 dollars worth of damage to fruit trees. The court ordered expensive precipitators installed

22. *E.g.*, City of Lakeland v. State *ex rel.* Harris, 143 Fla. 761, 197 So. 470 (1940). At least one state holds any injury to health inherently irreparable. Hunnicutt v. Eaton, 184 Ga. 485, 191 S.E. 919 (1937).

23. Klumpp v. Rhoads, 362 Ill. 412, 200 N.E. 153 (1936).

24. Holman v. Athens Empire Laundry Co., 149 Ga. 345, 100 S.E. 207 (1919).

25. Governmental operation of sewage disposal plants was frequently protected. *See, e.g.*, Frost v. City of Los Angeles, 181 Cal. 22, 31-32, 183 P. 342, 346 (1919); City of Lakeland v. State *ex rel.* Harris, 143 Fla. 761, 197 So. 470 (1940).

26. *E.g.*, Cohen v. City of Houston, 176 S.W. 809, 814 (Ct. Civ. App. Tex. 1915). *See* Maloney, *The Balance of Convenience Doctrine in the Southeastern States, Particularly as Applied to Water*, 5 S.C.L.Q. 159 (1952).

27. *E.g.*, Waschak v. Moffat, 379 Pa. 441, 109 A.2d 310 (1954); Pennsylvania Coal Co. v. Sanderson, 113 Pa. 126, 6 A. 453 (1886).

28. *See, e.g.*, Richard's Appeal, 57 Pa. 105 (1868), which legalized the status of Pittsburgh as the "Smokey City." *Id.* at 111-12.

29. 208 N.Y. 1, 101 N.E. 805 (1913).

30. Note, *The Legal Setting of Nuclear Powerplant Siting Decisions: A New York State Controversy*, 57 CORNELL L. REV. 80, 88 (1971).

31. *See, e.g.*, Boomer v. Atlantic Cement Co., 26 N.Y.2d 219, 257 N.E.2d 870 (1970); People v. Cunard White Star Ltd., 280 N.Y. 413, 21 N.E.2d 489 (1939); People v. Savage, 1 Misc. 2d 337, 148 N.Y.S.2d 191 (Sup. Ct.), *aff'd mem.*, 309 N.Y. 941, 132 N.E.2d 313 (1955); Bove v. Donner-Hanna Coke Corp., 142 Misc. 329, 254 N.Y.S. 403 (Sup. Ct. 1931), *aff'd mem.*, 236 App. Div. 37, 258 N.Y.S. 229 (4th Dep't 1932) (pollution is indispensable to progress).

32. 226 F. Supp. 169 (D. Ore. 1963).

within one year as a condition to continued operation.[33] Similarly, in *Department of Health v. Passaic Valley Sewage Commissioners*,[34] a New Jersey court refused to balance the equities in favor of the Sewage Commission and ordered the Commission to cease polluting upper New York Bay, notwithstanding the high cost of installing the latest purifying devices.

Significantly, both *Harvey* and *Passaic* held that the existence of anti-pollution statutes did not preempt common law injunctive relief.[35] Indeed, in *Urie v. Franconia Paper Corp.*[36] the New Hampshire supreme court went so far as to hold that a statute allowing polluters ten years to meet legislative stream standards was not a license to pollute, and did not bar equitable relief on a private nuisance theory. The case seems soundly decided, since legislative stream classifications, like most legislative criteria, set only minimum standards. When more care is required to meet common law standards, the failure to do so quite properly results in common law liability.

Certainly these cases serve as a warning that common law actions, whether based on riparian or nuisance theory, continue as viable legal tools with which to combat pollution. If the power industry is to avoid injunctions against waste heat discharges, advantage must be taken of the latest technology to reduce the harm from discharges to an acceptable minimum or affirmative action taken to develop valuable uses for the waste heat to balance the potential injury from the outflow.

State Legislation

Growing concern for preservation of the environment has also prompted state constitutional and legislative action. New constitutional provisions have been adopted to echo environmental concern,[37] sometimes allowing private actions to halt violations of environmental policy provisions.[38] Some states have passed laws requiring environmental impact statements as a prerequisite to authorizing regulated projects.[39] Others have legislated to strengthen the citizen's right to challenge public or private activities that degrade or threaten the environment.[40] Some states, including Florida,[41] provide citizens direct

33. *Id.* at 175.

34. 100 N.J. Super. 540, 242 A.2d 675 (Ch.), *aff'd*, 105 N.J. Super. 565, 253 A.2d 577 (App. Div. 1968).

35. Department of Health v. Passaic Valley Sewerage Comm'n, 100 N.J. Super. 540, 547, 242 A.2d 675, 681 (Ch.), *aff'd*, 105 N.J. Super. 565, 253 A.2d 577 (App. Div. 1968); Renken v. Harvey Aluminum, Inc., 226 F. Supp. 169, 176 (D. Ore. 1963).

36. 107 N.H. 131, 218 A.2d 360 (1966).

37. *See, e.g.*, FLA. CONST. art. II, §7; PA. CONST. art. I, §27; R.I. CONST. art. I, §117.

38. *See, e.g.*, ILL. CONST. art. XI, §§1, 2; N.Y. CONST. art. XIV, §§4, 5.

39. *See, e.g.*, CAL. PUB. RES. CODE §§21,000 *et seq.* (West 1970); Del. Laws 1971, ch. 70, tit. 7; Montana Laws 1971, ch. 238; Wash. Laws 1971, ch. 109.

40. *See, e.g.*, Conn. Laws 1971 (H.R. 5037); The Florida Environmental Protection Act of 1971, FLA. STAT. §403.412 (1971); The Michigan Environmental Protection Act, MICH. STAT. ANN. §§14.528(201) *et seq.* (1970) (*discussed in* Sax, *Michigan's Environmental Protection Act of 1970: A Progress Report*, 70 U. MICH. L. REV. 1002 (1972)); Minnesota Environmental Rights Act, Minn. Laws 1971, ch. 952; TENN. CODE ANN. §70-340(a) (Supp. 1972).

41. The Florida Environmental Protection Act of 1971, FLA. STAT. §403.412 (1971).

access to the courts, bypassing the regulatory agencies,[42] while others take the preferable route of providing an administrative agency with the initial opportunity to rectify the citizen's complaint,[43] thereafter guaranteeing him his day in court.

All state regulatory statutes do not specifically include heat in the definition of pollution. However, heat is included in a substantial number of statutes,[44] since many have adopted the definition of pollution of the Suggested State Water Pollution Control Act, which includes:[45]

> [C]hange in temperature . . . as will or is likely to create a nuisance or render such waters harmful, detrimental or injurious to public health, safety or welfare, or to domestic, commercial, industrial, agricultural, recreational, or other legitimate beneficial uses, or to livestock, wild animals, birds, fish, or other aquatic life.

State regulations promulgated on the basis of such definitions may be quite restrictive. For example, Pennsylvania's Sanitary Water Board thermal discharge regulations limit heat content of discharges to an amount that would not raise the temperature of the stream at the point of discharge 5° F. above ambient temperatures, or to a maximum of 87° F., whichever is less. For a stream capable of supporting a cold water fishery the maximum allowable temperature is 58° F.[46]

The Federal Water Pollution Control Act (FWPCA) amendments of 1972 will force the remaining states to establish thermal pollution standards.[47] The

42. The Michigan Environmental Protection Act, MICH. STAT. ANN. §§14.528(201) *et seq.* (1970).

43. The Tennessee Water Quality Control Act, for example, authorizes any person to file a complaint with the Commissioner of the Department of Public Health alleging a violation of the Act's provisions. Appeals to the Tennessee Water Quality Board are guaranteed to either the complainant or the violator if the Commissioner takes action that is considered inappropriate by them. TENN. CODE ANN. §70-341 (Supp. 1971). *See* Maloney, *The Tennessee Water Quality Control Act of 1971*, 25 VAND. L. REV. 331 (1972).

44. *E.g.*, TENN. CODE ANN. §70-326(9) (Supp. 1972); VT. STAT. ANN. tit. 10, §901(6) (Supp. 1972).

45. Suggested State Water Pollution Control Act, §2(a) (rev. 1965) as published in May 1965 by the Division of Water Supply and Pollution Control, Public Health Service, U.S. Dep't of Health, Education and Welfare, and *reprinted in* 1966 by the Federal Water Pollution Control Administration, U.S. Dep't of the Interior. The original version of the suggested act was developed in 1950 and the laws of approximately three-fourths of the states include all or part of its provisions. *See* 3 B. GINDLER, WATERS AND WATER RIGHTS §233.1 (1967).

46. R. BOARDMAN, ELECTRIC POWER AND THERMAL DISCHARGES: THERMAL CONSIDERATIONS IN THE PRODUCTION OF ELECTRIC POWER 213-27 (1917). However, a recent survey indicates that as of 1970 approximately half of the states had not set temperature standards for their streams, even though required to do so by the Water Quality Act of 1965. Comment, *supra* note 5, at 85 n.59.

47. Act of Oct. 18, 1972, Pub. L. No. 92-500, 70 Stat. 498, 84 Stat. 91, *amending* 33 U.S.C. §§1151-75 (1970) [hereinafter cited as FWPCA].

Act expressly incorporates thermal standards within the term "water quality standards,"[48] and requires the states to establish such standards for intrastate waters[49] in addition to the thermal standards already required for interstate waters.[50] Moreover, each state must identify waters within its boundaries for which federal effluent limitations[51] are not stringent enough to implement state water quality standards,[52] or will not sufficiently assure protection and propagation of a balanced fish and wildlife population due to inadequate federal control over the thermal discharge component.[53] The state must then estimate the total maximum daily thermal load required to assure the required protection, submitting the estimate to the Administrator of the Environmental Protection Agency (EPA).[54]

Although the Administrator of the EPA is given primary responsibility for establishing effluent limitations, the states are to be consulted prior to their adoption or revision[55] and are not precluded from instituting more stringent limitations.[56] In either event the limitations must identify the degree of effluent reduction attainable through the application of the best practicable control technology available, taking into account the costs, processes, and non-water quality environmental impact (including energy requirements).[57]

To underscore the FWPCA's intent to place responsibility for water pollution control on the states, any applicant for a federal license or permit to conduct an activity that may result in a discharge into navigable waters is required to provide a certificate from the state that the discharge will not violate applicable water quality or effluent standards.[58] No license or permit will be granted if the certification is denied by the state.[59] Moreover, prior to the initial operation of any federally licensed facility or activity which has received the needed state certification, if the facility or activity is not subject to a federal operating license or permit, the certifying state is to be provided

48. *Id.* §303(h).

49. *Id.* §303(a)(2), (3)(A). States that have not already adopted intrastate water quality standards must adopt such standards within 180 days of the enactment of the amendments and submit them to the Administrator of the Environmental Protection Agency. *Id.* §303(a)(3)(A). If the standards submitted are not acceptable, the Administrator must notify the state, specifying the needed changes, within ninety days. If the changes are not adopted within ninety days after notification, the Administrator will promulgate standards applicable to that state. *Id.* §303(a)(3)(C). The states must hold public hearings at least once every three years to review their standards. *Id.* §303(c)(1).

50. *Id.* §303(a)(1).

51. The Act defines "effluent limitation" as any restriction "on quantities, rates, and concentrations of chemical, physical, biological, and other constituents which are discharged from point sources . . . ." *Id.* §502(11).

52. *Id.* §303(d)(1)(A).

53. *Id.* §303(d)(1)(B).

54. *Id.* §303(d)(1)(D), (d)(3).

55. *Id.* §304(b).

56. *Id.* §303(d)(1)(A), (d)(1)(B).

57. *Id.* §304(b). *See also* §301(b).

58. *Id.* §401(a)(1).

59. *Id.*

an opportunity to review the manner in which the facility or activity will be conducted.[60] This state review assures that applicable water quality, effluent, or other limitations will be taken into account. If the state determines that limitations or standards will be violated, the original license or permit may be suspended.[61]

Federal Legislation

The oldest federal prohibitions against water pollution are contained in the Refuse Act of 1899, an early amendment of the Rivers and Harbors Act.[62] The Refuse Act prohibits the discharge or deposit of "refuse matter . . . other than that flowing from streets and sewers . . . in a liquid state" into, or on the bank of, any navigable waters of the United States.[63] Until recently, however, the term "refuse" was construed so restrictively by the courts that the Act was rarely used in pollution litigation.[64] Not until 1966 in *United States v. Standard Oil Co.*,[65] involving a spill of aviation gasoline into the St. Johns River near Jacksonville, Florida, were teeth supplied for the Act. The Supreme Court in *Standard Oil* redefined "refuse" to include "anything which has become waste, however useful it may earlier have been."[66] Although aviation gasoline and heated water are quite dissimilar, at least one federal court has interpreted the Refuse Act to encompass thermal discharges as well. In *United States v. Florida Power & Light Co.*[67] the district court applied the Act to the plant's hot water outflow into Biscayne Bay. Further discharges were not enjoined, however, because the Government had not established that the plant's operation was causing irreparable harm to the Bay's ecology. The opinion weighed heavily the defendant's plan to reduce what the court found to be minimal thermal pollution to a benign level by 1971.[68] Thus, although Florida Power & Light escaped injunction, the precedent of classifying thermal discharges as "refuse" under the Act was established. The Corps of Engineers subsequently adopted this interpretation by regulation.[69]

Since the Refuse Act permits payment of one-half of the fine to a citizen

60. *Id.* §401(a)(4).
61. *Id.*
62. 33 U.S.C. §§401-13 (1970).
63. *Id.* §407.
64. *E.g.*, United States v. The Delvalle, 45 F. Supp. 746 (E.D. La. 1942). The court stated that the term "refuse" is used in the statute in its adjective sense. Thus, the accidental discharge of "valuable fuel oil" did not constitute a discharge of "refuse."
65. 384 U.S. 224 (1966).
66. *Id.* at 229.
67. 311 F. Supp. 1391 (S.D. Fla. 1970).
68. *Id.* at 1392. The author understands that following the decision a consent decree was entered into under which the Florida Power & Light Company agreed to greatly extend its cooling canal system, and no further appeal was taken.
69. 33 C.F.R. §209.131(d)(1) (1972) (discharges or deposits of water at a temperature different from that of the navigable waterway or tributary into which the same will flow are considered to be discharges or deposits to which the Refuse Act is applicable).

informer,[70] there has been speculation that standing for citizen *qui tam* actions[71] is thereby implied.[72] Several recent federal decisions, however, have held otherwise, primarily because another section of the Act states that litigation will be brought by the Department of Justice.[73] Although there has been no confirmation of this view by the Supreme Court, it appears that *qui tam* actions will not be allowed under the Refuse Act.

Although the prohibitions contained in the Refuse Act remain in effect, discharge of pollutants into navigable waters is now regulated pursuant to the newly amended Federal Water Pollution Control Act.[74] Formerly the Corps of Engineers had authority to issue permits for such discharges. Today, however, such permission must be obtained from the Administrator of the EPA or from a state agency that has established a permit program acceptable to the Administrator.[75]

Certainly the FWPCA is the most comprehensive piece of federal legislation yet enacted to regulate discharges of waste heat. Designed to place the major burden of pollution control on the states,[76] the Act deals expressly with thermal pollution in many provisions.[77] The Act prohibits any discharge of a "pollutant," defined to include heat,[78] that does not comply with effluent limitations, water quality standards, standards of performance, or applicable permit conditions.[79]

70. 33 U.S.C. §411 (1970).
71. *Qui tam pro domingo rege quam pro de ipso sequitus* — "Who brings the action as well for the king as for himself." United States *ex rel.* Mattson v. Northwest Paper Co., 327 F. Supp. 87, 88 n.1 (D. Minn. 1971). *See* Comment, *Qui Tam Actions Against Polluters of Navigable Waters: An Attempted Augmentation of Refuse Act Enforcement*, 3 ST. MARY'S L.J. 278 (1971).
72. Bregman, *Thermal Pollution Control — Need for Action* (Thermal Pollution Symposium of the Cooling Tower Institute Meeting, New Orleans, La., Jan. 30, 1968).
73. *E.g.*, Connecticut Action Now, Inc. v. Roberts Plating Co., 457 F.2d 81 (2d Cir. 1972), *aff'g* 330 F. Supp. 695 (D. Conn. 1971); Gerbing v. I.T.T. Rayonier, Inc., 332 F. Supp. 309 (M.D. Fla. 1971); United States v. Florida-Vanderbilt Dev. Corp., 326 F. Supp. 289 (S.D. Fla. 1971); Bass Anglers Sportsman's Soc'y v. United States Plywood-Champion Papers, Inc., 324 F. Supp. 302 (S.D. Tex. 1971). *See also* United States v. St. Regis Paper Co., 328 F. Supp. 660 (W.D. Wis. 1971).
74. Act of Oct. 18, 1972, Pub. L. No. 92-500, 70 Stat. 498, 84 Stat. 91, *amending* 33 U.S.C. §§1151-75 (1970).
75. *Id.* §402(a)(4), (5). *See id.* §511(b). Even after a state receives approval to administer its own permit program, the Administrator of the EPA can require the state to transmit to him a copy of every permit application and notice of every action taken on the application. *Id.* §402(d)(1). The Act also gives the Administrator the power to authorize a permit program in any state while retaining an ultimate veto power. *Id.* §402(d)(2). Permits for discharges into the territorial seas, the waters of the contiguous zone, or the oceans must be issued in compliance with guidelines established by the Administrator, *id.* §403(a), and copies of all permit applications and all actions taken must be sent to the Administrator. *Id.* §403(b).
76. *Id.* §101(b).
77. *See, e.g., id.* §104(t), which authorizes up to $10 million per fiscal year to conduct studies of the effects and methods of control of thermal discharges. *See also id.* §§316, 303(d), (g), (h).
78. *Id.* §502(6).
79. *Id.* §301(a).

Federal effluent limitations are to be established, and reviewed every five years to require the application of the best practicable control technology.[80] Once established, these limitations will be applied to all "point sources" of pollutant discharges.[81]

Water quality standards must also be established.[82] The Administrator of the EPA will promulgate heat standards to be applied to the states unless the states establish acceptable standards.[83]

The Administrator of the EPA is also required to establish "standards of performance" for categories of buildings, structures, facilities, or installations from which there are or may be pollutant discharges.[84] Although the Administrator may include any category he deems necessary, Congress has mandated that steam electric power plants be included.[85] No later than one year after a category is listed the Administrator must publish regulations establishing standards of performance for *new* sources within the category.[86] After this promulgation it will be unlawful for any owner or operator of any new source to operate in violation of the standards of performance.[87]

The Act offers a degree of security to power plant owners and operators subject to these standards of performance. Although the standards can be made more stringent as technology and alternatives change,[88] if construction of the facility was designed to meet all applicable standards, it will not be subject to a more stringent standard for ten years after completion.[89]

Thermal dischargers are also afforded a degree of security by a special "thermal discharges" section of the FWPCA.[90] Although that section requires effluent standards and standards of performance to reflect the best extant technology for the location, design, construction, and capacity of cooling water intake structures to minimize adverse environmental impact,[91] the owner or operator may be permitted to discharge additional heat under some circumstances. Whenever the thermal discharger can demonstrate that any effluent limitation proposed for control of the thermal component will require more stringent limitations than necessary to protect fish and wildlife, a more appropriate limitation with respect to the thermal component may be imposed.[92] Moreover, once a modification of a thermal discharge source is promulgated, it will not be supplanted by a more stringent effluent limitation on the thermal component for ten years after completion of the modification.[93]

The new amendments provide much more effective enforcement tools than did the procedures authorized under the old FWPCA.[94] Significantly, the Act now allows the Administrator of the EPA to require the owner or operator of a power plant, or any other point source of thermal discharge, to maintain records, make reports, install and use monitoring equipment, sample effluents, and provide such information as the Administrator shall desire.[95] Additionally, the Administrator or his representative has a right of entry upon or through the premises and may at reasonable times copy any records, inspect any monitoring equipment, and sample any effluents for purposes of developing standards, detecting violations, or carrying out any objectives of the Act.[96] If the Administrator deems the procedures and laws of any state relating to inspection, monitoring, and entry applicable to at least the same extent as those established for the Administrator by the Act, such state will be authorized to apply and enforce its own procedures.[97]

Whenever, on the basis of information available to him, the Administrator finds a person in volation of any standard, limitation, standard of performance, or responsibility imposed by the FWPCA, or in violation of any permit condition implementing the provisions of the Act, he can either issue an order for compliance or bring a civil action.[98] An order for compliance must state the nature of the violation and specify a time for compliance, not to exceed thirty days.[99] The Administrator, in the alternative, may commence a civil action in the United States district court wherein the defendant is located, resides, or is doing business, to seek "appropriate relief" including a temporary or permanent injunction.[100]

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80. *Id.* §301.

81. *Id.* §301(e). "[T]he term, point source, means any discernible, confined and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, or vessel or other floating craft, from which pollutants are or may be discharged." *Id.* §502(14).

82. *Id.* §303.

83. *Id. See also* §302(a), (b).

84. "[T]he term, standard of performance, means a standard for the control of the discharge of pollutants which reflects the greatest degree of effluent reduction which the administrator determines to be achievable through application of the best available demonstrated control technology, processes, operating methods, or other alternatives, including, where practicable, a standard permitting no discharge of pollutants." *Id.* §306(1).

85. *Id.* §306(b)(1)(A).

86. *Id.* §306(b)(1)(B).

87. *Id.* §306(e). If the procedure and the law of any state require the application and enforcement of standards of performance to at least the extent required by the FWPCA, such state will be authorized to apply and enforce such standards upon submission of plans to, and approval of, the Administrator of the EPA. *Id.* §306(c).

88. *Id.* §306(b)(1)(B).

89. *Id.* §306(d).

90. *Id.* §316.

91. *Id.* §316(b).

92. *Id.* §316(a).

93. *Id.* §316(c).

94. *See* note 107 *infra.*

95. Section 308(a) of the Act of Oct. 18, 1972, Pub. L. No. 92-500, 70 Stat. 498, 84 Stat. 91, *amending* 33 U.S.C. §§1151-75 (1970).

96. *Id.*

97. *Id.* §308(c). Anyone who knowingly makes a false statement or report, or who tampers with any monitoring device required to be maintained may be fined up to $10,000 and imprisoned for up to six months. *Id.* §309(c)(2).

98. *Id.* §309(a)(3).

99. *Id.* §309(a)(4). A copy of any order must also be sent to the state in which the violation occurs. *Id.*

100. *Id.* §309(b). Notice of the commencement of the civil action must be sent to the appropriate state. *Id.* For the purpose of the enforcement section the term "person" means any individual, corporation, responsible corporate officer, partnership, association, state, municipality, commission, political subdivision of a state, or interstate body. *Id.* §§309(c)(3), 502(5).

If the Administrator finds a person in violation of any condition or limitation that implements the Act's standards, limitations, or requirements in a permit issued by a state under an approved permit program, he can proceed by compliance order or civil action, or he can notify the violator and the state of his finding.[101] If the state does not commence appropriate enforcement action within thirty days after such notification, the Administrator must issue a compliance order to the violator or commence a civil action.[102]

Stern penalties are provided for violators. Violation of the Act's standards, limitations, or permit conditions can bring a civil penalty of up to 10,000 dollars per day of violation.[103] If the violation is willful or negligent, a criminal fine of 2,500 dollars to 25,000 dollars per day of violation can be imposed with possible imprisonment of up to one year.[104] A second conviction for a willful or negligent violation brings up to 50,000 dollars per day and up to two years in prison.[105]

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101. *Id.* §309(a)(1). The Administrator can bypass most statutory enforcement procedures in an emergency. Section 504 provides: "Notwithstanding any other provision of this Act, the Administrator upon receipt of evidence that a pollution source or combination of sources is presenting an imminent and substantial endangerment to the health of persons or to the welfare of persons where such endangerment is to the livelihood of such persons, such as inability to market shellfish, may bring suit on behalf of the United States in the appropriate district court to immediately restrain any person causing or contributing to the alleged pollution to stop the discharge of pollutants causing or contributing to such pollution or to take such other action as may be necessary."

102. *Id.* If the Administrator finds that permit violations are so widespread that they appear to result from a state's failure to enforce effectively, he must notify the state. If the failure to enforce continues beyond thirty days after such notice, the Administrator will give public notice of the finding and take over enforcement of permit conditions, using compliance orders and civil actions, until the state convinces him that the program will be properly enforced. *Id.* §309(a)(2).

The FWPCA also provides for citizen suits. Any person having an interest that is or may be adversely affected may bring suit in a United States district court against any person or governmental agency that allegedly is in violation of any standard or limitation of the Act or any order issued by the Administrator of the EPA or a state. *Id.* §§505(a), (f), (g). Suit may also be brought against the Administrator for failure to perform any non-discretionary act or duty. *Id.* §505(a)(2). The district courts have jurisdiction, without regard to the amount in controversy or the citizenship of the parties, to enforce the standards, limitations and orders, and to apply appropriate civil penalties. *Id.* If the citizen alleges violation of a standard of performance, suit may be brought immediately after notifying the Administrator, the appropriate state, and the violator. In all other cases the citizen must wait sixty days after notification to bring suit. *Id.* §505(b). The court is authorized to award costs of litigation, including attorney and expert witness fees, to any party. *Id.* §505(d). This section does not, however, restrict any statutory or common law right the citizen has to seek enforcement. *Id.* §505(e).

103. *Id.* §309(d).

104. *Id.* §309(c)(1).

105. *Id.* To augment the deterrent effect of these penalty provisions the FWPCA prohibits any federal agency from entering into any contract for goods, materials, and services with anyone convicted of an offense under §309 if the contract is to be performed at a facility at which the violation that gave rise to the conviction occurred (if such facility is owned, leased, or supervised by the person convicted). *Id.* §508(a). The President, however, may exempt any contract, loan, or grant from all or part of this "withholding" provision if

The FWPCA thus emerges as a far-reaching legislative scheme to cope with the problem of thermal pollution.[106] The Act significantly streamlines enforcement procedures,[107] consolidates certification requirements, and attempts

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he determines, and notifies the Congress, that the exemption is "in the paramount interest of the United States." *Id.* §508(d).

106. Fuente de Reynosa, S.A. v. City of McAllen, 357 F.2d 43 (5th Cir. 1966); Rochester Gas & Elec. Corp. v. F.P.C., 344 F.2d 594 (2d Cir. 1965); Wisconsin v. F.P.C., 214 F.2d 334 (7th Cir. 1954), *cert. denied*, 348 U. S. 883 (1955).

Section 505(g), granting the right to bring citizen suits to persons who have an interest that is or may be adversely affected, will apparently still have to square with the "injury in fact" test of standing as announced in Association of Data Processing Serv. Organizations v. Camp, 397 U.S. 150 (1970), as applied to environmental suits in Sierra Club v. Morton, 405 U.S. 727 (1972). *See* Comment, *Administrative Law: Standing To Represent the Public Interest — The Password Is Injury*, 25 U. FLA. L. REV. 233 (1972).

107. The two types of enforcement procedures under the old FWPCA, 33 U.S.C. §§1151-75 (1970), were extremely cumbersome. If a polluting discharge into interstate waters violated either state or federal water quality standards, the Administrator of the EPA could give the violator 180 days notice that action would be taken. *Id.* §§1160(c)(5), (g)(1). If the interstate pollution was not abated within that period, the Administrator could request the Attorney General to bring an abatement action. *Id.* If the pollution was intrastate, consent of the state's governor was required. *Id.* §§1160(c)(5), (g)(2). This was the "streamlined procedure" finally provided for by the 1970 amendments to the Act. The older enforcement procedure, used in the event that the pollution endangered public health or welfare, was even more cumbersome. After at least three weeks notice to local agencies, an enforcement conference was convened by the EPA. Then at least six months were given to implement the conference recommendations. If satisfactory action had not been taken during the six-month period, a hearing board was empanelled to make further recommendations. Again, six months were allotted for compliance; only thereafter could the Administrator request the Attorney General to bring an abatement action, with the governor's consent required for intrastate pollution. *Id.* §§1160(c), (f), (g). Under a parallel air pollution abatement procedure the single case to reach the judicial enforcement stage required eleven years to reach a conclusion. 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). The air pollution abatement procedure was later streamlined by the Clean Air Amendments of 1970, Clean Air Act, 42 U.S.C. §§1857 *et seq.* (1970), which in turn became the model for the Water Pollution Amendments contained in the Water Quality Improvement Act of 1970, 33 U.S.C. §1171 (1970).

The weakness of pre-1972 enforcement procedures was dramatically illustrated in United States v. Florida Power & Light Co., 311 F. Supp. 1391 (S.D. Fla. 1970). Proceedings were initiated by a request from Governor Kirk to the Secretary of the Interior, who then had authority to convene an enforcement conference. The Governor was forced to request the conference rather than to use the streamlined procedure because Florida had not yet established temperature criteria for Biscayne Bay. Temperature standards were adopted at the enforcement conference. Meanwhile the company had begun constructing a six mile diversion canal to reduce waste heat. When Secretary Hickel's request to halt construction was refused by the company, he requested the Department of Justice to bring suit. Time delays built into the FWPCA rendered initiation of an action under that Act impractical. Suit under the general enforcement procedure would have been premature because the six month delay before instituting board hearings had not passed. Bringing suit under the streamlined procedures was not feasible, since a 180-day delay for compliance would have been required, although it was clear the company did not intend to comply. These problems made any attempt at enforcement under the old FWPCA ineffective and led to the choice to sue under the Refuse Act with the results previously described. *See* text accompanying notes 67-69 *supra*.

to forestall pollution problems through a requirement of pre-construction certification.[108] The Act is not, however, without weaknesses. Not only does it fail to provide for mandatory pre-certification hearings, but also if the state should choose not to examine the permit applicant properly by pre-operational review, the federal agency has no further duty to withhold a license. State regulatory programs are presently ill-equipped to shoulder the large initiative given them under the Act.[109] In addition, the funding authorized seems insufficient to guarantee the intended efficiency, and serious doubt remains as to how much of the authorized funds will eventually be appropriated or released by the Office of Management and Budget if provided by Congress.[110] If the states, which may also lack enforcement money, fail to comply with the Act's directives, lack of money for federal enforcement could result in little or no real enforcement effort at any level.

POWERPLANT CERTIFICATION

Licensing Problems in General

Where does all this leave a power company desiring to construct an electric generating plant? To begin with, it will be required to secure certification from the appropriate state agency assuring that plant construction will comply with existing applicable effluent limitations, water quality standards, and standards of performance.[111] Public notice will be given announcing the application for certification and, if deemed appropriate, a hearing will be held.[112] If the state refuses to act on the request for certification within a reasonable time, not to

108. Pre-construction certification proceedings, if conducted diligently, are significant ecological tools. Certainly before construction the environmental agency has much more leverage to insure compliance. Once a multi-million dollar facility is standing, the clear tendency, when injunctive relief is sought against its operation, is to balance the equities in favor of permitting operation despite adverse ecological effects. Maloney, *Judicial Protection of the Environment: A New Role for Common-Law Remedies*, 25 VAND. L. REV. 145, 148, 159 (1972). *See, e.g.*, Boomer v. Atlantic Cement Co., 26 N.Y.2d 219, 257 N.E.2d 870, 309 N.Y.S.2d 312 (1970). *But see* Note, *The Role of the Courts in Technology Assessment*, 55 CORNELL L. REV. 861, 873-75 (1970); Note, *Torts-Nuisance-Air Pollution — Permanent Damages Awarded in Lieu of Injunction*, 39 FORDHAM L. REV. 338 (1970); Note, *Torts — Comparative Injury Doctrine of Nuisance*, 49 N.C.L. REV. 402 (1971).

109. Tarlock, Tippy & Francis, *Environmental Regulation of Power Plant Siting: Existing and Proposed Institutions*, 45 U. So. CAL. L. REV. 502, 529-30 (1972). *See also* Note, *Water Quality Standards in Private Nuisance Actions*, 79 YALE L.J. 102, 107-09 (1970); Comment, *Thermal Electric Power and Water Pollution: A Siting Approach*, 46 IND. L.J. 61, 84-90 (1970).

110. *See* 119 CONG. REC. S2014 (daily ed. Feb. 5, 1973) (report of Roy Ash, Director of the Office of Management and Budget). *See also* Gainesville (Fla.) Sun, Dec. 4, 1972, §B at 1; N.Y. Times, Nov. 28, 1972, at 73, col. 2.

111. Section 401 of the Federal Water Pollution Control Act Amendments of 1972, Act of Oct. 18, 1972, Pub. L. No. 92-500, 70 Stat. 498, 84 Stat. 91, *amending* 33 U.S.C. §§1151-75 (1970).

112. *Id.* §401(a)(1).

exceed one year, the certification requirements will be waived.[113] Absent such waiver, the State certification must accompany an application for any federal permit.[114]

A discharge permit will be required from the EPA unless the discharge-permit program has been relegated to the state.[115] In the latter case the prior state certification[116] would appear unnecessary. Any construction or dredging and filling affecting navigable waters will necessitate a permit from the Corps of Engineers.[117]

In addition, nuclear plants will require a license from the Atomic Energy Commission (AEC).[118] Although the AEC is charged with the duty of licensing nuclear power plants and, in connection therewith, of ascertaining that the public health and safety are adequately protected,[119] the scope of AEC power to review a state certified application may be somewhat limited. In the past the AEC interpreted its duty as limited to radiological health and safety, not including non-radiological pollution. This interpretation was upheld in *New Hampshire v. AEC*.[120] Subsequently, Congress passed the National Environmental Policy Act (NEPA)[121] and the Water Quality Improvement Act (WQIA).[122] In *Calvert Cliffs Coordinating Committee, Inc. v. AEC* the Circuit Court of Appeals for the District of Columbia held that the NEPA established environmental protection as part of the AEC's basic mandate and that the WQIA, although making AEC license approval contingent upon a water quality certification, did not preclude the AEC from demanding stricter controls than those required by the certifying agency.[123] The new FWPCA,

113. *Id.*

114. *Id.* The certification must set forth any limitations and monitoring requirements necessary to assure compliance with the FWPCA. These limitations and requirements will then become conditions attached to the federal license or permit. *Id.* §401(d).

115. *Id.* §402.

116. *See* text accompanying note 111 *supra*.

117. 33 U.S.C. §403 (1970). Since the Corps has been charged with the responsibility of evaluating the environmental impact of a proposed dredge and fill project, in addition to its evaluation of the effect on navigation, Zabel v. Tabb, 430 F.2d 199 (5th Cir. 1970), *cert. denied*, 401 U.S. 910 (1971), applicants for a Corps' permit presumedly will undergo another environmental evaluation.

118. 42 U.S.C. §2134(b) (1970).

119. *Id.*

120. 406 F.2d 170 (1st Cir.), *cert. denied*, 395 U.S. 962 (1969).

121. 42 U.S.C. §§4321-47 (1970).

122. 33 U.S.C. §1171 (1970).

123. 449 F.2d 1109 (D.C. Cir. 1971). *Compare* 10 C.F.R. §50, app. D 246 (1971) (old AEC rules), *with* 10 C.F.R. §50, app. D 259 (1972) (AEC rules issued to comply with *Calvert Cliffs*). For reactions to the prospective impact of *Calvert Cliffs* on future licensing procedures, see Murphy, *The National Environmental Policy Act and the Licensing Process: Environmentalist Magna Carta or Agency* Coup De Grace?, 72 COLUM. L. REV. 963 (1972); Reis, *Environmental Activism: Thermal Pollution — AEC and State Jurisdictional Considerations*, 13 B.C. IND. & COM. L. REV. 633 (1972); Tarlock, *Balancing Environmental Considerations and Energy Demands: A Comment on* Calvert Cliffs' Coordinating Comm., Inc. v. AEC, 47 IND. L.J. 645 (1972). *See* Comment, *Environmental Law: Strict Compliance with Procedural Requirements of NEPA — The Agencies Must Play by the Rules*, 24 U. FLA. L. REV. 814 (1972).

however, expressly states that nothing in the NEPA shall allow any federal agency authorized to license an activity that may result in a discharge of a pollutant to review any effluent limitation or other requirements established pursuant to the FWPCA, or to review the adequacy of any certification, or to impose as a condition precedent to the issuance of a license any different effluent limitation.[124] The FWPCA amendments thus appear to sap much of the vitality of the *Calvert Cliffs* independent review mandate. The EPA and the AEC have, however, entered into a joint agreement that attempts to preserve the AEC's broad environmental review powers under *Calvert Cliffs* except where there is a conflict with implementing actions taken under the FWPCA.[125] The AEC Interim Policy Statement on Implementation of the 1972 FWPCA, which both parties adopt in the joint agreement referred to above, specifically states that limitations set forth in state certifications "shall be regarded as only minimum limitations or requirements and the Commission shall retain any authority under NEPA to impose more stringent limitations or requirements."[126] Whether the federal agencies can thus shore up section 511(c) of the FWPCA and reinstate the *Calvert Cliffs* mandate remains to be seen, but it is to their credit that they are trying to avoid what appears to have been a step backward by the Congress in this area of environmental protection.

The same proscription against tampering with state certified standards would of course apply to any federal agency charged with regulatory power over water-related activities. The Federal Power Commission, which licenses

124. Section 511(c)(2) of the Federal Water Pollution Control Act Amendments of 1973, Act of Oct. 18, 1972, Pub. L. No. 92-500, 70 Stat. 498, 84 Stat. 91, *amending* 33 U.S.C. §§1151-75 (1970).

125. *Memorandum of Understanding Between the Environmental Protection Agency and the Atomic Energy Commission on Carrying Out Responsibilities Under the Federal Water Pollution Control Act,* 38 Fed. Reg. 2713 (1973). The AEC has agreed that it will accept decisions under specified sections of the FWPCA with respect to compliance with limitations or other requirements promulgated or imposed pursuant to the FWPCA. But until decisions under these sections have been made, the AEC will continue to base its permitting action with respect to such factors as thermal pollution on the environmental considerations called for by the NEPA as construed in *Calvert Cliffs*. In so doing, the agreement calls for the AEC to give due regard to EPA's views as expressed in comments on AEC draft environmental statements. This part of the agreement will be found in *Atomic Energy Commission Interim Policy Statement on Implementation of the 1972 Federal Water Pollution Control Act,* 38 Fed. Reg. 2679 (1973). This Interim Policy Statement, promulgated simultaneously with the Memorandum of Understanding referred to above, is specifically adopted by both the EPA and the AEC in the latter document as the *modus operandi* for the AEC action in the environmental area. *Memorandum of Understanding, supra.* The EPA has expressed its intent to go along with the decisions made by the AEC, thus surfacing and apparently settling environmental questions at the pre-construction licensing stage rather than at the operating license stage years later. Address by Honorable John Quarles, Acting Administrator, EPA, before the Section of Public Utility Law, American Bar Association 96th Annual Meeting, Aug. 6, 1973.

126. Atomic Energy Commission Interim Policy Statement on Implementation of the 1972 Federal Water Pollution Control Act, 38 Fed. Reg. 2679, 2680 (1973).

hydroelectric plants,[127] would therefore also seem to be subject to the regression implicit in the FWPCA amendments.

Separate state certifications are not needed for each federal license or permit. Generally the certification obtained with respect to the construction of the facility fulfills the certification requirement for any other federal license or permit required for the operation of the plant. However, if the state or the Administrator of the EPA notifies the agency considering the application for an operating license that reasonable assurance of compliance with applicable standards or limitations no longer exists due to changed conditions, further certification will be required.[128]

Powerplant Siting

Much litigation and frustration could be eliminated by changing the traditional practice of allowing a utility to select a site for its plant, undertake extensive planning, and sometimes actually start construction before certification is required.[129] Comprehensive power plant siting legislation can force preselection planning to avert or minimize harm from waste heat discharges.[130]

127. Federal Power Act, 16 U.S.C. §797 (1920). The regulatory power of the FPC to deal with thermal pollution problems is minimal. Because of its responsibility to assess the nation's over-all power generation and distribution systems, the FPC confronts the thermal problem in an advisory capacity. *Id.* Comment, *Thermal Discharges: A Legal Problem,* 38 TENN. L. REV. 369, 386 (1971). Although the FPC has power to regulate activities on reservoirs formed by hydroelectric facilities, 16 U.S.C. §797 (1920), even this minimal potential control over thermal discharges from steam-generating plants has been diluted by the FWPCA. Section 102(b)(6) of the FWPCA provides that no license granted by the FPC for a hydroelectric power project can include storage for regulation of streamflow for the purpose of water quality control unless the Administrator of the EPA recommends inclusion. Even if included, the size of the storage capacity is statutorily limited. Act of Oct. 18, 1972, Pub. L. No. 92-500, 72 Stat. 498, 84 Stat. 91, *amending* 33 U.S.C. §§1151-75 (1970).

128. *Id.* §401(a)(3).

129. In 1969 only 26 states required certification prior to construction. ENERGY POLICY STAFF, OFFICE OF SCIENCE AND TECHNOLOGY REPORT ON ELECTRIC POWER AND THE ENVIRONMENT 56 (Aug. 1970).

130. Although taking the discretionary site selection from the power industry and subjecting the decision to comprehensive planning is ecologically advantageous, whether this planning should be consolidated into one agency and whether the agency should be at the state or federal level has been the subject of rather predictable debate. The utilities apparently favor continued regulation by the states. The typical state public utility commission may find it difficult to fairly balance environmental and power interests because: (1) the commission is often dominated by the utility industry, (2) states in competition with other states for industry and growth cannot be expected to rigorously apply environmental standards, and (3) the state does not possess the manpower or expertise necessary to cope with the faculties of the power industry. *See* L. JAFFEE, JUDICIAL CONTROL OF ADMINISTRATIVE ACTION 10 (1965); Note, *Of Birds, Bees and the FPC,* 77 YALE L.J. 117 (1968). For a discussion of further policy considerations favoring either state or federal regulations see Brooks, *Millstone Two and the Rainbow: Planning Law and Environmental Protection,* 4 CONN. L. REV. 54, 67 (1971).

An additional aim of such legislation should be to create "one-stop" licensing to eliminate the costs and delays necessitated by requiring multiple agency permits for a single plant.[131]

Proposals are presently before Congress to enact federal siting legislation.[132] One proposal, the Macdonald Bill,[133] would settle disputes about plant siting by permitting a three-man federal panel to override provisions of both state and federal laws whenever a "demonstrable emergency" exists. The Macdonald Bill has been reported to the House Committee on Interstate and Foreign Commerce and may be superseded by, or fused with, more comprehensive proposals. A bill prepared by the Administration,[134] for example, would encourage all states to create one-stop agencies. Under the administration bill the federal government would assume control of site certification in states that fail to adopt one-stop licensing procedures within two years of the bill's passage.[135] However, once the state adopts acceptable procedures, state decisions on siting would be considered conclusive on all matters of state and local law.[136] To be acceptable the state procedures must be based on Presidential guidelines covering selection criteria, citizen participation rights, and staff adequacy of the one-stop agency.[137] A federal certifying agency to be designated

131. The one-stop agency's administrative structure and orientation are obviously important. If the one-stop agency supersedes or preempts the statutory powers of specialized agencies, the possibility exists that the utility may be shielded from more stringent and probing regulation, thus weakening the intent to balance environmental considerations effectively. Tarlock, Tippy & Francis, *supra* note 109, at 556.

On the other hand, it cannot be doubted that the state agency would be less prone to pressure from a proposed power plant than small communities eager to increase their tax base. New England River Basins Comm'n, *Environmental Evaluation of Seabrook, New Hampshire Nuclear Power Plant, Power and the Environment*, Report No. 2, at IV-A-1-3 (Jan. 1971).

132. *See, e.g.*, The Dingell-Moss Bill, H.R. 15,199, 92d Cong., 2d Sess. (1972); The Eckardt-Helstoski Bill, H.R. 13,966, 92d Cong., 2d Sess. (1972); The Electric Power Supply & Environmental Protection Act (Macdonald Bill), H.R. 11,066, 92d Cong., 1st Sess. (1971); The Staggers-Springer Bill (Administration), H.R. 5277, 92d Cong., 1st Sess. (1971).

133. The Electric Power Supply & Environmental Protection Act, H.R. 11,066, 92d Cong., 1st Sess. (1971).

134. H.R. 5277, 92d Cong., 1st Sess. (1971).

135. *Id.* §5(c). One-stop proceedings would also be required under the Eckhardt-Helstoski Bill, H.R. 13,966, 92d Cong., 2d Sess. §5 (1972), but not under the Macdonald Bill, H.R. 11,066, 92d Cong., 1st Sess. (1971), or the Dingell-Moss Bill, H.R. 15,199, 92d Cong., 2d Sess. (1972).

136. H.R. 5277, 92d Cong., 1st Sess. §5(b) (1971). If the federal agency approves the state's structure, the federal agency issues a "certificate of qualification of procedure." This certificate is then conclusive evidence of the state agency's authority over the construction of the power plant facilities. *Id.*

137. H.R. 5277, 92d Cong., 1st Sess. §9 (1971). Under the Macdonald Bill, H.R. 11,066, 92d Cong., 1st Sess. (1971), there is no federal authority to issue guidelines. The state is considered to have a siting agency if the Governor certifies to the Secretary of the Interior that the agency is constituted, staffed, and financed to perform functions in a balanced, expeditious, and competent manner. *Id.* §405(b).

by the President[138] would then either approve or disapprove the structure of the state agency. If approved, state agency decisions would thereafter be conclusive; if disapproved, the state would be given time to correct the structure or appeal before takeover by the federal agency.[139] The bill would not eliminate the necessity for obtaining all other applicable federal permits or licenses.[140]

Some states have already enacted laws regulating the siting of power plants. A Maryland statute,[141] for example, requires a pre-construction hearing on plant siting before certification by the Public Utilities Commission. The law requires that consideration of all environmental factors be balanced with the needs of the public and the capacity of the utility to serve the market. A Vermont statute,[142] even more exacting, states that the Commission *must* find that the project will not have adverse effects on the environment before certification. Other states,[143] including Florida,[144] have created one-stop licensing to consolidate and coordinate plant siting approval.

The Florida Electrical Power Plant Siting Act insures that the certification issued by the Department of Pollution Control (DPC) will negate the need for any permit, certificate or similar document formerly required by any other state or local agency.[145] To receive such certification, an application must be conveyed to the DPC.[146] The DPC then notifies the division of state planning

138. H.R. 5277, 92d Cong., 1st Sess. §3(d) (1971).

139. *Id.* §§5(d), (e).

140. No environmental impact statement, now required under §102 of NEPA, need be filed, however, if the state certifying agency follows procedures substantially comparable to the review procedures of the Council on Environmental Quality. *Id.* §16(a). The requirement of an impact statement has not been eliminated under the Macdonald, Dingell-Moss, or Eckhardt-Helstoski Bills.

141. MD. ANN. CODE art. 78, §54(a) (1970).

142. VT. STAT. ANN. tit. 30, §248(4) (1969).

143. *See, e.g.*, CAL. PUB. UTIL. CODE §2852 (West Supp. 1971); CONN. PUB. ACT. No. 575 (1971); Md. Laws 1971, ch. 31; WASH. REV. CODE §§80.50.010-.900 (1970).

144. Fla. Laws 1973, ch. 33, §1, *to be codified as* FLA. STAT. §§403.501-.516.

145. *Id.* §403.511(3). Although this section does not affect the right of local officials to enforce local building codes, it does relieve the power industry of the burden of securing multiple permits and authorizations. *See, e.g.*, FLA. STAT. §161.041 (1971) (requires permit from department of natural resources for construction or any physical activity or any other disposition or removal of beach material upon land below the mean high water line); FLA. STAT. §§253.123-.125 (1971) (permits necessary from board of county commissioners for dredging or filling in unincorporated area of any county bordering navigable waters); FLA. STAT. §§370.033-.034 (1971) (must get a certificate of registration from the department of natural resources to engage in any dredge or fill activities); FLA. STAT. §373.219 (Supp. 1972) (permit required from department of natural resources or the governing board of a water management district for any withdrawal, diversion, impoundment, or consumptive use of water); FLA. STAT. §§373.413, .416 (Supp. 1972) (permits needed to construct or maintain any dam, impoundment, reservoir, or works designed to divert or impound waters exceeding 10 acres in area); FLA. STAT. §381.271 (1971) (approval of state board of health needed to install or alter a system of water supply or refuse disposal). See also the authorizations needed under FLA. STAT. chs. 298, 378, 380, 387 (1971).

146. Fla. Laws 1973, ch. 33, §1, *to be codified as* FLA. STAT. §§403.506, .503(3). An application fee of up to $25,000 must accompany the application for certification. *Id.* §403.503(6).

and the public service commission that both conduct investigations and prepare recommendations on the proposed site, submitting their findings to the DPC within three months.[147] The DPC in the meantime conducts its own study[148] and presides over public hearings.[149] At least two hearings must be held.[150] At the initial hearing, held in the county of the proposed site, the DPC must determine whether the proposed location is in compliance with existing land use plans and zoning ordinances.[151] If it is not, the DPC cannot take further action until the site is made to conform.[152] If the site is in compliance, the land planning and zoning authorities are estopped from thereafter changing their requirements so as to affect the proposed location.[153]

Based on the evidence adduced at the hearings and gathered from the studies, the DPC then makes its recommendation to the Florida Pollution Control Board,[154] which must ultimately approve, in whole or with modifications, or deny the issuance of the requisite certificate.[155]

Notwithstanding the benefits to the environment and the siting applicant received from such a streamlined but comprehensive review, the real strength of Florida's Act may lie in its provision for ten-year site planning. Beginning January 1, 1974, each electric utility must submit a ten-year site plan to the division of state planning, estimating its power needs and revealing the general location of proposed plant sites.[156] The division then makes a preliminary study within 12 months,[157] finally classifying each proposal as suitable or unsuitable, and suggesting possible alternatives.[158] The ten-year plan must be reviewed and submitted by the utility at least every two years.[159]

147. *Id.* §403.507(1). The public service commission must prepare a report and recommendation concerning foreseeable needs for electric power in the area of the projected plant. The division of state planning must review and update its studies made in investigating ten-year site plans submitted by the utilities. See text accompanying notes 156-159 *infra.*

148. The department of pollution control must evaluate the proposed facility, considering the following non-inclusive criteria: (1) cooling system requirements; (2) proximity to load centers, navigable waters, and transportation systems; (3) soil and foundation conditions; (4) water availability; (5) land use; and (6) accessibility. Fla. Laws 1973, ch. 33, §1, *to be codified as* FLA. STAT. §403.507(2).

149. *Id.* §503.508.

150. *Id.* The parties to a certification hearing must include the applicant, the public service commission, division of state planning, any interested state or local agency that has filed a notice of intent with the DPC, and any relevant citizens' group that has filed the notice of intent.

151. *Id.* §403.508(2). The initial hearing must be held within 60 days from receiving the application for certification. *Id.* §403.508(1).

152. *Id.* §403.508(2).

153. *Id.* Any other appropriate matter may, of course, be heard at the initial hearing. No particular requirements are mandated for the second hearing.

154. *Id.* §403.509(1). This report must be made within 12 months after receiving the application. This deadline may be extended with the mutual consent of the DPC and the applicant.

155. *Id.* §403.509(2). The action shall be by written order. If the certificate is denied, or approved with modifications, the board must inform the applicant of the action necessary to secure approval.

156. *Id.* §403.505.

157. In its study the division must solicit the views of federal, state, and local agencies and determine the need for the power, the possible environmental impact, conformance with the state's comprehensive plan, and possible alternatives. *Id.* §403.505(1). To help defray the cost of the study the division may levy a $1,000 fee.

The regulatory scheme of the Florida siting act also recognizes a new concept of utility plant location, which may lessen site problems: floating power plants to be operated at sea. Such plants can effectively mitigate environmental harm by providing an unlimited supply of cooling water that can quickly dissipate unwanted heat far from onshore and estuarian breeding grounds. A facility to build such plants is being constructed by Westinghouse-Tenneco on Blount Island in Jacksonville, Florida.[160] The floating nuclear plants it proposes to build are to be moored inside stone or floating breakwaters located some three miles at sea, with underwater cables carrying the power to land.[161] Although the AEC has yet to approve such plans, orders have been received and the company is optimistic about future prospects.[162]

ENCOURAGING BENEFICIAL USES OF THERMAL DISCHARGES

Modern Developments

As previously noted, power plants produce both electric and thermal energy. Traditionally thermal energy has been absorbed by cooling water, which in turn is discharged. Obviously, there is nothing inherently bad about hot water; it has been, and can be, put to beneficial uses. For example, thermal discharges have been used to provide extraction steam for refinery processes;[163] to grow crops, provide mosture, and control temperature in greenhouses;[164] for

158. *Id.* §403.505(1).

159. *Id.* The impact of Florida's siting act as a conservation tool may, however, be considerably diluted by the following grandfather clause:

"Provisions of this chapter shall apply to any electrical power plant as defined herein. No construction of any new electrical power plant or expansion in steam generating capacity of any existing electrical power plant may be undertaken after October 1, 1973, without first obtaining certification in the manner herein provided, *except that this act shall not apply to any such electrical power plant or major transmission line presently operating or under construction, or which has, upon the effective date of this act, applied for a permit or certification under requirements in force prior to the effective date of this act.*" *Id.* §403.506(1) (emphasis added). Since a literal reading of this provision exempts plants now operating or under construction from all provisions of the *Act*, the Act seemingly will not become effective until new plants are contemplated and built. The practical effect might be that utilities will expand existing plants in areas already subject to substantial waste heat discharges rather than go through the planning and studies required for new construction.

160. The St. Petersburg (Fla.) Times, June 5, 1972, §B at 1.

161. *Id.* at 8, col. 3.

162. *Id.* col. 2.

163. For fifteen years the Public Service Electric & Gas Co. of Linden, N.J. has provided extraction steam for the refinery processes of the Bayway Refinery of Esso Standard Oil Co. Warren, *Power in the System*, in PROCEEDINGS OF THE NATIONAL CONFERENCE ON WASTE HEAT UTILIZATION 7 (1972).

164. *See* Hodge, *Waste Heat Use in Controlled-Environment Greenhouses*, in PROCEEDINGS OF THE CONFERENCE ON THE BENEFICIAL USES OF THERMAL DISCHARGES 108-12 (1970).

open field irrigation and frost protection by sprinklers;[165] and to warm agricultural soils.[166] The potential beneficial use of thermal discharges is limited only by technological imagination.[167]

But as long as thermal discharges are cast back into the source waters, legal and ecological problems will continue to be raised. If dischargers are to avoid being enjoined as nuisances and as violative of environmental laws and regulations, ways must be devised not only to reduce the effect of the discharges to technologically feasible minimums, but also to provide ecological benefits to offset the allegedly adverse results.

One such benefit can come from the development and encouragement of aquaculture — the growing and harvesting of the products of the sea — in the outflow area of the power plant. Such use has been found not only possible, but also productive and beneficial. In Britain, for example, the hot water outflow of power stations has been used successfully to raise flatfish (sole) to marketable size in half the normal time.[168] The power plant discharge waters of the Long Island Lighting Company have been used to cultivate oysters year-round at greatly increased growth and survival rates.[169] Various species of fish are also adaptable to aquaculture techniques, many showing tremendous growth with the higher temperatures.[170]

Florida's Aquaculture Law

Florida's 1971 Aquaculture Law[171] establishes a valuable policy statement and legal framework for the improvement of aquaculture. The law authorizes

165. *See* Boersma, *Warm Water Utilization*, in PROCEEDINGS OF THE CONFERENCE ON THE BENEFICIAL USES OF THERMAL DISCHARGES 74-107 (1970); King, *Irrigation — Nuclear Power — Partners in the Future?*, 93 OREGON FARMER 7 (1970).

166. Boersma, *supra* note 165, at 74-101.

167. Thermal discharges are already planned to be used to supply process steam to Dow Chemical facilities from the nuclear power plant at Midland, Mich. Kessler, *Use of Industrial Process Steam To Reduce Nuclear Plant Waste Heat*, in PROCEEDINGS OF THE NATIONAL CONFERENCE ON WASTE HEAT UTILIZATION 78-79 (1971). Thermal discharges are also expected to control the environment in a totally enclosed city (Seward's Success, Alaska) programmed for initial occupancy within two years. Peland, *Thermal Energy and the 21st Century*, in PROCEEDINGS OF THE NATIONAL CONFERENCE ON WASTE HEAT UTILIZATION 211-24 (1972).

168. Nash, *Power Stations as Sea Farms*, NEW SCIENTIST, Nov. 14, 1968, at 367-69.

169. J. RYTNER & J. BARDACH, THE STATUS AND POTENTIAL OF AQUACULTURE 9 (1968). This success with oysters was particularly important to cold water areas, since warm water is critical to the growth of oysters and the natural population of oysters has diminished drastically due to industrial and domestic pollution. *Id.* at 30. However, in tropical waters, although the discharge waters may certainly be used most of the year, the summer water temperature might be raised by the outflow to 96° or more, a destructive level for much plant and animal life.

170. For example, shrimp growth is increased by 80% when water is maintained at 80° F. instead of 70° F., and catfish grow three times faster at 83° F. than at 76° F. Yee, *Thermal Aquaculture: Potential and Problems*, in PROCEEDINGS OF THE NATIONAL CONFERENCE ON WASTE HEAT UTILIZATION 41 (1972).

171. FLA. STAT. §§253.67-.75 (1971).

the Trustees of the Internal Improvement Trust Fund to lease submerged lands and the water column above for aquaculture to the extent consistent with the public interest.[172] The leases,[173] which may be granted for either commercial or experimental purposes[174] can run for a maximum of ten years, renewable by agreement.

However, there appear to be a number of areas of potential conflict between the interests created by Florida's Aquaculture Law and other federal and state interests. Successful aquaculture necessitates the erection of stakes, markers, and structures which could impede navigation[175] and, therefore, may require exclusive or nearly exclusive use of an area.[176] Assuming the area were navigable, a permit probably would be required from the Corps of Engineers for erection of such structures[177] and, absent such permit, the structures would be subject to removal notwithstanding state approval.

Even assuming a federal permit were obtained, use of the waters and submerged land may conflict with public and private rights.[178] If the waters are navigable they are held in trust for the people of the state for purposes of navigation[179] and exclusive right to their use cannot be claimed.[180] The public, in addition, has a common right to fish in public navigable waters[181] and to use such waters for recreational purposes.[182] However, the public right of navigation is subject to lawful state regulation in the public interest.[183] The state can also interfere with other public rights by transferring interests in property to promote "the interests of the public therein."[184] Indeed, since all such public rights are subject to state restrictions in the interests of the public welfare,[185] the operator of an aquaculture area, leased in the public interest,[186]

172. *Id.* §253.68.

173. *Id.* §253.71(1).

174. *Id.* §253.68.

175. *See* Rules of the State of Florida, Dep't of Natural Resources, Division of Marine Resources ch. 16-B-5.04(1) (cultch materials on shellfish leases, which occupy more than 1/3 of natural water column at mean low water are hereby declared nuisance per se); *id.* ch. 16-B-5.06(1) (cultch must be on bottom and take up no more than 6 inches).

176. FLA. STAT. §253.68 (1971) gives the trustees authority to grant exclusive use of the bottom and water column to the extent required.

177. 33 U.S.C. §403 (1970).

178. Of course if the aquaculture activity is conducted on the property owned by the utility, no such conflicts would occur. The relationship would be governed by the laws of landlord and tenant.

179. Hicks v. State *ex rel.* Landis, 116 Fla. 603, 156 So. 603 (1934). *See* Cummings v. City of Chicago, 188 U.S. 410 (1903); Merrill-Stevens Co. v. Durkee, 62 Fla. 549, 57 So. 428 (1912); F. MALONEY, S. PLAGER & F. BALDWIN, WATER LAW AND ADMINISTRATION: THE FLORIDA EXPERIENCE §122.2 (1968).

180. State v. T.O.L., Inc., 206 So. 2d 69, 71 (4th D.C.A. Fla. 1968).

181. State v. Stoutamire, 131 Fla. 698, 179 So. 730 (1938).

182. City of Miami Beach v. Hogan, 63 So. 2d 493 (Fla.), *cert. denied*, 346 U.S. 819 (1953).

183. *Id. See* Watson v. Holland, 155 Fla. 342, 20 So. 2d 388 (1944).

184. Hicks v. State *ex rel.* Landis, 116 Fla. 603, 606, 156 So. 603, 604 (1934).

185. Sharrow v. City of Dania, 83 So. 2d 274 (Fla. 1955); State v. T.O.L., Inc., 206 So. 2d 69 (4th D.C.A. Fla. 1968).

186. FLA. STAT. §253.68 (1971).

may be able to claim the benefits of such restrictions if a conflict with public rights occurs.[187]

Situations in which an aquaculture area interferes with private riparian rights may pose an additional conflict.[188] Although the riparian owner has no title to the bordering water, he has the right of access.[189] Moreover, he is entitled to access from his property to the *navigable* part of the water[190] or to the main body of water.[191] Riparian rights, however, are not absolute; the impairment of the right must be substantial to warrant relief.[192] Thus, no legal conflict would occur where the aquaculture area is easily circumvented, allows reasonable ingress or egress, or is leased to the riparian owner himself. A substantial interference, however, may give rise to legal sanctions against the lease on grounds that the state action amounts to an unconstitutional "taking" of a protected property right[193] or a violation of the public trust.[194]

187. *See* State v. T.O.L., Inc., 206 So. 2d 69 (4th D.C.A. Fla. 1968). "When public rights or public needs come in conflict, it is for the . . . agency cloaked with discretionary authority to exercise that authority by adopting a position of public policy seeking as its end the greatest and highest public good." *Id.* at 72.

188. All rights listed in Florida Statutes §271.09 plus others "defined by law" are "legal rights" and are afforded appropriate protection. City of Eustis v. Firster, 113 So. 2d 260 (2d D.C.A. Fla. 1959).

189. *See, e.g.*, Shively v. Bowlby, 152 U.S. 1 (1894); City of Philadelphia v. Standard Oil Co., 12 F. Supp. 647 (E.D. Pa. 1934), *aff'd*, 79 F.2d 764 (3d Cir. 1935), *cert. denied*, 297 U.S. 705 (1936).

190. United States v. Rands, 389 U.S. 121 (1967); Padgett v. Central & So. Fla. Flood Control Dist., 178 So. 2d 900 (2d D.C.A. Fla. 1965).

191. Webb v. Giddens, 82 So. 2d 743 (Fla. 1955). *But see* Central & So. Fla. Flood Control Dist. v. Griffith, 119 So. 2d 423 (3d D.C.A. Fla. 1960). Complementing the right to access, the riparian also has a right to dredge a channel to the navigable part of the water unless it interferes with a paramount public right. City of Philadelphia v. Standard Oil Co., 12 F. Supp. 647 (E.D. Pa. 1934), *aff'd*, 79 F.2d 764 (2d Cir. 1935), *cert. denied*, 297 U.S. 705 (1936). In Florida the Randall Act, FLA. STAT. §§253.01 *et seq.* (1971), requires a dredging permit to be obtained from the Trustees of the Internal Improvement Fund after a biological and ecological study has been made to insure no interference with the natural resources of the area. Arguably, such riparian dredging right could be denied by withholding the permit to further the public's interest in developing such resources. FLA. STAT. §253.68 (1971).

192. Duval Eng'r & Contracting Co. v. Sales, 77 So. 2d 431 (Fla. 1954). However, there is some authority for the proposition that relief will be denied against even a substantial interference. *See, e.g.*, Colberg, Inc. v. State *ex rel.* Dep't of Pub. Works, 67 Cal. 2d 408, 432 P.2d 3, 62 Cal. Rptr. 401 (1967), *cert. denied*, 390 U.S. 949 (1968) (the right of access to navigable waters is burdened with a servitude in favor of the state when the state properly exercises its power to utilize such waters); Carmazi v. Board of County Comm'rs. 108 So. 2d 318 (3d D.C.A. Fla. 1959) (upholding the construction of a dam cutting off access by everyone upstream of the dam to Biscayne Bay to control a "menace to the national welfare" — salt water intrusion).

193. *See* Lauer, *The Riparian Right as Property*, in WATER RESOURCES AND THE LAW 131 (1958); Sax, *Takings and the Police Power*, 74 YALE L.J. 36 (1964); Waite, *Beneficial Use of Water in a Riparian Jurisdiction*, 1969 WIS. L. REV. 864, 872; Note, *The State v. the Riparian: A Problem of Water Use and Control*, 1961 WASH. U.L.Q. 257.

194. *See, e.g.*, Illinois Central R.R. v. Illinois, 146 U.S. 387 (1892); Broward v. Mabry, 58 Fla. 398, 50 So. 826 (1909); F. MALONEY, S. PLAGER & F. BALDWIN, *supra* note 179, §122; Sax, *The Public Trust Doctrine in Natural Resource Law: Effective Judicial Intervention*, 68 MICH. L. REV. 471 (1970).

Assuming a lease for aquaculture activities in a hot water outfall area surmounted the above hurdles, some interesting legal problems still remain. Although the discharge of sewage into tidal waters has been recognized as a common law right in some jurisdictions,[195] the Supreme Court of Florida in *Gibson v. City of Tampa*[196] held that legislative enactment of:[197]

> [A]cts to provide for the propagation and culture of oysters materially alter the common law right of defendant to empty its raw sewage into the ocean. Parties taking advantage of the provisions of these acts by acquiring oyster leases and investing large sums in the propagation of oysters acquire valuable rights therein which cannot be taken from them except by due process of law.

Since injury to aquaculture areas[198] by pollution would seem to be governed by the same rule and, since the "refuse" principle should apply to thermal discharges,[199] there has been speculation that aquaculture leases in hot water outfall areas may prove to be "two-edged swords" for power plants. On the one hand, aquaculture activities and the resultant ecological benefits from such usage may be sufficient to offset detrimental effects, tipping the balance against enjoining the discharges as a nuisance or statutory violation. However, if the lessee of the aquaculture area is injured by the discharge, *Gibson* seems to provide an additional basis to attack the plant.

The facts giving rise to the *Gibson* holding, however, may be distinguishable from the situation involved in the future leasing of hot water outfall areas for aquaculture. In *Gibson* the plaintiff had paid rent and expended large sums to develop his oyster business on the leased submerged lands. Years *after* he acquired the land the city started dumping raw, untreated sewage thereon, gradually destroying plaintiff's business.[200] The city defended on the basis of its common law right to dump the untreated sewage, which was concededly destructive to the oysters.[201] Hot water discharges, however, may be beneficial or, at least, may not carry the traditional stigma attached to raw sewage discharges when the plant's utility is balanced against alleged substantial destruction of the leased property. Moreover, if an existing hot water discharge area is leased, the lessee will take his lease with knowledge of the discharge. A

195. *See, e.g.*, Darling v. City of Newport News, 123 Va. 14, 96 S.E. 307 (1918), *aff'd*, 249 U.S. 540 (1919).

196. 135 Fla. 637, 185 So. 319 (1938).

197. *Id.* at 640, 185 So. at 321.

198. Among the conceivable ills that might befall an aquaculture area located in a power plant's thermal discharge area (*i.e.*, radiological, chemical, particulate) is the unexpected shutdown of the plant with the resultant stoppage of hot water, which may produce the most novel problems. Of course, if the aquaculture area is in a discharge pond or chute on the plant's property, the question will be resolved within the framework of the lease. But if the area is under a state lease in public waters, and there is no contingency for plant shut-down, can the aquaculturist claim a prescriptive right to the "pollution"? Indeed, who owns the heat if the state owns the water?

199. *See* text accompanying notes 65-69 *supra*.

200. Gibson v. City of Tampa, 135 Fla. 637, 638, 185 So. 319, 320 (1938).

201. *Id.*

remedy for nuisance lies only when the questioned activity is unreasonable. "Coming to the nuisance," although not usually a complete defense,[202] is often considered a factor supporting reasonableness.[203] Moreover, the Aquaculture Law does allow the trustees to lease the area with any reasonable conditions they wish to attach.[204] Presumedly, a condition encompassing waste heat usage could be included. Finally, nothing in the statute seems to preclude the power company from leasing the discharge area itself for "experimental" aquaculture.[205] The company might then reap additional benefits in goodwill and possible tax deductions by conducting experiments or by assigning the lease[206] to a research or commercial enterprise. Thus, the two-edged sword would become, instead, a doubly sharp one for the company.

By enacting its Aquaculture Law the Florida Legislature has adopted a new concept presaging fuller use of excess heat for the public good. Used constructively to stimulate the growth and harvesting of commercially important marine plants and animals, waste heat may become thermal "enrichment" instead of "pollution." The ecological benefits from such enrichment may become a plus factor that can be balanced against enjoining thermal discharges as a nuisance or statutory violation. With the rapidly increasing demands for power, and the proportional growth in cooling water use, any such plus factor deserves further study and encouragement.[207]

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202. Although a few courts have held that coming to the nuisance is sufficient by itself to deny relief, Barth v. Christian Psychopathic Hosp. Ass'n, 196 Mich. 642, 163 N.W. 62 (1917) (dictum); East St. Johns Shingle Co. v. City of Portland, 195 Ore. 505, 246 P.2d 554 (1952); Powell v. Superior Portland Cement, Inc., 15 Wash. 2d 14, 129 P.2d 536 (1942); in Florida it has been ruled to be no defense at all, Lawrence v. Eastern Air Lines, Inc., 81 So. 2d 632 (Fla. 1955). *See* Comment, *Torts: Defense of Coming to a Nuisance,* 9 U. FLA. L. REV. 228 (1956).

203. *See* Martin Bldg. Co. v. Imperial Laundry Co., 220 Ala. 90, 124 So. 82 (1929); McCarty v. Natural Carbonic Gas Co., 189 N.Y. 40, 81 N.E. 549 (1907); W. PROSSER, THE LAW OF TORTS §91 (4th ed. 1971).

204. FLA. STAT. §253.71 (1971).

205. *Id.* §253.68.

206. *Id.* §253.71(6).

207. For a concise summary of present and potential uses of thermal discharges for agriculture and aquaculture see M. YAROSH, B. NICHOLS, E. HIRST, J. MICHEL & W. YEE, AGRICULTURAL AND AQUACULTURAL USES OF WASTE HEAT (1972). *See also* G. TRUMBLE, LEGAL AND ADMINISTRATIVE ASPECTS OF AN AQUACULTURE POLICY FOR HAWAII (1972). The federal government has shown interest in beneficial utilization of thermal outflow areas. The Federal Water Pollution Control Act Amendments of 1972, Act of Oct. 18, 1972, Pub. L. No. 92-500, 70 Stat. 498, 84 Stat. 91, *amending* 33 U.S.C. §§1151-75 (1970), has authorized funding to conduct studies on maximizing the beneficial effects of thermal discharges. *Id.* §104(t). To implement this federal interest, the Act empowers the Administrator of the EPA to permit the discharge of pollutants under controlled conditions for an approved aquaculture project under either state or federal supervision. *Id.* §318(a). The Administrator must promulgate regulations, not later than Jan. 1, 1974, establishing procedures and guidelines necessary to carry on an approved project. *Id.* §318(b).