# "Potential For Harm" As The Enforcement Standard For Section 7003 of the Resource Conservation And Recovery Act

*Barry J. Trilling*†


## I.
## INTRODUCTION

This article concerns the use of section 7003 of the Resource Conservation and Recovery Act[1] (RCRA) to deal with "imminent and substantial endangerments" to human health and the environment, and focuses on the issue of potential (as opposed to "actual") harm in the definition of the term "endangerment". As of this writing the federal government has filed sixty-one civil actions in United States district courts under RCRA, of which fifty-nine contained allegations of imminent and substantial endangerment under RCRA section 7003.[2] The article discusses how the views expressed in *Reserve Mining Co. v. Environmental Protection Agency*,[3] *Ethyl Corp. v. Environmental Protection Agency*,[4] and *In-*

† Partner, Trilling & Kennedy, Washington, D.C. A.B. University of California Los Angeles 1968; J.D. University of California, Berkeley (Boalt Hall) 1971; formerly trial attorney, Hazardous Waste Section, Land and Natural Resources Division, United States Department of Justice. Mr. Trilling wishes to acknowledge Mr. Douglas A. Johns (B.A. Oberlin College, 1979) and Ms. Francine G. Rudoff (B.A. University of Rochester, 1977; M. Reg. Pl. University of Pennsylvania, 1980) for their editorial assistance and Mr. Robert C. Morgan (B.S. Colorado State University, 1969; M.S. University of Maryland, 1976) for his technical and scientific advice.

1. Pub. L. No. 94-580, 90 Stat. 2795 (codified at 42 U.S.C. §§ 6901, 6973 (1976)).
2. *See* HAZARDOUS WASTE SECTION, LAND AND NATURAL RESOURCES DIVISION, U.S. DEP'T OF JUSTICE, ANN. REP. (1980) [hereinafter cited as DOJ ANNUAL REPORT] for a listing of the first 51 cases filed. A list of the remaining cases can be obtained from the Environmental Enforcement Section, Land and Natural Resources Division.
3. 514 F.2d 492 (8th Cir. 1975).
4. 541 F.2d 1 (D.C. Cir.), *cert. denied*, 426 U.S. 941 (1976).

*dustrial Union Department v. American Petroleum Institute*[5] (the *Benzene Case*), that scientifically supportable demonstrations of potential rather than actual harm may underlie regulatory decisionmaking, and may be used by the federal government in section 7003 litigation.

## II.

### HISTORICAL PERSPECTIVE

America's material prosperity has both caused and resulted from the ever-growing demand for convenient and inexpensive goods. This demand has created jobs by causing industrial growth, thus creating more prosperity, greater expectations, and even more demand. Increased and diversified expansion, however, has been accompanied by the increase and diversification of hazardous chemicals disposed of in the industrial process.[6] The disposal of these hazardous chemical wastes has created problems the scope of which has only recently received national attention. Yet, the origin of these problems is linked with the disposal of chemical wastes that may have occurred decades in the past.

In the summer of 1978, for example, attention was focused on the chemical disaster at the "Love Canal" in Niagara Falls, New York, a landfill not used for the disposal of wastes since 1953. Love Canal was only the first of an overwhelming number of chemical disposal sites to be identified as posing a hazard to human health and the environment. Estimates by the Environmental Protection Agency (EPA) indicate that total industrial waste in the United States annually amounts to 344 million metric tons (wet), of which ten to fifteen percent, 35 million metric tons, are considered hazardous. EPA estimated that only ten percent of these wastes were disposed of in an environmentally sound manner. Moreover, EPA concluded that hundreds of the 30,000 hazardous-waste sites it identified may present imminent and substantial endangerments to human health or the environment.[7]

The 1979 Annual Report of the Council on Environmental

5. 448 U.S. 607 (1980).

6. *See* RENSSELAER POLYTECHNIC INSTITUTE, TECHNOLOGY FOR MANAGING HAZARDOUS WASTE, REPORT TO THE GOVERNOR AND LEGISLATURE (prepared for the New York State Environmental Facilities Corporation pursuant to the New York State Industrial Hazardous Waste Management Act of 1978) at II-1 (1979).

7. *See* SUBCOMMITTEE ON OVERSIGHT AND INVESTIGATIONS, HOUSE COMM. ON INTERSTATE AND FOREIGN COMMERCE, 96TH CONG., 1ST SESS., HAZARDOUS WASTE DISPOSAL 1 (Comm. Print 96-1 IFC 31, 1979) [hereinafter cited as HOUSE COMMITTEE REPORT]; 43 Fed. Reg. 947 (1978).

Quality noted that the roots of the nation's hazardous-waste problem extend back many years:

> The chemical industry in particular experienced phenomenal growth, with production rising five fold between 1950 and 1970. There were significant qualitative changes as well. After World War II, for the first time, there was widespread production and use of synthetic organic materials—substances invented by man that do not exist in nature. . .
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> As these substances gained acceptance, it became increasingly obvious that they could create unexpected problems.[8]

Concern about improper storage, transport, and disposal of hazardous waste generated as a result of this industrial expansion and the inattention of government to the problem of hazardous-waste disposal is reflected in a September 1979 congressional report which states that

> [o]ur country presently lacks an adequate program to determine where these sites are; to clean up unsafe active and inactive sites; and to provide sufficient facilities for the safe disposal of hazardous waste in the future.[9]

Further, despite the enactment of numerous pieces of environmental legislation over the past decade,[10] significant gaps remain

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8. U.S. COUNCIL ON ENVIRONMENTAL QUALITY, ENVIRONMENTAL QUALITY-1979 at 6 (1979) [hereinafter cited as CEQ-79].

9. HOUSE COMMITTEE REPORT, *supra* note 7, at 1.

10. *See, e.g.*:

- Comprehensive Environmental Response, Compensation, and Liability Act of 1980, § 101, 42 U.S.C.A. § 9601 (West 1980 Laws Spec. Pamph. 1981);
- Resource Conservation and Recovery Act, § 2, 42 U.S.C. § 6901 (1976 & Supp III 1979);
- Toxic Substances Control Act, § 2, 15 U.S.C. § 2601 (1976 & Supp. III 1979);
- Clean Water Act, § 2, 33 U.S.C. § 1251 (1976 & Supp. III 1979);
- Clean Air Act, § 317, 42 U.S.C. § 7401 (1976 & Supp. III 1979);
- Safe Drinking Water Act, § 2, 42 U.S.C. § 3001 (1976);
- Federal Environmental Pesticide Control Act of 1972, § 2, 7 U.S.C. § 136 (1976 & Supp. III 1979);
- Consumer Product Safety Act, § 2, 15 U.S.C. § 2051 (1976 & Supp. III 1979);
- Occupational Safety and Health Act of 1970, § 2, 29 U.S.C. § 651 (1976 & Supp. III 1979);
- Hazardous Materials Transportation Act, § 102, 49 U.S.C. § 1801 (1976 & Supp. III 1979);
- Federal Hazardous Substances Act, § 2, 15 U.S.C. § 1261 (1976 & Supp. III 1979);
- Uranium Mill Tailings Radiation Control Act of 1978, § 2, 42 U.S.C. § 7901 (Supp. III 1979);
- Federal Food, Drug, and Cosmetic Act, § 1, 21 U.S.C. § 301 (1976 & Supp. III 1979);
- Poison Prevention Packaging Act of 1970, § 2, 15 U.S.C. § 1471 (1976);

in the overall legal structure, and there have been substantial delays in the enforcement of these laws.

Environmental laws passed in the late 1960's and early 1970's focused on air and water pollution, mandating reductions in emissions associated with the nation's industrial expansion.[11] Arguably, these laws have made notable progress in cleaning up the environment. They did not, however, require that chemicals be tested to ascertain their effects on human health or the environment; they did not encourage recycling of industrial wastes; nor did they address the problems associated with the land disposal of hazardous wastes. To make matters worse, the treatment processes required by the air- and water-pollution laws have resulted in the production of yet additional hazardous wastes requiring safe disposal.[12]

Congress did not directly and comprehensively address man-

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- Lead-Based Paint Poisoning Prevention Act, § 101, 42 U.S.C. § 4801 (1976) (repealed 1978);
- Disaster Relief Act of 1974, § 101, 42 U.S.C. § 5121 (1976 & Supp. III 1979);
- Marine Protection, Research, and Sanctuaries Act of 1972, § 2, 33 U.S.C. § 1401 (1976 & Supp. III 1979);
- Deepwater Port Act of 1974, § 2, 33 U.S.C. § 1501 (1976 & Supp. 1979);*
- Outer Continental Shelf Lands Act, § 2, 43 U.S.C. § 1331 (1976 & Supp. 1979);*
- Intervention on the High Seas Act, § 2, 33 U.S.C. § 1471 (1976 & Supp. 1979);*
- Trans-Alaska Pipeline Authorization Act, § 202, 43 U.S.C. § 1651 (1976 & Supp. 1979);*
- Ports and Waterways Safety Act of 1972, § 101, 33 U.S.C. § 1221 (1976 & Supp. 1979);*
- Used Oil Recycling Act of 1980, § 2, 42 U.S.C.A. § 6901a (West 1980).*

* The last six statutes relate to oil as a hazardous substance.

11. *See, e.g.*, the Federal Water Pollution Control Act Amendments, 33 U.S.C. § 1251, (1972), as amended by the Clean Water Act, 33 U.S.C. § 1251 (1977); Clean Air Act Amendments of 1970, 42 U.S.C. § 1857b (1970), as amended by the Clean Air Act Amendments, 42 U.S.C. § 7401 (1977).

12. For example, the Clean Water Act requires that the discharge of all wastes from an industrial facility into U.S. waters be permitted under the National Pollutant Discharge Elimination System (NPDES), 33 U.S.C. § 1342. Pollutants removed from waste prior to discharge must be otherwise disposed of safely. Another example is the Marine Protection, Research and Sanctuaries Act (MPRSA), Pub. L. No. 92-532, 86 Stat. 1052 (codified at 33 U.S.C. § 1401 (1972)), which curtails ocean dumping of sewage sludge by 1981, further increasing the amount of waste requiring land disposal.

Commenting on the new regulations EPA has promulgated under RCRA, *see infra* note 19, one observer has noted:

> Ironically, a substantial portion of the hazardous waste streams governed by these new regulations results from pollution control systems installed to capture wastes that would otherwise have been discharged to the ambient air or surface waters through smokestacks or effluent pipes. Millions of tons of these pollution control residuals are generated every year in the United States—a contribution that will increase significantly in the early to mid-1980s as industries are required to meet

agement of toxic substances until the mid-1970's when it enacted the Toxic Substances Control Act (TSCA)[13] and RCRA. TSCA contains provisions requiring the submission of specified test data to determine the safety of chemicals already on the market, and to ensure that new chemicals meet certain standards.[14] While TSCA deals primarily with the generation, labeling, and use of dangerous chemicals, RCRA primarily concerns their disposal and was designed to "eliminate the last remaining loophole in environmental law, that of unregulated land disposal of discarded materials and hazardous wastes."[15]

In response to the problem of "abandoned" hazardous-waste sites several pieces of legislation, commonly referred to as "Superfund", were introduced in both the House and the Senate. On December 11, 1980, the Comprehensive Environmental Response Liability and Compensation Act[16] was signed into law. This superfund act creates a $1.6 billion fund financed 87.5 percent by a tax on feedstocks of oil and certain chemicals and 12.5 percent by federal appropriation. The fund will be used to cover the costs associated with cleaning up those hazardous-waste sites for which potential defendants are unknown or are not able to cover the costs of necessary remedial actions.

Superfund section 106(c)[17] requires the Administrator of EPA, after consulting with the Attorney General, to issue guidelines for coordination of agency remedial and enforcement action pursuant to all environmental emergency authorities administered by EPA, including section 7003 of RCRA, no later than June 11, 1981. Those guidelines are to be "to the extent practicable consistent with the national hazardous substance plan" of Superfund. The "national hazardous substance plan," in turn, is to be part of the Superfund "National Contingency Plan" pursuant to Section 105

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increasingly stringent emission and effluent limitations under the Clean Air and Water Acts.

Raffle, *The New RCRA Generator Regulations: Implications for Industry*, ENVTL. REG. ANALYST 2 (June 1980).

13. Pub. L. No. 94-469, 90 Stat. 2003 (codified at 15 U.S.C. § 2601 (1976)).

14. *See also* Federal Insecticide, Fungicide, and Rodenticide Act, 7 U.S.C. § 135-135k (1976), *amended by* Federal Environmental Pesticide Control Act of 1972 *and* Federal Pesticide Act of 1978, 7 U.S.C. § 136-136y (Supp. IV 1980) (FIFRA) (concerning the labeling, marketing and safety of pesticides; dealing only with pesticides, FIFRA is not as comprehensive in scope as TSCA).

15. HOUSE COMMITTEE REPORT, *supra* note 7, at 29.

16. Pub. L. No. 96-510 (codified at 42 U.S.C. §§ 9601-9656).

17. 42 U.S.C. § 9606 (1980).

of that Act,[18] which was due for promulgation under the statute also no later than June 11, 1981.

Although these guidelines may be silent on legal theory, they may, in the broadest general sense, define the manner in which the government will act in RCRA Section 7003 litigation. However, as of this writing, neither the guidelines nor the national hazardous-substance plan with which those guidelines should be consistent have been promulgated by EPA. Meanwhile it is anticipated that, pending issuance of a National Contingency Plan and final Superfund section 106(c) regulations, EPA's Office of Solid Waste will issue interim guidance memoranda on discrete enforcement sections under RCRA, *e.g.*, sections 3008, 3013, and 7003. Although these interim guidance memos will probably not be published in the Federal Register, they should be available upon request from EPA.

Regulations promulgated pursuant to subtitle C of RCRA concerning hazardous-waste management, however, became effective on November 19, 1980. These regulations provide for identification and listing of hazardous wastes, for a manifest system which tracks hazardous waste from the point of generation to disposal, for an "interim status" permit system for facilities which treat, store, or dispose of hazardous wastes, and for standards for generators and transporters of hazardous waste and for owners and generators of hazardous-waste treatment, storage, and disposal sites.[19] On January 12, 1981 EPA issued standards for treatment, storage and disposal facilities. These standards concern location, closure and post-closure care, financial assurance, and use and management in tanks, surface impoundments, and waste piles.[20] On July 21, 1981 EPA extended until October 4, 1981, the period for comments upon its proposed standard for permitting hazardous-waste land disposal facilities.[21] Even though these regulations have been issued, it is possible that both court challenges and EPA's own voluntary withdrawal of them[22] could add substantial

18. 42 U.S.C. § 9505 (1980).

19. 40 C.F.R. § 265 (1981). EPA issued the first of its RCRA Subtitle C Regulations on February 26, 1980, focusing on primary RCRA issues: Basic Program Definitions and Policy, 40 C.F.R. § 260, Requirements for Generators of Hazardous Waste, 40 C.F.R. § 262, Requirements for Transportation of Hazardous Waste, 40 C.F.R. § 263.

20. 40 C.F.R. §§ 122, 264, 265 (1981).

21. 46 Fed. Reg. 37,527 (1981) (to be codified in 40 C.F.R. § 264).

22. For example, EPA has proposed to suspend the effective dates of its hazardous-waste treatment and storage facility permitting standards applicable to existing incinerators and surface storage impoundments, which were published on January 12

delays to their enforcement. Indeed after EPA's release of RCRA regulations in May 1980, various trade associations and corporations filed fifty-two separate lawsuits challenging the regulations.[23]

The overall aim of the subtitle C regulations concerns long-term enforcement and focuses on regulating active hazardous-waste generators, transporters, and owners and operators of treatment, storage, and disposal facilities.[24] The 1979 House Committee Report on RCRA noted that

> [t]he purpose of subtitle C of RCRA is to protect the public health and the environment from the adverse effects of inadequate and unsafe hazardous waste disposal practices. Unfortunately, the Act was prospective and did not anticipate the serious problems posed by some existing hazardous waste sites, including abandoned sites.[25]

Despite the promulgation of many of the subtitle C regulations and the enactment of Superfund, administrative and logistical problems will delay full implementation of these programs. Several other statutory provisions, however, immediately authorize the federal government to act in hazardous-waste situations posing what "may be" imminent and substantial endangerments to public health and the environment. These statutes include section 7003 of RCRA,[26] section 7 of the Toxic Substances Control Act,[27] section 504(a) of the Clean Water Act[28], and section 1431 of the

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and 23, 1981, 46 Fed. Reg. 2802, 7666, pending a reexamination of the appropriateness of the regulations for existing facilities. *See* 46 Fed. Reg. 51,407 (1981).

23. *See* Shell Oil Co. v. EPA, No. 80-532 (D.C. Cir.).

24. These regulations will be subject to the enforcement mechanisms of RCRA sections 3005 and 3008, 42 U.S.C. §§ 6925, 6928 (1980), which do not necessarily concern the question of imminent and substantial endangerments. In addition, RCRA section 3013, 42 U.S.C. § 6934 (1980), provides that if the EPA Administrator determines that the presence or release of hazardous wastes at or from a site or facility may present a substantial hazard to human health or the environment, he may issue an order requiring the owner or operator, or a previous owner or operator, to conduct appropriate monitoring, analysis, and testing to ascertain the nature and extent of the hazard. Under some circumstances EPA may do the required work itself. The Administrator may bring a civil action against any person who refuses or fails to comply with a Section 3013 order and can seek civil penalties therefore of up to $5,000.00 per day. This provision, like section 7003, discussed *infra*, pertains to both active and inactive sites.

25. HOUSE COMMITTEE REPORT, *supra* note 7, at 57.

26. *See also* RCRA § 3013, *supra* note 24.

27. 15 U.S.C. § 2606(a)-(b) (1977).

28. 33 U.S.C. § 1364 (1977). Aside from emergency relief, other provisions of the Clean Water Act, 33 U.S.C. § 1251 (1972), and the Rivers and Harbor Act of 1899 (Refuse Act), 33 U.S.C. § 407, may be relied upon by the Government for hazardous-waste litigation.

Safe Drinking Water Act (SDWA).[29]

The government may seek a variety of remedies in these actions, including restitution payments for cleanup costs, damages for injuries to federal interests or property, and injunctions.[30] The creative power of the courts to shape injunctive relief to suit a particular problem can involve simple prohibition of the illegal activity or a mandatory order requiring immediate cleanup and long-term monitoring, or indemnification for future expenditures needed to protect the environment and the public's health and welfare. The facts of any situation will determine the appropriate remedy.[31]

## III.

## THE ELEMENTS OF RCRA SECTION 7003

Section 7003 of RCRA provides that the EPA's Administrator may, "upon receipt of evidence that the handling, storage, treatment, transportation or disposal of any solid waste or hazardous waste may present an imminent and substantial endangerment to health or the environment," bring suit "to immediately restrain any person contributing to such handling, storage, treatment, transportation or disposal. . . ."[32] As of August 1981, the United

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29. 42 U.S.C. § 300i (1977). *See, e.g.*, United States v. Price, No. 80-4104 (D.N.J. Sept. 23, 1981), 11 ENVTL. L. REP. (ENVTL. L. INST.) 21,047 (1981).

30. According to the DOJ ANNUAL REPORT, *supra* note 2, at 1, remedial relief sought in the fifty-one cases reviewed therein included:

> securing of the site to prevent public access, a plan of study to determine the extent of contamination, mitigation measures necessary to eliminate contamination and prevent further migration of wastes, segregation, recontainerization and removal of drums to reduce or eliminate the risk of fire, and monitoring of the site to verify cessation of contamination.

31. *See* United States v. Price, *supra* note 29, where the district denied a preliminary injunction but refused to dismiss claims based either on RCRA § 7003, 42 U.S.C. § 6973, or SDWA, 42 U.S.C. § 3001.

32. RCRA § 7003(a), 42 U.S.C. § 6973(a) (1980), provides in pertinent part as follows:

> (a) Authority of Administrator
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> Notwithstanding any other provision of this chapter, upon receipt of evidence that the handling, storage, treatment, transportation or disposal of any solid waste or hazardous waste may present an imminent and substantial endangerment to health or the environment, the Administrator may bring suit on behalf of the United States in the appropriate district court to immediately restrain any person contributing to such handling, storage, treatment, transportation or disposal to stop such handling, storage, treatment, transporation, or disposal or to take such other action as may be necessary. * * * [Section 6973(b) provides for the issuance of administrative orders and fines for violation thereof.]

RCRA § 1004(5), 42 U.S.C. § 6903(5) (1976), defines "hazardous waste" as follows:

> The term hazardous waste means a solid waste, or combination of solid wastes,

States Department of Justice had filed fifty-nine such cases under section 7003.[33]

Broken down to its basic elements, the RCRA section 7003 action must establish that:

(1) A contaminant "may present" an "endangerment;" and
(2) the "endangerment" is "imminent", and "substantial."

The terms "endangerment", "imminent", and "substantial" emphasize Congress' apparent intent[34] to protect the public against exposure to carcinogens and other toxic chemicals in a preventative statutory scheme.

## A. The Conceptual Framework for an Action Under RCRA Section 7003

The term "endangerment" pertains to the *kind* of situation for which evidence exists to bring a section 7003 action. The terms "imminent" and "substantial" pertain to the *degree* of the endangerment which the evidence must establish. An endangerment is thus not actionable under section 7003 unless it is imminent and substantial.

An endangerment posed by "the handling, storage, treatment,

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which because of its quantity, concentration, or physical, chemical, or infectious characteristics may—

(A) cause, or significantly contribute to an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness; or

(B) pose a substantial present or potential hazard to public health or the environment when improperly treated, stored, transported, or disposed of, or otherwise managed.

RCRA § 1004(27), 42 U.S.C. § 6903(27) (1976), defines "solid waste" as follows:

The term 'solid waste' means any garbage, refuse, sludge from a waste treatment plant, water supply treatment plant, or air pollution control facility and other discarded material, including solid, liquid, semisolid, or contained gaseous material resulting from industrial, commercial, mining and agricultural operations, and from community activities, but does not include solid or dissolved material in domestic sewage, or solid or dissolved materials in irrigation return flows or industrial discharges which are point sources subject to permits under section 1342 of title 33 [Section 402 of the Federal Water Pollution Control Act, as amended (30 Stat. 880)] or source, special nuclear, or byproduct material as defined by the Atomic Energy Act of 1954, as amended (68 Stat. 923).

33. *See supra* note 2. The first 51 cases were described in Garrett & Smith, *Federal Suits Under Imminent and Substantial Endangerment Provisions*, ENVTL. REG. ANALYST 7 (Jan. 1981):

Of the 51 suits, the majority (30), have involved inactive sites, while 21 have been at sites that were active at the time suit was filed. Soil contamination is alleged at 47 sites, while contamination of surface, ground, and drinking water is alleged at 29, 28 and 12 sites, respectively. In many cases, multiple contamination is alleged.

34. *See infra* text accompanying notes 62, 64.

transportation or disposal" ("management") of hazardous waste is in itself composed of two elements: harm and exposure.[35] Thus, if there is either no harm or no exposure, there can be no endangerment despite the amount or degree of either factor in the absence of the other. Suppose, for example, that substance "x" is a benign material, such as pure spring water, which is bottled and distributed for sale to consumers. Obviously no endangerment exists in this situation because, despite the potential exposure of such substance, no harmful results can be expected from the exposure. Now, suppose that substance "x" is an acknowledgedly harmful cancer-causing chemical that is being stored in minute amounts in an impenetrable structure. In such an instance, no endangerment exists despite the substance's toxicity because there is no exposure.

In the real world of hazardous-waste management, however, there usually exists at least the potential for exposure of arguably harmful substances. Under relevant case law, whether an endangerment exists will depend upon the relationship of the degree of the exposure to the degree of the potential harm reasonably expected to occur from exposure. Even if an endangerment does exist, however, it is arguably not actionable under RCRA section 7003 unless its exposure is "imminent" and the potential harm reasonably to be expected is "substantial".

Analysis under section 7003 requires first making a threshold determination that an endangerment exists; if so, then the exposure and harm must concurrently be assessed for their respective imminence and substantialness.

## B. Endangerment

Courts which will face the problem of determining whether the government has made out a case of endangerment under section 7003 are likely to be confronted with situations where there is clear evidence of the likelihood of exposure, but more questionable evidence of harm. As will be seen, this inability to demonstrate actual harm results from three factors common to most cases dealing with toxic substances: first, there is generally a latency period of some fifteen to forty years after exposure to a carcinogen before a cancer may develop[36]; second, it may be difficult to attribute adverse health effects to a specific pollutant, or to a

35. "Endanger" is defined in THE AMERICAN HERITAGE DICTIONARY OF THE ENGLISH LANGUAGE 431 (W. Morris ed. 1976) as: "To expose to danger or harm; imperil."

36. *See* CEQ-79, *supra* note 8, at 194.

particular source[37]; and third, scientists generally cannot determine a threshold level for many toxic substances below which one could expect no adverse health effects.[38]

These are problems with which courts have dealt before the enactment of RCRA; two leading cases dealt squarely with the question of what constitutes an endangerment in this context: *Reserve Mining Co. v. Environmental Protection Agency*,[39] and *Ethyl Corp. v. Environmental Protection Agency*.[40]

In *Reserve Mining*, the United States, the states of Michigan, Wisconsin and Minnesota, and several environmental groups sought an injunction ordering Reserve Mining Co. to cease discharging iron ore tailings into the ambient air of Silver Bay, Minnesota and in the waters of Lake Superior. The district court granted injunctive relief[41] ordering an immediate end to the discharges, thus closing the plant. Plaintiffs had argued that the discharges into air and water contained asbestos fibers which, when inhaled, had been associated with an increased occurrence of various forms of cancer.

To assess the health hazard, the parties presented extensive expert scientific and medical testimony, and the court appointed expert witnesses to evaluate the scientific testimony and to supervise studies to measure the levels of asbestos both in the air and in the water. The Court of Appeals for the Eighth Circuit affirmed in part and reversed in part the district court's ruling, and ordered modification of the injunction, finding the evidence insufficient to support the kind of demonstrable danger to public health that would justify closing the plant. The court held, however, that enough evidence existed of a legally-cognizable health risk to the public to continue in force a less stringent form of injunction.

The court found that the company had been discharging a substance which, under acceptable but unproven medical theory, may be considered as carcinogenic and that a proper assessment of the health hazard would rest on an analysis of the probabilities of harm. With regard to discharges in the water, these probabilities

37. *See, e.g.*, SENATE COMM. ON ENVIRONMENT AND PUBLIC WORKS, 96TH CONG., 2D SESS., SIX CASE STUDIES OF COMPENSATION FOR TOXIC SUBSTANCES POLLUTION, PUB. NO. 96-13 at xv-xvi (Comm. Print 1980) [hereinafter cited as SIX CASES].

38. For a detailed discussion of these issues, *see* L. CASARETT, TOXICOLOGY, THE BASIC SCIENCE OF POISONS (1975).

39. 514 F.2d 492 (8th Cir. 1975).

40. 541 F.2d 1 (D.C. Cir.), *cert. denied*, 426 U.S. 941 (1976).

41. 380 F. Supp. 11 (D. Minn. 1974).

were deemed low because they did not rest on a history of past health harm attributable to ingestion, but on a medical theory implicating the ingestion of fibers as a causative factor in increasing the cancer rate among asbestos workers. Concerning air, however, the risk of harm rested on a higher degree of proof: a correlation between inhalation of dust and subsequent illness. Even though the hazard could be measured only in general terms of a concern for the public health based on a "reasonable" medical theory in which there was no certain proof of harm, the court found the existence of risk justified an injunction requiring abatement of the health hazard on "reasonable terms as a precautionary and preventive measure to protect the public health."[42]

The *Ethyl Corp.* case dealt with section 211(c)(1)(a) of the Clean Air Act,[43] which authorizes the Administrator of EPA to regulate gasoline additives whose emission products "will endanger the public health or welfare."[44] Pursuant to this authority, EPA promulgated regulations mandating annual reductions in the lead content of gasoline because, in part, of their possible danger to public health. EPA's control strategy concentrated on an evaluation of the cumulative effect of airborne lead on total human lead exposure and the significance of that contribution. Various manufacturers of lead additives and refiners of gasoline petitioned for review of the regulations pursuant to Clean Air Act section 307.[45] The court noted the difficulty of producing conclusive evidence of the harmful effects of lead exposure:

> [S]ignificant exposure to lead is toxic, so that considerations of decency and morality limit the flexibility of experiments on humans that would otherwise accelerate lead exposure from years to months, and measure those results.[46]

However, on the basis of acceptable but less-than-certain scientific evidence, and given the precautionary nature of the statute, the court upheld EPA's regulations. The court noted that less rigor is required in the establishment of cause and effect where the statute is precautionary and the evidence difficult to come by, uncertain, or is conflicting because it is on the "frontiers of scientific knowledge."[47]

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42. 514 F.2d at 520.
43. 42 U.S.C. § 1857f-6c(c)(1)(A).
44. *Id.*
45. 42 U.S.C. § 1857d-5.
46. 541 F.2d at 26 (footnote omitted).
47. *Id.* at 28.

Thus, neither in *Reserve Mining* nor in *Ethyl Corp.* could the government demonstrate with certainty that the pollutant of concern (asbestos fibers in *Reserve Mining* and lead emissions in *Ethyl Corp.*) actually harmed anyone or was certain to harm someone in the future. There was no question, however, that human populations would be exposed to the *Reserve Mining* and the *Ethyl Corp.* pollutants. In each case the court was presented with the problem of determining whether an endangerment existed, and in each case found endangerment where there was clear evidence concerning the likelihood of exposure, but more questionable evidence of harm.

On its face, harm does not appear to be a difficult concept to grasp: everyone would probably agree that cancer, burns, and still-births constitute harm.[48] However, the struggles of the *Reserve Mining* and *Ethyl Corp.* courts show that the concept can present great difficulty. An analysis of harm cannot be simplistic. As discussed above, sometimes the harm is not expected to occur for years in the future, and even then its cause may be difficult to determine. Moreover, there is little conclusive evidence that the substances found in many hazardous-waste sites are indeed harmful. For instance,

> more than 7,000 substances have been tested for carcinogenicity in some way, although many were tested inadequately to provide conclusive evidence of whether they cause cancer. As of 1977, it was estimated that only about 1,500 of the tested chemicals had been investigated sufficiently to draw some conclusions about their carcinogenicity, and about 600 to 800 had shown substantial, positive evidence of carcinogenicity.[49]

Despite the paucity of "hard" evidence of harmfulness, however, Congress has indicated that it intended for EPA to be able to rely on well-accepted scientific methods such as epidemiological,

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48. At the Love Canal, for example, data compiled by the New York State Department of Health showed that, over a period of two years, 97 families at Love Canal suffered at least 21 excess health problems (*i.e.*, injuries, diseases and deaths in excess of the expected number among this population). The New York State Department of Health's epidemiological study, which looked for only a limited number of health problems, showed substantial effects: six excess spontaneous abortions, four excess major birth defects, and 11 people with liver abnormalities. It will be at least five years before the cancers linked with Love Canal's chemicals become evident. Yet early findings indicate that carcinogenic effects there will be substantial. *See, e.g., In the Matter of the Love Canal Chemical Waste Landfill Site Located in the City of Niagara Falls, Niagara County* (Feb. 1979) (supplemental order of New York State Department of Health Commissioner David Axelrod).

49. CEQ-79, *supra* note 8, at 198.

toxicological, physiological, biochemical, or statistical studies or research (including studies on the effects on animals)[50] to demonstrate the general potential of certain substances for causing adverse effects. Even extrapolations of research and studies, or a professional judgment based on the known behavior of analogous contaminants or the same contaminant in other media, may be used.[51] In this context, the Supreme Court has stated:

> When Congress undertakes to act in areas fraught with medical and scientific uncertainties, legislative options must be especially broad and courts should be cautious not to rewrite legislation, even assuming, *arguendo*, that judges with more direct exposure to the problem might make wiser choices.[52]

Thus, because a particular substance may be predicted as harmful, according to accepted scientific methods of extrapolation, EPA may be expected to argue that the substance is harmful for the purposes of RCRA section 7003.

Such an argument by EPA would be consistent with cases dealing with hazardous chemicals which, typically, do not meet the traditional standard of tort causation.[53] Such a standard generally requires a showing that a party has suffered actual injury. In these cases, however, the government must rely upon facts from which one could only infer the existence of potential harm. *Reserve Mining* and *Ethyl Corp.* both reflect the trend that when the government seeks injunctive relief in an action concerning hazardous substances, it need not show harm actually occurring or harm certain to occur. Rather, the government need only demonstrate a clear, scientifically supportable, potential for harm.

At the same time that the government demonstrates that the managed substance is harmful, it must also show the likelihood of exposure. Not all cases are as clear as *Reserve Mining* and *Ethyl Corp.* concerning the exposure side of the equation. Suppose, for example, that substance "x", a known carcinogen, has been depos-

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50. HOUSE COMM. ON INTERSTATE AND FOREIGN COMMERCE, SAFE DRINKING WATER ACT, H.R. REP. No. 1185, 93d Cong., 2d Sess. 10 (1974); *see also Benzene Case*, *infra* note 5. *Cf.* SIX CASES, *supra* note 37, at 3:

> The U.S. Regulatory Council announced a policy that federal agencies not distinguish between substances which cause cancer in animals and humans, since every substance known to cause cancer in humans also causes cancer in animals. [Citing 44 Fed. Reg. 60,038 (1979).]

51. HOUSE COMM. ON INTERSTATE AND FOREIGN COMMERCE, SAFE DRINKING WATER ACT, H.R. REP. No. 1185, 93d Cong., 2d Sess. 6 (1974).

52. Marshall v. United States, 414 U.S. 417, 427 (1974).

53. *See, e.g.*, Village of Wilsonville v. SCA Services, Inc., 426 N.E.2d 824 (Ill. 1981); *infra* text accompanying notes 65-68.

ited in a barrel which has been placed in an outside storage area of a chemical plant. To determine the degree of exposure, it will be necessary to assess the likelihood of its escape or release to a potentially affected population. The list of questions to be asked may include: Is the barrel corroded? Is the storage area protected by berms against escape of the chemicals? Are there people who work or live nearby who could come into contact with the substance if it escaped? Are there incompatible materials stored nearby which may be affected by the escape or release of the substance?

In the very first published decision under RCRA section 7003, *United States v. Vertac Chemical Corp.*,[54] the court followed the two-part harm/exposure analysis. In that case, highly toxic dioxin-laden waste was stored in an "oozing" state in barrels which were buried in a landfill on the company's plant site. Samples were taken of barrels still stored above ground, of soil in the landfill, and of sediment and sludge downstream in nearby waters. The court noted that it was "not unmindful that the proof with respect to the harmful effect of dioxin on humans is far from conclusive,"[55] and that "[j]ust as in *Reserve* there exists in the present case no proof of actual harm sustained from the escape of dioxin from the premises of Vertac."[56] The court, however, reviewed the scientific record which supported the allegations of dioxin's potential harmfulness and found that "under an acceptable but unproved theory [dioxin] may be considered as teratogenic, mutagenic, fetotoxic, and carcinogenic."[57]

Given the harmfulness of the substance, the court reviewed levels of dioxin that had been reported in terms of "the likelihood of human or environmental exposure."[58] The highest readings were expectedly in containers which had not been buried. These readings were high, but because there was little if any likelihood of these containers ever being exposed, this particular waste-management situation did not present an endangerment.[59]

On the other hand, evidence showed the existence of minute quantities of dioxin (in parts per trillion) in the sediment in a nearby creek and bayou, and in sludge in a downstream treatment

54. 489 F. Supp. 870 (E.D. Ark. 1980).
55. *Id.* at 881.
56. *Id.* at 880.
57. *Id.* at 885.
58. *Id.* at 876.
59. *Id.* at 876.

plant. Having found that there is presently no known safe detectable level of dioxin,[60] the court concluded that escape of dioxin from the site constituted an "imminent and substantial endangerment", subject to abatement.[61]

This determination accords with EPA's argument that the overall scheme of the environmental statutes is to prevent harm before it occurs, as indicated by the legislative history of RCRA, the Safe Drinking Water Act, and other emergency provisions.[62] The language of RCRA section 7003 is similar to that in section 1431(a) of SDWA.[63] The legislative history of this provision of SDWA addresses the issue squarely and clearly indicates that the Administrator should act to contain a contaminant before it actually harms anyone, *i.e.*, while the harm is still potential:

> Administrative and judicial implementation of this authority must occur early enough to prevent the potential hazard from materializing. . .[W]hile the *risk* of harm must be "imminent" for the Administrator to act, the harm itself need not be. Thus, for example, the Administrator may invoke [section 1431 of SDWA] when there is an imminent likelihood of the introduction into drinking water of contaminants that may cause health damage after a period of latency.[64]

Using this same approach, Judge Skelly Wright's opinion in *Ethyl Corp.* determined that the public health may be endangered by a lesser risk of a greater harm and by a greater risk of a lesser harm, the question of endangerment ultimately depending upon the facts of each case.[65]

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60. *Id.* at 879.

61. *Id.* at 885.

62. *See, e.g.*, HOUSE COMM. ON INTERSTATE AND FOREIGN COMMERCE, RESOURCE CONSERVATION AND RECOVERY ACT, H.R. REP. NO. 1491, 94th Cong., 2d Sess. 11 (1976); HOUSE COMM. ON INTERSTATE AND FOREIGN COMMERCE, SAFE DRINKING WATER ACT, H.R. REP. NO. 1185, 93d Cong., 2d Sess. 6 (1974); SENATE COMM. ON ENVIRONMENT AND PUBLIC WORKS, CLEAN WATER ACT OF 1977, S. REP. NO. 370, 95th Cong., 1st Sess. 7 (1977).

63. SDWA § 1431(a), 42 U.S.C. § 300i(a) (1974), provides:

> Notwithstanding any other provision of this title, the Administrator, upon receipt of information that a contaminant which is present in or is likely to enter a public water system may present an imminent and substantial endangerment to the health of persons, and that appropriate State or local authorities have not acted to protect the health of such persons, may take such actions as he may deem necessary in order to protect the health of such persons.

64. HOUSE COMM. ON INTERSTATE AND FOREIGN COMMERCE, SAFE DRINKING WATER ACT, H.R. REP. NO. 1185, 93d Cong., 2d Sess. 6, 35-36 (1974) (emphasis added).

65. Precisely, the Court said:

> While the dictionary admittedly settles on "probable" as its measure of danger, we

In a recent state court decision, *Village of Wilsonville v. SCA Services, Inc.*,[66] the Illinois Supreme Court considered such a factual determination. In that case the court upheld a lower court injunction requiring the closure of a hazardous-waste disposal site and the removal of its contents, pursuant to the common law of public nuisance. In his majority opinion, Justice Clark relied on an earlier Illinois case, *Fink v. Board of Trustees*,[67] in which the court had upheld the propriety of an injunction intended to prevent prospective injury, and on the comments of Professor Prosser.[68] In a concurring opinion, Mr. Justice Ryan, who did not disagree with either the result or the reasoning of the majority, added his analyses, which is consistent with the holdings of *Reserve Mining, Ethyl Corp.*, and *Vertac*:

> I am concerned that the holding of *Fink* quoted by the majority. . .(426 N.E. 2d at 836), may be an unnecessarily narrow view of the test for enjoining prospective tortious conduct in general. Any injunction is, by its very nature, the product of a court's balancing of competing interests, with a result equitably obtained. Prosser, in discussing the law of nuisance, quoted by the majority. . .(426 N.E.2d at 836), states:
>
> "[I]f the possibility [of harm] is merely uncertain or contingent [the plaintiff] may be left to his remedy after the nuisance has occurred." Prosser, Torts sec. 90, at 603 (4th ed. 1971).
>
> Prosser thus recognizes that there are cases in which the possibility of inflicting harm is slight and where the plaintiff may be left to his remedy at law. However, I believe that there are situations where the harm that is potential is so devastating that equity should afford relief even though the possibility of the harmful result occurring is uncertain or contingent. The Restatement's position applicable to preventative injunctive relief in general is that "[t]he more serious the impending harm, the less justification there is for taking the chances that are involved in pronouncing the harm too remote. (Restatement (Second) of Torts sec. 933 at 561, comment b (1979).) If the harm that may result is severe, a lesser possibility of it occur-

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believe a more sophisticated case-by-case analysis is appropriate. Danger, the Administrator recognized, is not set by a fixed probability of harm, but rather is composed of reciprocal elements of risk and harm, or probability and severity. *Cf. Carolina Environmental Study Group v. United States*, 166 U.S. App. D.C. 416, 419; 510 F.2d 796, 799 (1975); *Reserve Mining Co. v. EPA*, *supra*, 514 F.2d at 519-520. That is to say, the public health may properly be found endangered both by a lesser risk of a greater harm and by a greater risk of a lesser harm.

*Ethyl Corp.*, 541 F.2d at 18 (footnote omitted).

66. 426 N.E.2d 824 (Ill. 1981).

67. 71 Ill. Ap. 2d 276 (1966).

68. *See* W. PROSSER, HANDBOOK OF THE LAW OF TORTS 603 (4th ed. 1971).

> ring should be required to support injunctive relief. Conversely, if the potential harm is less severe a greater possibility that it will happen should be required. Also, in the balancing of competing interests, a court may find a situation where the potential harm is such that a plaintiff will be left to his remedy at law if the possibility of it occurring is slight. This balancing test allows the court to consider a wider range of factors and avoids the anomalous result possible under a more restrictive alternative where a person engaged in an ultra-hazardous activity with potentially catastrophic results would be allowed to continue until he has driven an entire community to the brink of certain disaster. A court of equity need not wait so long to provide relief.[69]

Both the majority and concurring opinions in *Village of Wilsonville* follow logically with the trends concerning the use of potential harm as a basis for finding relief. It is unlikely that this trend will be upset.

### C. Imminent and Substantial

As noted above, the existence of an endangerment depends on a concurrent assessment of exposure and harm. For relief to be awarded under RCRA section 7003, however, the evidence must establish a degree of endangerment that is both imminent and substantial. Thus, if there is either no imminence to the exposure or no substantialness to the harm, notwithstanding the amount of one in the absence of the other, relief should not be available under RCRA section 7003.[70]

Of the two concepts, imminence appears the easier to deal with in that it concerns the exposure side of the equation. If the act of exposing a substance may "open the door" for effects even years away, such an act of exposure, rather than its ultimate harm, is the factor which must be imminent. In *Environmental Defense Fund v. Ruckelshaus*,[71] the Court of Appeals for the District of Columbia found as consistent with the congressional purpose in precautionary environmental legislation the interpretation that "a hazard may be 'imminent' even if its impact will not be apparent for

69. 426 N.E.2d at 842.

70. *See* United States v. Vertac Chem. Corp.:

> The highest sample readings [of dioxin] were found, not surprisingly, in the toluene stillbottoms. These readings are high, but they pose no present threat to health or the environment because the parties all agree that storage of the stillbottoms in the new roofed facility provides *adequate interim protection against human or environmental exposure* until suitable permanent disposal is decided upon.

489 F. Supp. 870, 876 (emphasis added).

71. 439 F.2d 584 (D.C. Cir. 1971).

many years. . . ."[72] Further, in another recent RCRA section 7003 case, *United States v. Hardage*,[73] the court stated:

> In this context the phrase "imminent and substantial endangerment" should be taken to mean that sort of emergency situation in which application of the general provisions of the Act [RCRA] would be too time consuming to effectively ward off the threatened harm to the environment. *See*, 29A C.J.S. Emergency. In the briefs on this motion, the parties have not effectively addressed this question of when the emergency provision in § 7003 should be used in contrast to when the normal provisions of the Act would be appropriate. *The plaintiff, however, has made a convincing argument that the imminence of a hazard does not depend on the proximity of the final effect, but may be proven by the setting in motion of a chain of events which could cause serious injury. [Emphasis added.] See, e.g., Environmental Defense Fund v. EPA*, 465 F.2d 528, 535 (D.C. Cir. 1972).[74]

Thus, the term "imminent" modifies the exposure component of endangerment. Administrative and judicial implementation of emergency authority must occur sufficiently early to prevent the potential hazard from materializing.

The legislative history of RCRA does not address the meaning of the term "substantial". "Substantial" can mean having substance, reality, or materiality; or it can mean having significance, weight, or magnitude.[75] However, logic suggests, and the legislative history does not indicate otherwise, that Congress meant the "significance" or "magnitude" rather than the "reality" or "materiality" of an endangerment, and it shall be treated here accordingly.

In a recent case concerning the propriety of work place standards for exposure to benzene, the Supreme Court has, by analogy, arguably provided guidance to the meaning of substantialness for the purposes of RCRA section 7003. In *Industrial Union Department v. American Petroleum Institute*[76] (the *Benzene Case*), the Occupational Safety and Health Administration

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72. *Id.* at 597.

73. Civ. 80-1031-W (W.D. Okla. Dec. 2, 1980) (order denying motion to dismiss); 1 CHEMICAL & RADIATION WASTE LITIGATION REP. 689 (1981).

74. *Id.* at 4.

75. The AMERICAN HERITAGE DICTIONARY OF THE ENGLISH LANGUAGE 1284 (W. Morris ed. 1976) gives as its primary definitions for "substantial": "1. Of, pertaining to, or having substance; material. 2. Not imaginary; true; real." Only in its fifth definition does it refer to "[c]onsiderable in importance, value, degree, amount, or extent: *won by a substantial margin*."

76. 448 U.S. 607 (1980).

(OSHA) had set a standard for work-place exposures to benzene above which employers were prohibited from exposing their employees. The standard was so stringent as to require engineering modifications in the work place, as opposed to individual worker protection devices such as self-contained breathing apparatus. The Supreme Court held that OSHA had exceeded its statutory authority in issuing the standard because, among other reasons, it did not develop an adequate record which could support a finding that *significant* risks are present in the place of employment which must be eliminated or lessened by a change in current practices. Such a finding would require a record supporting the standard promulgated with an adequate "risk assessment" dealing with the adverse effects of exposure to benzene in the work place above the level required by OSHA.

A risk assessment,[77] for the purpose of predicting the magnitude of a substance's toxicity, presupposes exposure and does not concern the likelihood of any incident of exposure. Rather, it deals with the probability of harm in any exposed population. Thus, to use the example of known or suspected carcinogens, the risk assessment should estimate the number of additional cancer incidents in an exposed population above the number normally expected to occur in an absence of such exposure. For example, the number of incidents may be predicted to increase as a result of exposure from one in 100,000 to five in 100,000.

One example of a risk-assessment methodology which may meet the Supreme Court's *Benzene* decision standard for determining significance is EPA's Water Quality Criteria published in the Federal Register on November 28, 1980.[78] The term "Water Quality Criteria" refers to a quantitative estimate of the concentration of a pollutant in waters (above ambient levels) which, when not exceeded, will insure a water quality sufficient to protect a specified water use, e.g. one part pollutant to one billion parts of water. Two types of criteria are set by EPA: human-health criteria and aquatic-life criteria. The aquatic-life criteria set in EPA's Water Quality Criteria deal with nonhuman populations and establish levels of maximum chemical concentration which can be

77. For a discussion of risk assessment principles *see* Leape, *Quantitative Risk Assessment in Regulation of Environmental Carcinogens*, 4 HARV. ENVTL. L. REV. 86 (1980); W. Lowrance, OF ACCEPTABLE RISK; SCIENCE AND THE DETERMINATION OF SAFETY, (1976).

78. 45 Fed. Reg. 79,318-19 (1980). *Cf.* United States v. Price, No. 80-4104 (D.N.J. Sept. 23, 1981), 11 ENVTL. L. REV. (ENVTL. L. INST.) 21,047 at 21,050 (1981) (discussion of water quality criteria in the context of a RCRA Section 7003 action).

tolerated while still maintaining protection of aquatic life. The human-health criteria represent levels of chemical concentration which may exist and still not pose an undue risk to humans who drink the water without further treatment or who eat fish or shellfish from the water.

For carcinogens, EPA has set the maximum human-health protection criterion at zero, i.e., there is no safe exposure level. This reflects EPA's determination that no threshold level of exposure exists below which there will not be a cancer risk. However, because it is technologically impossible to reduce all exposures to a zero level at this time, EPA has established a predictive range of additional cancer cases expected to result from exposures to chemicals in certain concentrations, e.g., $10^{-5}$ (one additional cancer in an exposed population of 100,000) to $10^{-7}$ (one additional cancer in an exposed population of 10 million).[79]

For example, EPA has considered the chemical trichloroethylene (TCE) in its Water Quality Criteria. TCE has been proven to be a potent central nervous system depressant and it can cause severe neurological symptoms such as dizziness, loss of appetite and loss of motor coordination. It produces liver damage at sufficiently high exposure levels and causes cell mutations and cancer. The official EPA Water Quality Criterion for TCE is zero. The level of exposure to TCE which, according to the Water Quality Criteria, can be expected to pose a cancer rate of $10^{-6}$ (i.e., one additional cancer in an exposed population of 1 million people) is 2.1 parts per billion (micrograms per liter). This EPA risk assessment methodology was based on extrapolations of data obtained in animal tests at high exposure levels. Laboratory studies at low-exposure levels would have required enormous numbers of test animals over a long period of time to obtain statistically significant results. According to EPA, this method of risk extrapolation

> is generally recognized as the only tool available at this time for estimating the magnitude of health hazards associated with non-threshold toxicants and has been endorsed by numerous Federal agencies and scientific organizations, including EPA's Carcinogen Assessment Group, the National Academy of Sciences, and the Interagency Regulatory Liaison Group as a useful means of assessing the risks of exposure to various carcinogenic pollutants.[80]

79. For a detailed discussion of this method of risk determination for non-threshold effects *see* 45 Fed. Reg. 79,350 (1980).

80. 45 Fed. Reg. 79,324 (1980).

Failure of a court to accept any part of this EPA methodology would make a determination of substantiality difficult.

The Supreme Court appears to have approved an approach by regulatory agencies to rely on "less than certain" scientific risk assessments in determining regulatory policy in the *Benzene Case* decision:

> OSHA is not required to support its finding that a significant risk exists with anything approaching scientific certainty. Although the Agency's findings must be supported by substantial evidence,. . .the Secretary [may] regulate on the basis of the "best available evidence." As several Courts of Appeals have held, this provision requires a reviewing court to give OSHA some leeway where its findings must be made on the frontiers of scientific knowledge. [Citations omitted.] Thus, so long as they are supported by a body of reputable scientific thought, the Agency is free to use conservative assumptions in interpreting the data with respect to carcinogens, risking error on the side of over-protection rather than under-protection.[81]

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81. 448 U.S. at 656. On the other hand, in its *Benzene Case* decision, the Supreme Court stated in dealing with the concept of "significant risk":

> Some risks are plainly acceptable and others are plainly unacceptable. If, for example, the odds are one in a billion that a person will die from cancer by taking a drink of chlorinated water, the risk clearly could not be considered significant. On the other hand, if the odds are one in a thousand that regular inhalation of gasoline vapors that are 2% benzene will be fatal, a reasonable person might well consider the risk significant and take appropriate steps to decrease or eliminate it.

448 U.S. at 655. Indeed, in criticizing the Government's more expansive view of the authority given OSHA to regulate the workplace under sections 3(8) and 6(b)(5) of the Occupational Safety and Health Act, the court stated:

> Expert testimony that a substance is probably a human carcinogen—either because it has caused cancer in animals or because individuals have contracted cancer following extremely high exposures—would [under the Government's view] justify the conclusion that the substance poses some risk of serious harm no matter how minute the exposure and no matter how many experts testified that they regarded the risk as insignificant. That conclusion would in turn justify pervasive regulation limited only by the constraint of feasibility. In light of the fact that there are literally thousands of substances used in the workplace that have been identified as carcinogens or suspect carcinogens, the Government's theory would give OSHA power to impose enormous costs that might produce little, if any, discernible benefit.
>
> If the Government were correct in arguing that neither § 3(8) nor § 6(b)(5) requires that the risk from a toxic substance be quantified sufficiently to enable the Secretary to characterize it as significant in an understandable way, the statute would make such a "sweeping delegation of legislative power" that it might be unconstitutional under the Court's reasoning in *A. L. A. Schechter Poultry Corp. v. United States*, 295 U.S. 495, 539 and *Panama Refining Co. v. Ryan*, 293 U.S. 388. A construction of the statute that avoids this kind of open-ended grant should certainly be favored.

448 U.S. at 645-46 (footnote omitted).

In addition, the court in *Vertac*[82] accepted this methodology. In *Vertac*, EPA detected dioxin in the parts-per-billion range in soil and sediment on the plant site, and in the parts-per-trillion range off the site. In assessing the substantialness of the endangerment involved, the court found that dioxin was escaping from the Vertac site in quantities that, "under an acceptable but unproved theory" of EPA, would be considered as cancer-causing. This sufficed for a finding of substantial endangerment.

## IV.
## CONCLUSION

Of all the RCRA section 7003 cases filed as of this writing, only five to date have resulted in published judicial opinions[83] and of those only *Vertac* and *Hardage* deal squarely with the issues raised here. Even without more published opinions, however, the trend has been established that, for the purposes of an endangerment action, the demonstration of harm requires only a showing of potential for harm, and the concept of imminence pertains to exposure rather than the ultimate harm itself. With the Supreme Court's holding in its *Benzene Case* decision that an administrative agency must be given some leeway where its findings must be made on the frontiers of scientific knowledge, it is likely that the trend established in *Reserve Mining* and *Ethyl Corp.* will continue in litigation under RCRA section 7003.

82. 489 F. Supp. 870 (E.D. Ark. 1980).

83. *Vertac*, *id.*, United States v. Hardage, Civ. 80-1031-W (W.D. Okla. Dec. 2, 1980) (order denying motion to dismiss); 1 CHEMICAL & RADIATION WASTE LITIGATION REP. 689 ( ); United States v. Price, No. 80-4104 (D.N.J. Sept. 23, 1981.), 11 ENVTL. L. REP. (ENVTL. L. INST.) 21047 (1981); United States v. Midwest Solvent Recovery, Inc., 484 F. Supp. 138 (N.D. Ind. 1980); and United States v. Solvent Recovery Service of New England, 496 F. Supp. 1127 (D. Conn. 1980).