EPA'S Resolution of the Conflict Between Cleanup Costs and the Law in Setting Cleanup Standards Under Superfund

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I. Introduction

Like a prisoner in a medieval torture rack, several conflicting forces pull the United States Environmental Protection Agency (EPA) in different policy directions in setting cleanup standards under Superfund. This article reviews how EPA is torn by conflicts created by: (a) the large costs that must be borne by either the fund created to cleanup sites or responsible parties if complete and thorough cleanups are to be implemented, (b) pressure from the Office of Management and Budget (OMB) to minimize costs to American industry, (c) the political need to proceed more quickly with cleanups at Superfund sites because of perceived failures of the Reagan Administration, (d) the technical complexity of making decisions about health and environmental harm from contaminants that may be left at the site after cleanup, and, (e) the legal requirements of Superfund that structure how these cleanup standards shall be set. Although Congress has attempted to instruct EPA on how to resolve these conflicts, this article reviews how EPA has most recently dealt with these tensions in setting cleanup standards. Do the Superfund cleanup standards promulgated by the EPA adequately protect public health and the environment? Has EPA failed to develop coherent or even legally supportable cleanup standards under Superfund? Is there some-

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thing about the technical complexity of identifying the contamination at and cleaning up a Superfund site that has allowed EPA to set unlawful, inconsistent, and incoherent cleanup standards under Superfund? These are some of the issues considered in this article.

This article first describes the regulatory institutions and procedures that have been created to deal with complex environmental problems such as groundwater and soil contamination. The article next describes the cleanup standards that have been developed by EPA under Superfund and how EPA has resolved conflicts between large costs, adequate cleanup, and the law. Then the article describes technical and scientific difficulties associated with developing these cleanup standards. This is followed by an analysis of the environmental protection efficacy of the current EPA approach to cleanups under Superfund citing a recent example of cleanup decisions made in one Superfund case. Finally, the article draws certain conclusions about current EPA approaches to cleanups under Superfund and the EPA tendency to obfuscate certain important public policy questions through the scientific language systems of technical experts.

II. THE REGULATORY SETTING

We live in an age of dazzling scientific success. Computers, space missions, biotechnology, instantaneous worldwide communications, and high-yield food production are some of the more obvious examples. We also know, however, that this wonderful age of science has created the potential for unprecedented human-made environmental disasters. The threats posed by hazardous chemicals, endangered and vanishing species of flora and fauna, the potential depletion of the ozone layer, the global warming caused by the "green-house" effect are examples of complex problems thrust upon society for the first time during the last half of the twentieth century. Increasing contamination of groundwater resources by hazardous substances is another serious environmental problem that has emerged recently. Although many of these problems have been caused by the inventions of our technicians and scientists,[2] because our faith in science is at

2. For example, air pollution is created in part by the internal combustion engine, ozone depletion caused by gases used in air conditioners, groundwater contamination has been polluted by such exotic man made substances such as polychlorinated biphenyl (PCBs).

an all time high, we tend not to blame science or technology for these problems but assume that science will tell us which problems are of concern and what steps should be taken to protect us.[3]

During the last half of the twentieth century, government's reliance on scientific experts has increased more than in the past due not only to environmental problems, but also to the rising complexity of social problems and the concomitant need to relegate the more knotty problems of our complex society to experts.[4] Such a historical shift toward the "scientification" of what were formerly handled as political questions has been rapidly taking place in American government especially in the last few decades.

> Natural and social scientists were invited to join the government in large numbers during the 1960s because they promised to interject not only analytic rhyme but disciplined reason into the vagaries of policymaking. Science was going to supplant politics. The techniques of operations research, systems analysis, cost-effectiveness analysis, cost-benefit analysis, and risk-benefit analysis were going to replace the tactics of wheeling and dealing, logrolling, pork barreling, and general lobbying. Neutral facts were to supplant biased values. Henceforward, rationality and efficiency rather than passion and waste were to supplant biased values.[5]

In the United States and other developed nations the usual response to complicated environmental problems has been to create complex laws that empower administrative agencies staffed largely by engineers, biologists, chemists, geologists, environmental scientists, and lawyers to "manage" these problems. Starting with the National Environmental Policy Act in 1969, nine major federal environmental laws have been adopted.[6] In re-

3. For example, although most scientists concede that carbon dioxide and other "greenhouse" gases are building up in the atmosphere and that such buildup creates the potential for global warming, many politicians assert that we should not take steps to prevent the greenhouse effect until science can tell us what to do. *See, e.g.*, the remarks of John H. Sununu, N.Y. Times, Feb. 5, 1990, § A, at 15.

4. *See*, ROSEMARIE TONG, ETHICS IN POLICY ANALYSIS (1986).

5. *Id.* at 4.

6. The major environmental laws are: (1) National Environmental Policy Act of 1969 [NEPA], 42 U.S.C. §§ 4321 to 4370 (1982 & Supp. V 1987); (2) Clean Air Act [CAA], 42 U.S.C. §§ 7401-7642 (1982 & Supp. V 1987); (3) Federal Water Pollution Control Act [CWA], 33 U.S.C. §§ 1251-1266 (1982 & Supp. V 1987); (4) Resource Conservation and Recovery Act [RCRA], 42 U.S.C. §§ 6901-6987 (1982 and Supp. V 1987); (5) Federal Insecticide, Fungicide and Rodenticide Act [FIFRA], 7 U.S.C. § 136-136y (1982 & Supp. V 1987); (6) Safe Drinking Water Act [SDWA], 42 U.S.C. § 300f-300k; (7) Toxic Substances

sponse to these federal environmental laws, most states have adopted analogous or parallel state environmental laws. These laws allow the states to implement the programs that have been created by the federal laws while continuing or expanding upon areas of state law not covered by the corresponding federal law.[7]

As the federal and state environmental laws came into existence in the early 1970's and early 1980's, more and different types of environmental professionals had to be hired by government to meet the demands of the increasing technical complexity embedded in the emerging legal programs. For instance, when the Federal Water Pollution Control Act was first implemented in 1972, a typical state environmental agency's water program might have been staffed by a few sanitary engineers and a biologist or two.[8] However, as the same agency faced the responsibility of dealing with carcinogenic risk assessment, an issue which began to emerge in the middle 1980's, that same agency might have to rely on the fields of biostatistics, carcinogenesis, toxicology, pathology, epidemiology, genetics, medicine, nutrition, biochemistry, teratology, hydrogeology, civil engineering, and mathematical modeling.[9] Therefore, as the environmental laws have developed

Control Act [TOSCA], 15 U.S.C §§ 2601-2629 (1982 & Supp. V. 1987); (8) Endangered Species Act, 16 U.S.C.§§ 1531-1543 (1982 & Supp. V 1987); (9) Comprehensive Environmental Response, Compensation and Liability Act [CERCLA], 42 U.S.C. §§ 9601-9675 (1982 & Supp. V 1987).

7. In Pennsylvania, for instance, state mining, water and air pollution, and solid waste laws existed before the above referenced federal laws were adopted. After the federal laws were adopted, the Pennsylvania legislature amended the corresponding state law so that the Commonwealth could be delegated the new federal programs created by the new federal laws. However, all these newly amended state laws retained preexisting elements of Pennsylvania law that were not part of the federal program. For a discussion of the changes in one Pennsylvania environmental law that were adopted to add provisions required by federal law while maintaining prior provisions of Pennsylvania law *see,* Dernbach, *Pennsylvania's Implementation of the Surface Mining Control and Reclamation Act: An Assessment of How Cooperative Federalism Can Make State Regulatory Programs More Effective*, 19 U. MICH. J.L. REF. 903 (1986).

8. This writer was employed in 1973 by the New Jersey Department of Environmental Protection as a lawyer assigned to the Division of Water Resources. At that time there were only a few engineers and biologists assigned to the entire state water pollution control enforcement program. Over the next decade the technical staff was increased dramatically in both number and the types of disciplines. Added to the staff were geologists, hydrogeologists, professional planners, toxicologists, and a variety of different types of engineers.

9. For a discussion of the technical complexity embedded in risk assessment, *see* D. Brown, *Superfund Cleanups, Ethics, and Environmental Risk Assessment*, 16 B.C. ENVTL. AFF. L. REV. 181, 188 (1988). *See also, Symposium: Risk Assessment in Environmental Law:* 14 COLUM. J. ENVTL. L. 289-624 (1989) [hereinafter, Risk Assessment Symposium]; PAUSTENBACH, THE RISK ASSESSMENT OF ENVIRONMENTAL HAZARDS (1989).

in the last two decades, the decisions faced by environmental agency administrators have become increasingly technically complex. As the technical complexity of issues increases, the administrator charged with "managing" the problems under the law must rely more on technical experts to define the environmental problem and propose solutions.

In addition to the technical complexity created by the difficult scientific issues facing the government environmental managers, the administrator's job in "managing" any environmental problem is often made more difficult by the how the environmental laws limit or structure the administrator's discretion. These laws, for instance, not only require that the environmental administrator determine the scientific "facts" about the amount of pollution, but also require him or her to determine the costs and benefits or other economic consequences of various alternative actions,[10] although these laws vary greatly in how they reconcile the competing objectives of environmental protection and economic development. For example, some environmental laws require the government to balance health benefits against cost, such as the Toxic Substances Control Act[11], while others appear to allow for consideration of health only, e.g., section 109(b)(1) of the Clean Air Act.[12]

According to the model of an administrative agency accepted by most lawyers, administrators, and political scientists, the administrative expert breaks down all environmental problems into an "objective" technical problem and a "subjective" policy component.[13] In developing the policy component, the administrator looks at the guidance contained in the legislation and then applies the "objective" technical facts to the decision rule found in the policy-defining legislation. In this way, agency technicians apply scientifically derived "facts" to politically derived rules.

As the problems that environmental agencies had to solve became increasingly more complicated, more and more of the logic of decision-making has been relegated to the experts within the

10. For identification of the major federal environmental laws, *see* note 6, *supra*. For a discussion of different types of economic analysis that are required by the federal environmental laws, *see* text at notes 11 and 12, *infra*.

11. 15 U.S.C. § 2605(a) (1982 & Supp. V 1987).

12. 42 U.S.C. § 7409(b)(1) (1982 & Supp. V 1987).

13. *See generally* D. Brown, *Ethics, Science and Environmental Regulation*, 9 ENVTL. ETHICS 331 (1987).

administrative agency. Sam Hays, in a recent book on the history of environmental politics in the United States from 1955 to 1985, describes the transformation of political environmental problems into the technical "factual" questions that can be decided by the technical experts in the environmental agencies:

> Environmental politics shifted in the 1970s from legislation to administration, from broader public debate to management. Increasingly one heard of air quality management, water quality management, forest management, range management, coastal zone management, risk management, river management, and wilderness management. Hardly an environmental problem could be dealt with outside the terminology and conceptual focus of management which, in turn, played a powerful role in shaping environmental choice . . . . The shift in context transformed the environmental debate into a vast array of technical issues. . . .[14]

In 1980, Congress adopted the Comprehensive Environmental Response, Compensation, and Liability Act [CERCLA], commonly referred to as Superfund[15]. Superfund established a program to identify sites from which releases of hazardous substances into the environment might occur or have already occurred, and various mechanisms to have these sites cleaned up either through the use of a fund, through cooperative agreements with responsible parties, or through enforcement actions.[16] Congress enacted Superfund in 1980 because of the growing concerns over the dangers to public health and the environment posed by the improper disposal of chemical wastes.[17] This act provided funding and enforcement mechanisms that were thought necessary to cleanup sites that were contaminated with hazardous substances.[18]

All of the major federal environmental regulatory statutes adopted before Superfund, including the Resource Conservation and Recovery Act, the Safe Drinking Water Act, the Clean Air Act, the Clean Water Act, gave some detailed guidance to the EPA Administrator on how to set standards that determine "ac-

14. S. HAYS, BEAUTY, HEALTH, AND PERMANENCE, ENVIRONMENTAL POLITICS IN THE UNITED STATES, 1955-1985 392 (1987).

15. Pub. L. No. 96-510, 94 Stat. 2767 (codified at 42 U.S.C. §§ 9601-9657 (1980)).

16. For a description of the response authorities of the federal government under Superfund, *see* CERCLA § 104, 42 U.S.C. § 9604 (1982 & Supp. V 1987).

17. T. Brown, *Superfund and the National Contingency Plan: How Dirty is "Dirty?" How Clean is "Clean?"*, 12 ECOLOGY L.Q. 89 (1984) [hereinafter "T. Brown"].

18. *Id.*

ceptable" levels of discharge of or environmental exposure to pollutants and thereby to protect health and the environment.[19] The Superfund law of 1980 was controversial from its inception for Congress's failure to include a clear legislative approach and therefore guidance for the administrators on how to set cleanup standards.[20] This controversy is generally referred to as the "How Clean is Clean?" question under Superfund. This article reviews how EPA has most recently answered the "How Clean is Clean?" question and public policy problems created by the technical complexity of the EPA approach.

As this article will describe later, the cleanup of sites contaminated with hazardous wastes under Superfund often poses extraordinarily difficult and sometimes intractable technical questions. In fact, these technical problems are among the most complicated faced by environmental agencies.[21] Given the great technical complexity of Superfund cleanups and the concomitant need to delegate a greater number of issues commensurate with the complexity of the problem to scientific experts, Superfund

19. E.g., RCRA §§ 3001-3004, 42 U.S.C. §§ 6921-6924 (1984); CWA § 304(a), 33 U.S.C. § 1314(a) (1987); SDWA § 1412, 42 U.S.C.§§ 300g-1 (1977); CAA § 108-109 and 111-112, 42 U.S.C. §§ 7408-7409 (1977) and 7411-7412 (1978).

20. *See* discussion, *infra* Section III. For a general review of the controversy on cleanup standards under Superfund, *see* T. Brown, *supra* note 17; Sheridan, *How Clean Is Clean: Standards For Remedial Actions At Hazardous Waste Sites Under CERCLA*, 6 STAN. ENVTL. L.J. 9 (1986-87); Wolf and Warren, *How Clean Is Clean?*, 30 ENV'T 3 (1988).

21. Typically environmental agencies must make decisions on effluent limitations under air and water laws, whether a particular project can be issued a permit under any of the environmental laws or whether a new project creates an unreasonable threat to the environment. Although these decisions sometimes raise complex and difficult environmental and technical questions, many of the decisions can be made through the application of standard engineering calculations. The decisions that must be made under Superfund concerning cleanup of a hazardous waste site, however, raise unusually difficult questions about site characterization, toxicology of the hazardous substances, the feasibility of engineering solutions to the problems, and expectations about the success of the remedy that is selected.

One important component of the decision-making procedures that must be followed at a Superfund site in an attempt to deal with these complexities is a site specific risk assessment, which is an attempt to quantify the risk to the health and the environment posed by the chemicals that have been found at the site or that will be left at the site after the remedy is complete. Risk assessment procedures are particularly complex technical procedures that often include questions of toxicology, geology, hydrogeology, statistics, biology, chemistry, ecology, civil engineering, and mathematical modeling. For a discussion of the technical complexities posed by risk assessment, *see* D. Brown, *supra* note 9. *See also, Risk Assessment Symposium, supra* note 9; LaGoy, Nisbet and Schultz, *The Endangered Assessment to the Smuggle Mountain Site, Pitkin County, Colorado: A Case Study*, PAUSTENBACH, *supra* note 9, at 505-26.

cleanup decisions rely more heavily on the "factual" analysis of technical experts than many other environmental decisions made by a government agency. Do the "factual" issues that are relegated to experts under Superfund contain many important transscientific public policy questions? This article reviews not only the weaknesses of the EPA approach to cleanup standards under Superfund, but also the extent to which the technical experts making Superfund decisions are actually making "public policy" decisions as distinguished from "factual" decisions and how these public policy questions can easily become hidden in the technical language of the expert.

III. SUPERFUND CLEANUP STANDARDS-THE EPA ANSWER TO 'HOW CLEAN IS CLEAN?'

A. *Overview Of Cleanup Standards Under SARA And The NCP*

After six years of controversy about the failure of Congress to insert cleanup standards guidance into the original Superfund bill, the Superfund Amendments and Reauthorization Act of 1986, commonly known as SARA, finally created a Superfund section on cleanup standards, Section 121.[22] Under the original 1980 statute, Congress refrained from including a section on cleanup standards apparently because it assumed EPA would include the necessary standards in the National Contingency Oil and Hazardous Substance Contingency Plan, commonly referred to as the "NCP".[23] In 1982 EPA was sued by New Jersey and the Environmental Defense Fund for failure to insert cleanup standards in the NCP.[24] In 1985 a settlement of this case required EPA to, inter alia, propose amendments to the NCP that included: (1) the use of relevant quantitative health and environmental standards and criteria developed by EPA under other environmental laws; and (2) a rule addressing whether response activities must comply with other federal, state, or local environmental

22. 42 U.S.C. § 9621 (Supp. V 1987), Pub. L. No. 99-499, 100 Stat. 1613 (1986). Examples of criticisms of Superfund for lack of standards include those of representative David Stockman at 126 CONG. REC. 26,759, 26,786; H.R. Rep. No. 1016, 96th Cong., 2d Sess. 73-74 (1980).

23. The National Contingency Plan (NCP) has been published at 40 CFR § 300 (1981). Under Superfund as originally enacted the NCP was to contain "appropriate" means to achieve statutory goals. CERCLA § 105(), 42 U.S.C § 9605(3) (1982 & Supp. V 1987).

24. *See* Settlement Agreement between Environmental Defense Fund and State of New Jersey and Environmental Protection Agency, EDF v. U.S., EPA No. 82-2238 (D.C. Cir. February 1984) (summarized at 50 Fed. Reg. 5862-63 (1985)).

laws.[25] On November 20, 1985, the NCP was amended in accordance with the settlement entered earlier in the year.[26]

In 1986 SARA reauthorized the Superfund with $8.5 billion over 5 years and required the President to revise the NCP to conform to those amendments.[27] SARA's final form was due in part to Congressional unhappiness with EPA's prior approaches to the cleanup of Superfund sites.[28] In response to these concerns about cleanup standards, Congress added Superfund section 121.[29] This section for the first time includes in the statute a somewhat structured approach to cleanup standards. Section 121, however, does not include any specific cleanup standards nor any generic approach to cleanup standards for all classes of pollutants but largely mimics the rules on cleanup standards contained in the 1985 NCP.[30] Under the new section 121, cleanup standards must assure protection of human health and the environment, be cost-effective and be in accordance with the NCP.[31] Also, any cleanup standards must attain legally applicable or relevant and appropriate federal and state standards, requirements, criteria, or limitations, a concept commonly referred to as the ARAR requirement, unless the ARAR can be waived in accordance with certain expressly identified waiver provisions [32].

Although section 121 contains only narrative guidance rather than specific numerical cleanup standards, Congress did provide some specificity in section 121(d)(2) when it listed several statutes whose standards must be attained if applicable or relevant and appropriate. This section requires that remedial actions attain

25. *See* Settlement, *id.*

26. 50 Fed. Reg. 47,912 (Nov. 20, 1985).

27. For a general review of SARA *see* Atkenson et al, *An Annotated Legislative History of the Superfund Amendments and Reauthorization Act of 1986(SARA)*, 16 Envtl. L. Rep. (Envtl. L. Inst.) 10,360 (1986).

28. One commentator found: "The congressional debate leading to SARA's enactment showed that many legislators were unhappy with CERCLA's implementation. A common complaint was that not enough sites had been cleaned up, and that federal response actions tended to focus on containment and minimizing exposure to hazardous substances, rather than destruction of those substances." Freedman, *Proposed Amendments to the National Contingency Plan: Explanation and Analysis*, 19 Envtl. L. Rep. (Envtl. L. Inst.) 10,103, 10,113 (1988).

29. 42 U.S.C. § 9621 (Supp. V 1987). For a discussion of why Section 121 was added to Superfund *see* Freedman, *id.* at 10,113.

30. *Id.* There were, however, several significant differences from the 1985 NCP. *See infra* discussion in text of note 33.

31. CERCLA § 121(a), 42 U.S.C. § 9621(a) (Supp. V 1987).

32. CERCLA § 121(d), 42 U.S.C. § 9621(d) (Supp. V 1987).

maximum contaminant level goals, commonly referred to as MCLGs, established under the Safe Drinking Water Act, and water quality criteria established under the Federal Water Pollution Control Act "where such goals are relevant and appropriate under the circumstances of the release or threatened release."[33] A remedial action not attaining the ARAR may be selected when any one of the following six factual patterns are deemed to exist:

> (1) the remedial action constitutes only one part of a total remedial action that will comply with the ARAR when completed;
> (2) compliance would result in greater risk to human health and the environment than other options;
> (3) compliance is technically impracticable;
> (4) an alternative remedial action will attain a standard of performance equivalent to that of an ARAR;
> (5) with respect to the state requirements, the state has not consistently applied the requirements in similar circumstances; or;
> (6) for section 104 [funded] actions, compliance with the ARAR will not provide a balance between the need for protection of public health and welfare and the environment at the facility with the availability of Fund money for responses at other sites.[34]

In addition to these sections that specify approaches to cleanup standards, Section 121 also states that the President, in selecting a remedy, is to prefer actions in which treatment which permanently and significantly reduces the volume, toxicity and mobility of hazardous substances, pollutants, and contaminants is a principle element.[35] The President is to conduct an assessment of permanent solutions and alternative treatment technologies that will result in a permanent and significant decrease in the toxicity, mobility, or volume of hazardous substances, and further is to select remedies that use such solutions and technologies to the "maximum extent practicable."[36]

It is clear from this analysis that the SARA cleanup standards provisions provide additional statutory guidance on the acceptability of cleanup decisions under Superfund but give EPA much discretion in filling in the many details of this largely narrative guidance. One commentator sees the cleanup standard provisions of SARA as follows:

33. CERCLA § 121(d)(2), 42 U.S.C. § 9621(d)(2) (Supp. V 1987).
34. *See* CERCLA § 121(d)(4), 42 U.S.C. § 9621(d)(4) (Supp. V 1987).
35. CERCLA § 121(a), 42 U.S.C. § 9621(a) (Supp. V 1987).
36. CERCLA § 121(b), 42 U.S.C. § 9621(b) (Supp. V 1987).

> Although the new Act appears strengthened by inclusion of cleanup requirements from specific environmental statutes, this strength is largely illusory. The statutory provisions cited by the Act must still be legally applicable or relevant and appropriate, and broad waivers from requirements continue to be available. Determinations regarding these matters, as in the previous regulations, are apparently still left to EPA . . . . Thus, the new Act may not differ substantially from the 1980 CERCLA statute and regulations, in terms of providing a durable standard of cleanliness for hazardous waste sites.[37]

As was the case with the 1980 version of Superfund, EPA had the ability in the NCP to fill in the many gaps on cleanup standards still left open by the 1986 SARA amendments. Over two years after the enactment of SARA, on December 21, 1988, EPA proposed revisions to the NCP to implement SARA.[38] On February 2, 1990, four years after SARA, after the National Resources Defense Counsel sued EPA for failure to revise the NCP as SARA required within 18 months after SARA's enactment, EPA delivered to the Federal Register the revised NCP.[39]

Further guidance on remedial actions for contaminated groundwater at Superfund sites is described in an EPA guidance document of that name in published in February of 1989.[40]

The 1990 version of the NCP derives from the new Superfund section 121, the following nine criteria that are to be considered in selecting a remedy at a Superfund site:

> (1) Overall protection of human health and the environment (See discussion below);
> (2) Whether the remedy attains the applicable or relevant and appropriate requirements (ARARs) of Federal or State laws (See discussion below) or warrants a waiver recognized by the statute;[41]

37. Sheridan, *supra* note 20, at 24.

38. 53 Fed. Reg. 51,394 (Dec. 21, 1988) (to be codified at 40 C.F.R. pt. 300). For a discussion of the history of the NCP up to the these propose revisions *see* Freedman, *supra* note 28.

39. *See* Consent Decree, NRDC v. William Reilly, No. 88-198 (D. Colo. 1988). SARA requires that no later than 18 months after enactment of SARA, the President shall revise the NCP. 42 U.S.C. § 9605(b).

40. EPA, GUIDANCE ON REMEDIAL ACTIONS FOR CONTAMINATED GROUND WATER AT SUPERFUND SITES (Feb. 1989).

41. Six waivers to meeting ARARs are recognized by § 121(d)(4). 42 U.S.C. § 9621(d)(4). These waivers are: (1) When the remedy is interim; (2) When there is greater risk to health and the environment through the implementation of the remedy; (3) When it is technically impractical to implement the remedy; (4) When an alternative remedy would acquire an equivalent standard of performance; (5) Where a state ARAR has

(3) The long term effectiveness and permanence of the remedy;
(4) The remedy's reduction of toxicity, mobility, or volume;
(5) The remedy's short term effectiveness;
(6) The remedy's implementability;
(7) The remedy's cost-effectiveness;
(8) The state's acceptance of the remedy;
(9) The community's acceptance of the remedy.[42]

The NCP asserts that the first two criteria, protection of health and the environment and compliance with ARARs, are "threshold" criteria; they must be met unless EPA determines that a statutory variance from an ARAR is appropriate.[43] Criteria three through seven are factors to be balanced in determining which of the alternative remedies is appropriate.[44] Criteria eight and nine are identified as modifying criteria, that is, criteria that need only be considered in selecting the remedy.[45]

Because the first two criteria for selecting a remedy must be achieved by all remedies before cost is taken into account, the NCP would initially appear to stand for the proposition that the environmental goals identified in the statute may not be attenuated by cost considerations. In fact, the NCP recognizes that cost considerations are to be factored into the remedial selection process *only* after the environmental goal of the remedy has been determined through identification of ARARs.[46] The preamble to the NCP states:

> EPA believes that cost can only be used in selecting a remedy from among protective alternatives. The remedy selection process requires that alternatives must be demonstrated to be protective and ARAR-compliant (or justify a waiver) in order to be eligible for consideration in the balancing process by which the remedy is selected. This sequence of steps assures that the selected remedy will be protective of human health and the environment and that protection of human health and the environment will not be compromised by other selection factors, such as cost.[47]

been inconsistently applied; (6) When necessary for fund balancing. For a discussion of the ARAR waivers *see* Freedman, *supra* note 28, at 10,131.

42. 55 Fed. Reg. 8,849 (1990) (to be codified at 40 C.F.R. § 300.430 (e)(9)).

43. 55 Fed. Reg. 8,850 (1990) (to be codified at 40 C.F.R. § 300.430(f)(i)).

44. *Id.*

45. *Id.*

46. *See* preamble to the NCP, Subpart E, Role of Cost in cost-effectiveness determination, 55 Fed. Reg. 8,726 (1990).

47. *Id.*

A "cost-effectiveness" review of the remedial action alternatives is appropriate, therefore, only among alternatives that are capable of meeting the environmental protection goals that are determined in remedy selection criteria one and two. The legislative history of SARA also makes it clear that although the remedy selected by EPA must be "cost-effective" this consideration is to be considered ONLY AFTER THE ENVIRONMENTAL PROTECTION GOALS HAVE BEEN ESTABLISHED. For instance, the Congressional Record states in relevant part:

> The provision that actions under both section 104 and 106 must be cost-effective is a recognition of EPA's existing policy under the NCP. An analysis of cost effectiveness begins only after a remedial action has been selected in compliance with the health and environmental protection requirements, permanent treatment requirements, and other standards, criteria or other limitations imposed under law. The cost effectiveness requirement here, as under current law, does not apply to the selection of the remedial action but rather applies to the selection of the least costly alternative method of effectively implementing a remedial action once one has been selected. [48] (emphasis added)

In addition the Conference Committee Report on SARA states that:

> The term 'cost-effective' means that in determining the appropriate level of cleanup the [agency] *first determines the appropriate level of environmental and health protection to be achieved and then selects a cost-efficient means of achieving that goal.* Only after the [agency] determines, by selection of applicable or relevant and appropriate requirements, that adequate protection of human health and the environment will be achieved, is it appropriate to consider cost-effectiveness.[49] (emphasis added)

In addition to the new NCP, the 1985 NCP also made it clear that cost considerations, although relevant for choosing among remedies, were not to become the basis for waiving or otherwise modifying environmental protection goals.[50]

In the new NCP, EPA agrees that the above legislative history accurately characterizes the role of cost in selecting the remedy under the law. The preamble to the NCP says:

> EPA agrees that cost can only be considered in selecting a remedy from protective alternatives. The remedy selection process requires that alternatives must be demonstrated to be protec-

48. S. REP. No. 14913, 99th Cong., 2d Sess. (Oct. 3, 1986).
49. H.R. REP. No. 962, 99th Cong., 2d Sess. 245 (1986).
50. 40 C.F.R. § 300.68(g)(1) (1985).

> tive and ARAR-compliant (or justify a waiver) in order to be eligible for consideration in the balancing process by which the remedy is selected . . . . EPA believes that cost is a relevant consideration as part of the selection of the remedy from among protective, ARAR-compliant alternatives and not as merely as part of the implementation phase.[51]

This analysis leads to the conclusion that if one identifies the type of environmental protection objectives specified in the first two threshold criteria listed above, namely, the requirements to achieve overall protection of human health and the environment and ARARs, then one has determined the degree of environmental protection that should be expected of any cleanup action under Superfund after the remedy is implemented. Such an interpretation further leads to the conclusion that cost considerations are not relevant to the identification of these environmental protection objectives. However, a close examination of other sections of the recent NCP and the EPA guidance on groundwater cleanups under Superfund leads to the conclusion that EPA plans to take cost into consideration at virtually every step of the remedy selection process, including those steps in which environmental objectives and ARARs are selected.[52]

B. *Cleanup Goals That Are Protective Of Human Health And The Environment*

The first threshold criteria to be considered in selecting a remedy are goals that "are protective of human health and the environment."[53] This remedy selection criterion is authority to set cleanup goals where ARARs do not exist. The new NCP provides that a determination of overall protection of the health and the environment "draws on the assessment of other evaluation criteria, especially long-term effectiveness and permanence, short-term effectiveness and permanence and compliance with ARAR.[54] This reference to the other criteria would seem to make the remedy selection criteria of "protection of health and the environment" nothing more than a conclusion that follows from analysis of the other eight remedy selection criteria. However, the preamble to this rule indicates that where ARARs exist, they would be-

51. 55 Fed. Reg. 8,726 (1990).
52. *See infra,* discussion Section III(4) notes 69-148.
53. 55 Fed. Reg. 8,850 (1990) (to be codified at 40 C.F.R. § 300.430(f)(9)(iii)(A)).
54. 55 Fed. Reg. 8,849 (1990) (to be codified at 40 C.F.R. § 300.430 (f)(9)(iii)(A)).

come the goals that satisfy this first criteria.[55] Where an ARAR does not exist or where the baseline risk assessment indicates that cumulative risks—due to synergistic effects from multiple exposure pathways—make ARARs nonprotective, EPA will develop other remediation goals.[56] The following considerations will govern the identification of the goal that will be selected:

> (a) For non-carcinogens, levels that would that would cause no appreciable risk of significant adverse effect during a lifetime;
> (b) For known or suspected carcinogens, concentration levels that represent an increased lifetime cancer risk of 10^{-4} to 10^{-6}. A 10^{-6} level is to be used as a "point of departure" for determining cleanup goals when ARARs are not available or sufficiently protective.[57]

The cleanup goal for carcinogens will be selected from a risk range which states a probability of risk rather than through the identification of a single number that is deemed to be sufficiently protective, because, it is assumed that carcinogens do not exhibit a toxicological threshold effect.[58] In other words, there is no level below which it can be assumed that the chemical will be safe; one molecule of the substance can theoretically trigger a cancer:

> This is usually because the cells that are affected [by a carcinogen] have little or no 'defense' against the chemical and have little or no ability to repair or compensate for damage that is done.[59]

C. *Applicable and Relevant and Appropriate Federal and State Requirements (ARARs)*

The NCP, in accordance with section 121 of CERCLA, requires that remedies attain "applicable or relevant and appropriate requirements under federal or state environmental or facility citing laws or provide for grounds for invoking one of the waivers under paragraph (f)(1)(ii)(C) of this section."[60]

> 'Applicable requirements' means those cleanup standards, standards of control, and other substantive requirements, crite-

55. 55 Fed. Reg. 8,712 (1990).
56. 55 Fed. Reg. 8,713 (1990).
57. *Id.*
58. The UNITED STATES ENVIRONMENTAL PROTECTION AGENCY, TOXICOLOGICAL HANDBOOK, 3-5 (1985).
59. *Id.*
60. 55 Fed. Reg. 8,849 (1990) (to be codified at 40 C.F.R. § 300.430(e)(9)(iii)(B)).

> ria, or limitations that are promulgated under federal environmental or state environmental of facility citing law that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site. Only those state standards that are identified by a state in a timely manner and that are more stringent than federal requirements may be applicable.[61]
>
> 'Relevant and appropriate requirements' means those cleanup standards, standards of control, and other substantive requirements, or limitations promulgated under federal environmental or state environmental or facility citing law, while not 'applicable' to a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site, address the problems or situations sufficiently similar to those encountered at the CERCLA site so that their use is well suited to the particular site. Only those state standards that are identified in a timely manner and are more stringent than federal requirements may be relevant and appropriate.[62]

The NCP thus defines the "applicable" requirements in such a way that an "objective" determination can, in theory, be made of whether there is a federal or state law that applies either to cleanup of the site or the remedy after cleanup is completed.[63] Under this approach, a person who is attempting to determine whether an "applicable" requirement exists need only look to Federal and State laws that apply to air or water pollution, solid or hazardous waste disposal activities, or any other activity that may take place during or at the conclusion of a remedial action to determine whether an "applicable" requirement exists. However, as the discussion below illustrates, EPA's interpretation of "applicable" requirements, at least in some cases, is not as "objective" as one might have initially concluded from this description.[64]

A determination of "relevant and appropriate" requirements, however, is not as "objective" according to any theory.

> Applicable requirements were those that would be legally applicable but for CERCLA's implied repeal of other laws. Relevant and appropriate requirements. . . . are designed to apply to problems sufficiently similar to those encountered at CERCLA sites that their application is appropriate. Requirements may be relevant and appropriate if they would be 'applicable' but for jurisdictional restrictions associated with the require-

61. 55 Fed. Reg. 8,814 (1990) (to be codified at 40 C.F.R. § 300.5).
62. 55 Fed.Reg. 8,814 (1990) (to be codified at 40 C.F.R. § 300.5).
63. 55 Fed. Reg. 8,814 (1990).
64. *See infra* discussion, Section III(4)(B).

> ment. . . The term "applicable" was viewed as relatively objective; EPA or another lead agency had only to discern, as would any private party taking similar action, what federal environmental standards applied to the action in question, given its time and place, and the identity of the action. Determining which actions were 'relevant and appropriate' however, was a more subjective matter, requiring the exercise of considerable discretion.[65]

The 1990 NCP attempts to provide further guidance on what constitutes "relevant and appropriate." The rule lists eight factors to be considered in making a determination of whether a rule is "relevant and appropriate." These are:

> (a) The purpose of the requirement and the purpose of the CERCLA action;
> (b) The medium regulated or affected by the requirement and media contaminated or affected at the CERCLA site;
> (c) The substances regulated by the requirement and the substances found at the CERCLA site;
> (d) The actions or activities regulated by the requirement and the remedial action contemplated at the CERCLA site;
> (e) Any variances, waivers, or exemptions of the requirement are available for the circumstances of the CERCLA site;
> (f) The type of place regulated and the type of place affected by the release or CERCLA action;
> (g) The type or size of the structure or facility regulated and the type and size of structure or facility affected by the release or contemplated by the CERCLA action;
> (h) Any consideration of use or potential use of the affected resources in the requirement and the use or potential use of the affected resource at the CERCLA site.[66]

These factors are obviously so broad, ambiguous, and subject to interpretation that they give almost unlimited discretion to EPA in determining whether a requirement is "relevant and appropriate." For example, EPA has constructed guidance on determinations of "relevant and appropriate" that allow it to determine that a cleanup standard that has been promulgated under another law is not relevant and appropriate if in its judgement:

> (1) under (a) above, the purposes of the non-Superfund statute are different from Superfund noting that all laws differ to some extent from the purposes of Superfund which is a cleanup statute rather than a regulatory law. Under this factor, EPA can,

65. Freedman, *supra* note 28, at 10110.
66. 55 Fed. Reg. 8,841 (1990) (to be codified at 40 C.F.R. § 300.400(g)(2)).

> for example, simply declare that because RCRA is a regulatory statute, RCRA cleanup requirements are not relevant and appropriate to the Superfund statute which is a remedial statute (something which EPA has done in some cases, see discussion in Section III(B)(v)); and,
> (2) under (d) above, when actions or activities regulated under the other statute are not similar to the remedial action contemplated under the Superfund, a consideration which allows EPA to exclude any requirement of another environmental law should EPA identify any aspect of the proposed remedial action which is different from the activities regulated under the non-Superfund law.

Senator Mitchell, the chief drafter of Section 121, made a statement on the floor of the Senate in which he attempted to clarify the meaning of "relevant and appropriate."

> The first test of relevance and appropriateness is whether the standard, requirement, criteria, or limitation at issue was developed for the same environmental media as the media contaminated by the Superfund site. Standards developed under the Clean Water Act and the Safe Drinking Water Act would therefore be relevant both to contaminated ground and surface water at a Superfund cleanup, if not already legally applicable. . . .
> The second test of relevance and appropriateness involves a determination of which environmental media serve as pathways for actual or potential human or environmental exposure to a hazardous substance, pollutant or contaminant. Once such pathways are determined, the purposes for which the standard, requirement, criteria, or limitation at issue was developed should be considered. . . .
> Finally, in determining the relevance and appropriateness of standards, requirements, criteria, or limitations, EPA should consider not only pathways exposure but also the impact on the environment of contamination from a Superfund site. . . . Perhaps the most obvious example of this latter phenomenon is contamination of the human food chain by releases from Superfund sites.[67]

The eight NCP factors for determining the relevance and appropriateness of a cleanup standard are broader than the guidance contained in this legislative history. EPA has therefore failed to develop a rule that will prevent the AD HOC decision-making on cleanup standards for which EPA has been so frequently criticized in the past.[68] Given that EPA could always invoke one

67. 132 CONG. REC., S14915 (Oct. 3, 1986).
68. *See* Sheridan, *supra* note 20.

of the six ARAR waivers to circumvent the consequences of an ARAR it could not live with, the failure to be more specific on its interpretation of relevant and appropriate could be construed as a political preference for a finding that a standard is not relevant and appropriate rather than declaring that a cleanup standard has been waived for cost considerations.[69]

D. *The Superfund Cleanup Standards Described In The NCP Provide EPA With Unlimited Discretion To Take Cost Or Other Factors Into Account In Determining "Acceptable" Cleanup Levels*

The struggle between EPA and the Office of Management and Budget(OMB) on the relationship between cost and cleanup standards under SARA section 121 has been well documented.[70] For example, it has been reported that the final NCP provisions on cleanup standards "were a compromise [by EPA] with OMB over the range of allowable contamination that can remain at a Superfund site after cleanup. . . ."[71] In another example, the February 15, 1989 edition of INSIDE EPA: SUPERFUND REPORT contains the following statement about the role of OMB in the struggle with EPA on the extent to which cost considerations should be factored into cleanup standards decisions:

> The internal documents [between EPA and OMB] reveal a heated battle over sensitive subjects in the NCP, such as the role of cost in remedy selection and expanded use of institutional controls (such as fences, deed restrictions) at sites. Environmentalists and some in Congress have faulted EPA for considering cost and institutional controls in the remedy selection process, maintaining that the Superfund law indicates a preference for remedies that permanently treat waste. . . . The papers also indicate that OMB attempted to limit participation by the public and states in the remedy selection process and show that OMB sought to increase the amount of contaminants allowed to remain at a Superfund site.[72]

This section of this article identifies additional provisions of the NCP that allow EPA to take cost into consideration in setting cleanup standards under Superfund in individual cases. Although it initially appeared that SARA would increase the specificity of

69. For identification of ARAR waivers *see* note 41.
70. *See, e.g.*, Inside EPA, Superfund Report at 9 (November 9, 1988).
71. *Id.*
72. Inside EPA, Superfund Report at 15 (February 15, 1989).

Superfund's approach to the "acceptability" of cleanup standards, EPA has crafted an NCP that allows EPA to retain virtually unlimited discretion to take cost into account in establishing cleanup standards. The NCP allows EPA to have virtually unlimited discretion in selecting "acceptable" cleanup remedies at many sections of the proposed NCP including, but not limited to, the following:

1. Provisions of the NCP relating to protection of health and the environment

(a) The risk range

As stated in section III(2) above, EPA has defined a range of acceptable health risks from cancer-causing substances by which cleanups will be judged "acceptable" in the NCP.[73] This provision proposes to establish, as generally acceptable, cleanup levels where the surrounding population will be subject to a cancer risk from 1 in 10,000, generally referred to as a 10^{-4}risk, to 1 in 1,000,000, generally referred to as a 10^{-6} risk, but with the "point of departure" risk to be than 1 in 1,000,000.[74] Obviously a risk range for carcinogens has been identified so that cost can be taken into account in determining the environmental protection goals of the remedial action. But this is inconsistent with the above referenced statements made in the NCP that cost should not be taken into account until AFTER the environmental protection goals and the ARARs have been identified.

In response to comments that asserted that EPA should not have identified a risk range as constituting acceptable cleanup standards, the preamble to the NCP states that:

> EPA believes that use of a risk range is consistent with the mandates of CERCLA and disagrees with comments that Superfund should not use a risk range. CERCLA does not require the complete elimination of risk or of all known or adverse effects, i.e., remedies under CERCLA are not required to entirely eliminate potential exposure to carcinogens.[75]

However, the above referenced legislative history that has been adopted by EPA makes it clear that cost was not to be taken into account in setting the environmental protection goals. Since a risk range of $10^{-4}$to 10^{-6} creates a discretionary range of one

73. 55 Fed. Reg. 8,848 (1990) (to be codified at 40 C.F.R. § 300.430(e)(2)(i)(A)(2)).
74. *Id.*
75. 55 Fed. Reg. 8,716 (1990).

hundredfold to take cost into consideration when selecting a remedy, an argument can be made that the chosen risk range is inconsistent with those provisions of the statute that prohibit consideration of costs in the a selection of the remedy until after the environmental protection goals have been chosen. EPA's justification of the chosen risk range—that "CERCLA does not require the complete elimination of the risk" begs the question. EPA could have chosen a risk protection goal such as 10^{-6} as the risk that it deemed to be adequately protective without taking the position that all risk had to be eliminated. In fact the NCP recognizes that 10^{-6} represent a risk that it generally believes to be adequately protective in the NCP discussion of this risk as the "point of departure." The NCP explains EPA's interpretation of 10^{-6} risk as a "point of departure" as follows:

> The use of 10^{-6} [as a point of departure] expresses EPA's preference for remediation actions that result in risks at the more protective end of the remedial range, but this does not reflect a presumption that the final remedial action should retain such a risk level. Factors related to exposure, uncertainty and technical limitations may justify modification of initial cleanup levels that are based on the 10^{-6} risk level. The ultimate decision on what level of protection will be appropriate depends on the selected remedy, which is based on the criteria described in § 300.430(e)(9)(iii). . . . Cost is ultimately one of the criteria used in selecting the remedy.[76]

A range of "acceptable" carcinogenic risks, as compared to a numerically defined risk has obviously been included by EPA in the section of the proposed NCP that defines environmental protection goals so that it can take the costs of the cleanup into consideration when it determines whether the remedy is acceptable.

(b) Engineering and Institutional Controls

The 1990 NCP also adds a section to those provisions of remedy selection criteria entitled "expectations" that further clarifies how the proposed criteria for selecting the appropriate environmental protection goal will be interpreted by EPA.[77] This new section provides in relevant part:

> (B) EPA expects to use engineering controls, such as containment, for waste that poses a relatively low long-term threat or *where treatment is impracticable*. (emphasis added);

76. 55 Fed. Reg. 8,718 (1990).
77. 55 Fed. Reg. 8,846 (1990) (to be codified as 40 C.F.R. § 300.430 (a)(1)(iii)).

> (C) EPA expects to use a combination of methods, as appropriate, to achieve protection of human health and the environment. In appropriate site situations, treatment of the principal threats posed by a site, with priority placed on treating waste that is liquid, highly toxic, or highly mobile, will be combined with engineering controls (such as containment) and institutional controls, as appropriate, for treatment residuals and untreated wastes.
>
> (D) EPA expects to use institutional controls such as water use and deed restrictions to supplement engineering controls as appropriate for short- and long-term management to prevent or limit exposure to hazardous substances, pollutants or contaminants. Institutional controls may be used during the conduct of the remedial investigation/feasibility study (RI/FS) and implementation of the remedial action and, where necessary, as a component of the completed remedy. The use of institutional controls shall not substitute for active response measures (e.g., treatment and/or containment of source material, restoration of ground waters to their beneficial uses) as the sole remedy *unless such active measures are determined not to be practicable, based on the balancing of trade-offs among alternatives that is conducted during the selection of the remedy*.[78] (emphasis added)

Engineering controls that EPA has relied upon as part of a remedy to protect against exposure from hazardous substances have, in the past, included placing fences or barriers around contaminated sites.[79] Institutional controls that EPA has recommended for consideration include placing regulatory restrictions on use and construction of private water wells, the acquisition of real property, requirements that zoning changes be made, restrictions on property transactions including negative covenants and easements, and deed notices.[80]

The NCP thus envisions the use of engineering and institutional controls to supplement remedies that will not be protective of public health unless the engineering or institutional controls are instituted. Such an approach would presumably allow EPA to declare that a risk from a hazardous substance that has been calculated to pose a cancer risk of 10^{-3} from dermal contact or ingestion is "acceptable" when left at a site provided that the site is behind a protective fence or other "engineering control" that

78. *Id.*

79. Both engineering and institutional controls were approved by EPA as a method of making a cleanup acceptable in Consent Decree, U.S. EPA v. Texas Eastern Pipeline Company, No. 88-1917 (S.D. Tex. Aug. 1988) [hereinafter "Texas Eastern Decree"].

80. EPA, GUIDANCE ON REMEDIAL ACTIONS, *supra* note 40, at § 5.2.2.4.

prevents exposure. If institutional controls can make a remedy acceptable because of cost considerations, groundwater that is contaminated need not be cleaned up if deed restrictions were imposed that prevent contaminated water from being used. Such an approach, however, is inconsistent with the premise enunciated in other parts of the proposed NCP and its preamble in that the site remedy should achieve environmental protection goals before considering costs. EPA's desire to use engineering or institutional controls to obtain "acceptable" cleanups must be viewed as an attempt by EPA to maintain for itself the flexibility to take cost into consideration when selecting the environmental protection goals to be achieved by various remedies in a way that is fundamentally inconsistent with the above referenced legislative history on cost-effectiveness.[81] The NCP thus gives EPA almost unlimited flexibility to use fences, deed restrictions, or other institutional or engineering devices to make a remedy "acceptable" where another cleanup remedy that would be necessary to allow unlimited future land uses is deemed by EPA to be too costly.[82] Therefore, if EPA determines that a remedy that proposes to cleanup soils contaminated by PCBs to a level of one part per million after cleanup is too costly, it can simply define a remedy that targets a cleanup level of 25 parts per million as "acceptable" by requiring that the site be placed behind a fence forever thereby limiting exposure.[83]

The Record of Decision, commonly referred to as the ROD, is the Superfund decision document made available to the public in which EPA is required to explain its rationale for the selection of the remedy. If the ROD does not disclose that risk quantification that has been deemed "acceptable" only because the remedy assumes that a chunk of real estate has been written off for most future uses, the public may be fooled by assertions that the remedy is environmentally protective.[84]

81. *See* section III(1), *supra* notes 46-49.

82. *See* discussion in Section III(2).

83. This is the method EPA has followed in determining "acceptability" of cleanup in one case. *See* Texas Eastern Decree, *supra* note 79.

84. For provisions in NCP relating to content of RODs, *see* 55 Fed. Reg. 8,849 (1990) (to be codified at 40 C.F.R. § 300.430(f)(5)). For an example of a ROD that relies on engineering and institutional controls to make a remedy acceptable, *see* discussion of Douglassville ROD, *infra* Section V.

The use of engineering and institutional controls in Superfund remedies, thus, gives EPA almost unlimited discretion to take cost into consideration in selecting "acceptable" cleanup remedies.

2. Provisions in the NCP relating to ARAR determinations

As explained in section III(2) above, a determination of "applicable" requirements would initially seem to be a non-discretionary "objective" determination compared with the more "subjective" determination of "relevant and appropriate" requirements. In the ARARs discussion above, this article concluded that EPA in the NCP has allowed itself much discretion to take cost into consideration in making a determination of whether a requirement is "relevant and appropriate."[85] This section will review how EPA has factored cost into its consideration of whether a requirement is "applicable."

(a) MCLs versus MCLGs

Superfund section 121(d) requires that remedial actions attain maximum contaminant level goals (MCLGs) under the Safe Drinking Water Act (SDWA) where such goals are "relevant and appropriate under the circumstances of the release."[86] The SDWA requires EPA to promulgate national primary drinking water standards, including maximum contaminant levels (MCLs), which represent the maximum permissible concentration in water that may be delivered to any user of a public water system.[87] An MCL is required to be set as close as "feasible" to an MCLG, a level at which no known or anticipated adverse human health effects may occur, with an adequate margin of safety.[88] MCLs are based on the best available technology, taking cost into consideration.[89] In summary, MCLGs are health-based while MCLs are cost limited. While all of the MCLGs for carcinogens have been set at zero, some of the MCLs are at levels approaching 3×10^{-4}, a risk which is technically outside EPA's "acceptable" risk range.[90]

85. *See* discussion Section III(2), *supra*.
86. CERCLA § 121(d)(2), 42 U.S.C. § 9621(d)(2) (Supp. V 1987).
87. SDWA § 1401(3), 42 U.S.C. § 300(f)(3) (1982 & Supp. V 1987).
88. SDWA § 1412(b)(4), 42 U.S.C. § 300g-1(b)(4) (1982 & Supp. V 1987).
89. SDWA §§ 1412(b)(4) and (5), 42 U.S.C. §§ 300g-1(b)(4) and (5) (1982 & Supp. V 1987).
90. Freedman, *supra* note 28 at 10,126, n. 218.

Notwithstanding what appears to be a clear mandate in SARA to identify MCLGs as the applicable ARAR, the NCP states as follows:

> Maximum contaminant level goals (MCLGs) established under the Safe Drinking Water Act, that are set above zero, shall be attained by remedial actions for ground or surface waters that are current or potential sources of drinking water, where the MCLGs are relevant and appropriate under the circumstances of the release based on the factors in § 300.400(g)(2). If an MCLG is determined not to be relevant and appropriate, the corresponding maximum contaminant level (MCL) shall be attained where relevant and appropriate to the circumstance of the release.[91]

On May 22, 1989, EPA proposed MCLs and MCLGs for thirty organic chemicals.[92] Of the thirty chemicals, thirteen had proposed MCLGs set at zero.[93] The following table represents the proposed MCL and MCLG levels for these thirteen chemicals as well as the concentration for these chemicals that EPA has identified as the 10^{-6}risk level. The numbers are expressed in micrograms per liter.[94]

CHEMICAL	MCL	MCLG	10^{-6} RISK
(1)acrylamide	treatment technique	zero	0.0100
(2)alachlor	1.0	zero	0.50
(3)chlorodane	2.0	zero	0.0270
(4)0-dibromochlor-propane(DBCP)	0.2	zero	0.0250
(5)1,2-dichloro-propane	5.0	zero	0.5200
(6)epichlorohydrin	treatment technique	zero	3.54
(7)ethylene-dibromide(EDB)	0.05	zero	0.0004
(8)heptachlor	0.4	zero	0.0760
(9)heptachlor epoxide	0.2	zero	0.0380
(10)polychlorinated biphenyl(PCBs)	0.5	zero	0.0050
(11)styrene	5.0	zero/0.001	none-identified
(12)tetrachloro-ethylene	5.0	zero	none-identified
(13)toxaphene	5.0	zero	0.030

From this chart the following facts can be deduced: (1) the MCLs are usually at least an order of magnitude less stringent than the 10^{-6} risk level; (2) where concentrations are identified for MCLs, the MCLs are always less stringent than the 10^{-6} risk range.

91. 55 Fed. Reg. 8,848 (1990) (to be codified at 40 C.F.R. § 300.430 (e)(2)(B)).

92. 54 Fed. Reg. 22,064 (May 22, 1989).

93. *Id.*

94. For MCLs and MCLGs, *see id.* For 10^{-6} risk numbers, *see* GENERAL ACCOUNTING OFFICE, U.S. CONGRESS, GROUNDWATER PROTECTION, THE USE OF DRINKING WATER BY THE STATES 29 (1988). For styrene, EPA proposed 0.1 mg/l for the MCLG based on a classification of styrene as a class C carcinogen and zero based on a B^2 classification.

In response to those who criticized EPA for not following the clear statutory language in SARA on the applicability of MCLGs, in the preamble to the NCP EPA defended its ability to establish MCLs as the cleanup standard for carcinogens citing the following six reasons:

> (1) EPA believes . . . that where an MCLG is zero level of contaminants (as it is for carcinogens), that MCLG is not "appropriate" for the cleanup of ground and surface water at CERCLA sites. . . . This approach best harmonizes the multiple directions of the statute to consider MCLGs, MCLs, and practicability.[95]

This justification on the grounds of "practicability" could be understood as an admission that costs have been taken into account in setting the legal cleanup standard, for an appeal to the "multiple directions of the statute" is offensive to the plain meaning of the statute that required MCLGs to be the ARAR.

> (2) By requiring CERCLA remedies to attain MCLGs only when 'relevant and appropriate,' section 121(d)(2) of the statute affords EPA considerable discretion. It is EPA's opinion that MCLGs of zero, while reasonable as non-enforceable goals under the SDWA, are not appropriate as cleanup standards under the terms of CERCLA for several reasons. First, the purpose of MCLGs under the SDWA are much different than the purposes of ARARs under CERCLA section 121. Examining the purposes of a requirement is one of the criteria used in the NCP to determine whether a requirement is relevant and appropriate to the circumstances of the release.[96]

This argument must be viewed as nothing more than an amazingly disingenuous attempt to find support for EPA's position. To declare that an MCLG is not relevant and appropriate because the purposes of MCLGs under the SDWA are different than the purposes of ARARs under Superfund is to conveniently forget that it is in section 121 of Superfund that it is declared that MCLGs will be applicable.[97] Clearly, therefore, Superfund, in section 121, has unequivocally declared that there is an identity between the purposes of MCLGs under the SDWA and Superfund cleanup standards.

> (3)EPA also believes that MCLGs of zero are not appropriate for determining actual cleanup levels to be attained under

95. 55 Fed. Reg. 8,751 (1990).
96. 55 Fed. Reg. 8,751-52 (1990).
97. CERCLA § 121(d), 42 U.S.C. § 9621(d).

> CERCLA because CERCLA does not require the complete elimination of risk or of all known or anticipated effects; i.e., remedies under CERCLA are not required to entirely eliminate potential exposure to carcinogens.[98]

Although CERCLA does not require the elimination of all risk or anticipated effects, this argument fails to acknowledge that CERCLA does expressly require that MCLGs be applicable were relevant and appropriate. The plain meaning of the statute could not be clearer, namely, MCLGs shall be the ARAR where relevant and appropriate.

> (4) Another reason that EPA believes that an MCLG of zero is not "appropriate" is that it is impossible to detect whether "true" zero has been attained.[99]

Although it may be difficult to detect a "true" zero there is no legal principle that prevents Congress from establishing the legal liability of a responsible party whenever there is any addition of pollutants to the groundwater or to retain liability for the cleanup of hazardous substance until all pollution has been eliminated.

> (5) EPA's interpretation gives legal effect to another important mandate in CERCLA section 121. In addition to requiring EPA to attain MCLGs where relevant and appropriate, the statute directs EPA to require levels that attain the "requirements" under federal environmental laws, including the SDWA, where legally applicable or relevant and appropriate (section 121 (d)(2)(A)). MCLs are legally enforceable requirements under SDWA. Thus, section 121 appears to require EPA to attain both MCLs and MCLGs, where applicable or relevant and appropriate at CERCLA sites. . . .[100]

This statutory construction strains one's credulity. It is difficult to believe that EPA could with a straight face hold the position that the express requirement of 121 that makes MCLGs an ARAR may be abrogated by other general non-directive provisions of section 121 that simply authorize EPA to identify other ARARs.

> (6) EPA's determination that MCLGs that equal zero are not relevant and appropriate requirements is also consistent with CERCLA section 121 (d)(4)(C), which establishes technical impracticability as a basis for waiving a requirement that would otherwise be applicable or relevant and appropriate. This waiver provision indicates that Congress did not intend standards to be attained if they are impracticable to be met under

98. 55 Fed. Reg. 8,752 (1990).
99. *Id.*
100. *Id.*

> the circumstances of a specific release. EPA has determined that MCLGs equal to zero are not relevant and appropriate because whether that level has been attained cannot be verified under the circumstances of any release.[101]

Again, this argument confuses the problems of measuring zero with the legal duty imposed on EPA by Congress to define the success of a remedy at a level where all pollutants are removed from the site. If EPA were only worried about the enforceability of an MCLG of zero, it could have specified that enforcement would take place at any number above the detection limit of available measuring instrumentation.

During the floor debate over SARA, Senator George Mitchell (D-Maine), a member of the House-Senate conference committee on SARA explained why Congress chose MCLGs over MCLs:

> Section 121(d) specifically requires application of maximum contaminant level goals . . . whenever they are relevant and appropriate. The Congress chose to apply MCLGs instead of relying on MCLs because MCLGs are based solely on public health considerations. MCLs can reflect the modification and loosening of such health based standards on the basis of cost considerations that should not be applied to Superfund cleanups. Use of MCLs for superfund cleanups could result in cleanups that do not protect human health and the environment.[102]

Although it is conceded that reasonable people might disagree on whether it is wise from a public policy perspective to require MCLGs because costs of cleanup might be dramatically increased by such a requirement, this legislative history indicates that Congress could not have been more explicit in its attempt to determine by law how this important public policy issue should be resolved.

(b) ARAR waivers

Section III(1) of this article makes reference to six criteria contained in SARA which authorize EPA to waive an otherwise appropriate ARAR.[103] These criteria are repeated in the NCP, which states:

> An alternative that does not meet an ARAR under federal environmental or state environmental or facility citing laws may be selected under the following circumstances:

101. *Id.*
102. S. REP. No. 14915-16, 99th Cong. 2d Sess. (Oct. 3, 1986).
103. *See* Section III(1), *supra*.

> (1) The alternative is an interim measure and will become part of a total remedial action that will attain the applicable or relevant and appropriate federal or state requirement;
> (2) Compliance with the requirement will result in greater risk to human health and the environment than other alternatives;
> (3) Compliance with the requirement is technically impractical from an engineering perspective;
> (4) The alternative will achieve a standard of performance that is equivalent to that required under the otherwise applicable standard, requirement, or limitation through use of another method or approach;
> (5) With respect to a state requirement, the state has not consistently applied, or demonstrated the intention to consistently apply, the promulgated requirement in similar circumstances at other remedial actions within the state; or
> (6) For Fund-financed response actions only, an alternative that attains the ARAR will not provide a balance between the need for protection of human health and the environment at the site and the availability of Fund monies to respond to other sites that may present a threat to human health and the environment.[104]

The preamble to the NCP provides some explanations of how EPA will be interpret these variances.[105] The EPA interpretation of waiver (3), technical impracticality, is as follows:

> EPA generally believes that cost should generally play a subordinate role in determining practicability from an engineering perspective. Engineering practice is in reality ultimately limited by costs, hence costs may legitimately be considered in determining what is ultimately practicable.[106]

The legislative history on this provision is somewhat in conflict with this interpretation:

> Section 121(d) provides that a remedial action which does not comply with a legally applicable or relevant and appropriate standard . . . may be selected only if the President makes one or more of six affirmative findings. Such findings must be made on a site-by-site basis and are subject to the public participation requirements of the legislation. . . .
> The third finding is that compliance with such requirements is technologically impracticable from an engineering perspective. Once again, this finding should apply to a small number of rela-

104. 55 Fed. Reg. 8,850 (1990) (to be codified at 40 C.F.R. § 300.430(f)(1)(ii)(C)).
105. 55 Fed. Reg. 8,747-48 (1990).
106. 55 Fed. Reg. 8,748 (1990).

> tively unusual situations where no technologies for hazardous waste treatment, destruction, or disposal have been developed that would meet the requirements. . . . Cost is not an appropriate consideration under this finding.[107]

Once again, therefore, EPA has chosen an interpretation of a provision that it is at odds with the legislative history.

(c) Groundwater classification

Despite Superfund section 121's requirements to select remedies that will protect the health and the environment and achieve ARARs, EPA has in the NCP announced its intention to use its groundwater classification scheme to modify cleanup standards under Superfund.[108] The preamble to the NCP explains that the degree of cleanup of contaminated groundwater that EPA will require at Superfund sites will depend upon the classification of the contaminated groundwater.[109]

The groundwater classification scheme that EPA will follow at CERCLA sites includes the following classifications:

> Class I groundwaters: resources of unusually high value that are highly vulnerable to contamination because of the hydrogeological character of the areas where they occur. . . .
> Class II groundwaters: all non-Class I ground waters that are currently used (IIA) or are potentially available (IIB) for drinking water or other beneficial uses. . . .
> Class III groundwaters: are not considered to be potential sources of drinking water and are of limited beneficial use. These are ground waters which are highly saline, or otherwise contaminated beyond levels that allow restoration using methods *reasonably* employed in public water systems. This condition must not be attributable to a specific site. . . .(emphasis added)[110]

The preamble to the NCP also announces that in implementing Superfund cleanups for contaminated groundwater, EPA will develop restoration time frames for each site.[111] Restoration time periods refer to the period of time that will be allowed to achieve established remediation levels.[112] Restoration periods may range from very rapid periods (one to five years) to relatively extended

107. CONG. REC. S. 14916-17 (Oct. 3, 1986) (statement of Sen. Mitchell).
108. 55 Fed. Reg. 8,732 (1990).
109. *Id. See also,* Guidance On Remedial Actions, *supra* note 40.
110. *Id.*
111. 55 Fed. Reg. 8,732 (1990).
112. *Id.*

periods (perhaps decades).[113] In determining restoration time frames EPA may take several factors into consideration, according to the preamble of the NCP.

> The Superfund program will usually consider several different alternative restoration time periods and methodologies to achieve the preliminary remediation goal and select the most appropriate option (including the final remediation goal) by balancing trade-offs of long-term effectiveness, reductions of toxicity, mobility, or volume through treatment, short-term effectiveness, implementability and cost.[114]

For class I and II groundwater the NCP declares that MCLs and non-zero MCLGs are the generally applicable or relevant and appropriate standard.[115] This must be understood as a declaration by EPA that despite the fact that a more stringent ARAR groundwater standard might be applicable under the Resource Conservation and Recovery Act and regulations promulgated thereunder, the less environmentally stringent MCL will always be deemed to be the appropriate ARAR.[116] RCRA regulations require RCRA sites be cleaned up to either background or MCLs or to alternatives that are available through a variance procedure, commonly referred to as the ACL procedure, standing for alternative concentration limit.[117] EPA has therefore determined, at least in this instance, that if there is more than one ARAR that is applicable to a remedy, the least environmentally stringent shall be deemed appropriate under Superfund. This approach is obviously of questionable legal validity under Superfund. In fact, a statement by Congressman Robert Roe of New Jersey supports the conclusion that Congress intended EPA to select the most stringent ARAR where more than one exists.

> Where two applicable, relevant or appropriate Federal or State standards, requirements, criteria, or limitations pertain to the same situation, or to the same hazardous substance, pollutant or contaminant, *the most stringent one shall be used in selecting a remedial action.*[118](emphasis added)

113. *Id.*

114. *Id.*

115. *Id.*

116. Regulations implementing RCRA cleanup standards are found at 40 C.F.R. § 264(F) (1982).

117. *Id.*

118. 132 CONG. REC. H9600 (Oct. 8, 1986) (statement of Congressman Roe).

And so for class I and II groundwaters the NCP allows EPA to select remedies that may take decades to implement based upon cost.

But of even greater concern, from both an environmental and legal point of view, is how EPA has handled Class III groundwaters under the NCP. EPA states in the NCP that for Class III groundwaters, MCLs nor MCLGs are neither applicable nor relevant and appropriate.[119] Restoration periods and remediation levels that will have to be achieved only need meet the "beneficial uses" of the ground water.[120] Since, by definition Class III waters are not currently capable of meeting most "beneficial uses," it seems apparent that the proposed NCP defines a cleanup scheme that envisions no cleanup of Class III groundwaters. In this way the groundwater classification scheme seems to unlawfully trump RCRA or other relevant and appropriate standards. Such an approach appears to be premised on the assumption that if a groundwater system is already contaminated, it makes no sense to require cleanup of the site. However, such logic not only overlooks the clearly relevant law, the requirement that ARARs be applied to cleanups, but ignores the fact that if contaminated groundwater systems are going to be remediated, regulators must begin somewhere. The NCP groundwater classification scheme and its implementation unlawfully writes-off those groundwater systems that have been contaminated by many sources.

The groundwater protection strategy in the NCP, thus, becomes a super ARAR that has no basis in law. It unlawfully allows cost considerations to set remediation goals, allows such no-treatment techniques such as natural attenuation to allow decades of time to treat groundwater, and writes off contaminated groundwater from remediation that is otherwise required under the law.

(d) RCRA applicability

The Resource Conservation and Recovery Act (RCRA)[121] was passed in 1976 to create a cradle-to-grave regulatory program for hazardous wastes. Of all the environmental statutes that would seem, at first blush, to be applicable or relevant and appropriate

119. 55 Fed. Reg. 8,732 (1990).

120. *Id.*

121. 42 U.S.C. § 6901 (1982 & Supp. V) was passed in 1976 as a series of amendments to the Solid Waste Disposal Act of 1965, 79 Stat. 997 (1966). The amendments were so extensive that they are commonly referred to as RCRA.

to Superfund actions, RCRA is the first to come to mind because it is most analogous to Superfund. Both statutes specify how hazardous wastes shall be cleaned up. Both statutes provide for corrective or remedial action once improper waste management has caused a release to occur. Superfund expressly includes RCRA wastes in its definition of hazardous substances when it says that "a hazardous substance is any hazardous waste having the characteristics identified under the Solid Waste Disposal Act [RCRA]."[122] Despite the obvious similarity between these statutes and the strong intuitive sense of applicability of RCRA, EPA, under the Reagan administration, consistently and disingenuously attempted to restrict the application of RCRA because it believed that costs of complying with RCRA would drive Superfund cleanup costs to levels that were deemed to be unacceptable.[123] Steven Smith, an attorney for EPA's Office of Enforcement and Compliance Monitoring-Waste Division who was involved with the development by EPA of the NCP and ARARs since at least 1985, describes, in a most remarkable article, EPA's failed attempts over the history of Superfund to read RCRA in such a way that it would have the most limited applicability to Superfund cleanups.[124] Smith describes EPA's various attempts to structure RCRA jurisdictional requirements so that RCRA would rarely be applicable as a Superfund ARAR. EPA's desire to read RCRA out of Superfund was motivated, of course, because compliance with the tougher cleanup standards in RCRA would drive costs to levels which were "unacceptable" to EPA.[125]

Two examples of RCRA regulations that are environmentally stringent and which would drive up remedial costs are the groundwater cleanup levels and closure requirements that apply to the closure of RCRA hazardous waste disposal facilities. For instance, regulations specifying maximum concentrations of constituents for groundwater that apply to closure of RCRA facilities include the following:

(A) groundwater cleanup must attain:
(1) A background level; or
(2) One of 14 expressly listed MCLs;

122. CERCLA § 101, 42 U.S.C. § 9601(14) (1982 & Supp. V 1987).
123. *See* Smith, *CERCLA Compliance With RCRA: The Labyrinth*, 18 Envtl. L. Rep. (Envtl. L. Inst.) 10,518.
124. *See id.*
125. *Id.*

(3) An alternative concentration limit that will not pose a substantial or potential hazard to human health or the environment as long as the alternate concentration limit is not being exceeded.[126]

(B) RCRA facility closure requirements allow owner/operators of RCRA facilities only two options when closing that facility:

(1) Clean closure, a requirement that all contaminated substances, including contaminated soils, are removed from the site.[127] This requirement is generally referred to as the edible soil/drinkable leachate requirement. It prohibits remedies such as capping that merely contain the hazardous substances on the site.

(2) Landfill closure, although containment remedies such as capping are allowed, this option requires that a vegetative cover be established on the site and 30 years of post-closure care and maintenance, including groundwater monitoring that is designed to assure that the above referenced groundwater protection standards are not exceeded.[128]

These requirements obviously are more environmentally protective than the MCL cleanup standards.

According to the Smith article, EPA, on several occasions, attempted to structure jurisdictional tests on the applicability of RCRA to Superfund that had the effect of undermining RCRA.[129] EPA first attempted to read RCRA closure regulations so that the EPA, before it could assert that the closure requirements applied to a Superfund site, would have to prove that any substance found at a Superfund site was originally disposed of after the effective date of RCRA in November of 1980.[130] This requirement to find that the disposal took place before 1980 would be a condition precedent to finding RCRA applicability. Yet Superfund would apply to those sites after 1980 and therefore would arguably dispose of those wastes at the time that the Superfund remedy was implemented.[131] When EPA realized that this narrow reading of the jurisdictional requirements of RCRA would undermine RCRA enforcement efforts at non-Superfund sites, EPA had to devise some other way to make RCRA sites fail Superfund tests of appli-

126. 40 C.F.R. § 264.94 (1983).

127. *See, e.g.*, 40 C.F.R. § 264.220-249 (1989) (surface impoundments); *see* closure and post closure, 40 CFR § 264.110-120 (1989).

128. *Id.*

129. Smith, *supra* note 123, at 10,534.

130. *Id.*

131. *Id.* at 10,533.

cability.[132] After attempting to structure several other jurisdictional tests for RCRA that would make RCRA sites fail Superfund applicability questions, EPA finally created a "two fold objective test for the applicability of RCRA, and then adjusted the test so that many CERCLA actions will *fail* the test, thus RCRA disposal regulations will not be applicable to many [Superfund] remedial sites."[133] (emphasis added).

The first prong of the test is a determination of whether the hazardous substances at the site are RCRA wastes.[134] EPA guidance developed to avoid the RCRA closure requirements for Superfund cases specifies that in the absence of information demonstrating that a substance found at a Superfund site is a RCRA waste, there is a presumption that it is *not* a RCRA waste and therefore the RCRA cleanup standard is not an "applicable" Superfund cleanup standard.[135] (emphasis added) The second prong of the RCRA applicability test specifies that provided the Superfund remedial action does not remove RCRA wastes from an area defined as the Superfund unit, RCRA cleanup standards will not apply.[136] That is, EPA created a new definition of "disposal" and "unit" under RCRA so that RCRA disposal regulations will not apply to Superfund sites.[137] Moreover, Mr. Smith asserts that the test to determine and thereby avoid RCRA applicability under Superfund has become an "arcane semantical conundrum."[138] As a result, few people in EPA understand that consistent application of the rule is not now possible.[139] Further Mr. Smith admits that the final rule that specifies the applicability of RCRA cleanup standards to Superfund is based upon "tenuous legal interpretations" [of RCRA].[140]

Therefore, EPA officials, rather than looking to the law for guidance to resolve an issue of important public consequence, namely, how clean must a Superfund site be after a remedy is implemented, were willing to construct a test that had little or no foundation in law and that is so complicated that even those who

132. *Id.*
133. *Id.* at 10,539.
134. *Id.*
135. *Id.*
136. *Id.*
137. *Id.*
138. *Id.* at 10,528.
139. *Id.*
140. *Id.* at 10,538.

are responsible for implementing it have difficulty understanding it. All of this was done, of course, so that EPA could make cleanup 'adequacy' decisions based on cost, something which the legislative history of SARA and the NCP prohibited.[141]

v. Remedy selection methodology

The 1990 NCP establishes the following remedy selection process that is developed initially in the feasibility study:

> I-Development of alternatives that protect health and the environment.[142]
> II-Establish remedial action objectives.[143]
> III-Identify and evaluate potentially suitable technologies including innovative technologies.[144]
> IV-Assemble suitable technologies into alternative remedial actions.[145]
> V-Prepare a detailed analysis on a limited number of alternatives for compliance with the remedy selection criteria of: (1) overall protection of the environment, (2) compliance with ARARs, (3) long-term effectiveness, (4) reduction of toxicity, mobility, or volume through treatment, (5) short-term effectiveness, (6) implementability, (7) cost, (8) state acceptance, (9) community acceptance.[146]
> VI-Develop a proposed remedy and select the remedy after providing opportunity for public comment.[147]

This rule on remedy selection confirms that general environmental protection and ARAR compliance are threshold criteria to be achieved before cost is considered in final remedy selection, that is, step VI above.[148] However, when the original alternatives are selected for detailed analysis, that is in step IV above, the NCP specifies that:

> The costs of construction and any long-term costs to operate and maintain the alternatives shall be considered. Costs that are grossly excessive compared to overall effectiveness may be considered as one of several factors used to eliminate alternatives.[149]

141. *See* Section III(1), *supra*.
142. 55 Fed. Reg. 8,848 (1990) (to be codified at 40 C.F.R. § 300.430(e)(1)).
143. *Id.* (to be codified at 40 C.F.R. § 300.430(e)(2)(i)).
144. *Id.* (to be codified at 40 C.F.R. § 300.430(e)(2)(ii)).
145. *Id.* (to be codified at 40 C.F.R. § 300.430 (e)(2)(iii)).
146. 55 Fed. Reg. 8,849 (1990) (to be codified at 40 C.F.R. § 300.430 (e)(9)).
147. 55 Fed. Reg. 8,850 (1990) (to be codified at 40 C.F.R. § 300.430(f)).
148. *Id.*
149. 55 Fed. Reg. 8,849 (1990) (to be codified at 40 C.F.R. § 300.430(e)(7)(iii)).

This screening process in step IV allows costs to eliminate alternatives before detailed analysis of environmental and ARAR compliance is performed in step V. Therefore, only those alternatives that are not excessively costly are analyzed for compliance with the remedy selection threshold criteria. By eliminating remedies from consideration in early screening before detailed analysis of alternatives, this screening process may exclude remedies that might otherwise meet all ARARs or environmental protection requirements. In other words, the remedy selection process in the NCP allows cost considerations to eliminate ARAR-compliant remedies before environmental protection goals are firmly established.

Section 121 of Superfund also states that the President, in selecting a remedy, is to prefer actions in which treatment that permanently and significantly reduces the volume, toxicity and mobility of hazardous substances, pollutants, and contaminants is a principle element.[150] The President is to conduct an assessment of permanent solutions and alternative treatment technologies that will result in a permanent and significant decrease in the toxicity, mobility, or volume of hazardous substances; further he is to select remedies that use such solutions and technologies to the "maximum extent practicable."[151] This statutory provision created a very strong legislative preference for permanent treatment such as incineration of contaminated soils and against containment remedies such as capping. The final NCP, however, classifies the remedy selection criteria of permanent treatment and reduction of toxicity, mobility, or volume along with other "balancing criteria." The rule deals with these issues as follows:

> Each remedial action shall utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. This requirement shall be fulfilled by selecting the alternative that satisfies paragraph (f)(1)(2)(A) [environmental protection] and (B) [ARARs] of this section *and provides the best trade-offs among alternatives in terms of five primary balancing criteria noted in paragraph (f)(1)(i)(B) of this section.* The balancing shall emphasize long-term effectiveness and reduction of toxicity, mobility, or volume through treatment. The balancing shall also consider the preference for

150. CERCLA § 121(b), 42 U.S.C. § 9621(b) (Supp. V 1987).
151. *Id.*

> treatment as a principal element and the bias against off-site land disposal of untreated waste.[152] (emphasis added).

Thus the NCP interprets the statutory requirement that remedies implement permanent solutions "to the maximum extent practicable" through a requirement that this consideration be "balanced" with other criteria including cost. This rule weakens the strong statutory presumption by creating a requirement that permanence of the remedy and reduction of toxicity and mobility be balanced with cost, short and long-term effectiveness, and implementability.

From the above it is obvious that EPA has reserved to itself almost unlimited discretion to take cost into consideration in setting cleanup standards under Superfund. This analysis also reveals that despite the NCP's preamble's assertion that cost considerations are only factored into the remedy selection process after the threshold determinations on health and environmental protection and ARARs have been made, cost considerations can affect these threshold determinations at a variety of steps in the remedy selection process.

It might be argued that cost should be taken into consideration in determining the "adequacy" of a remedy under Superfund, but such considerations seemed to have been limited by Congress. Although it is clear from the analysis so far and the case example that follows that EPA takes cost into consideration at virtually every stage of a remedy selection process, what the public often sees at Superfund sites is limited declarations by EPA that the remedy "adequately" protects public health and the environment.[153] Such declarations, however, hide controversial public policy questions in what appear to be neutral "scientific" findings of fact, questions of toxicity or science rather than politics or values.

IV. DIFFICULT TECHNICAL AND PUBLIC POLICY QUESTIONS POSED BY SITES CONTAMINATED WITH HAZARDOUS SUBSTANCES

The cleanup of sites that have been contaminated by hazardous substances is an extremely complex, uncertain, and controversial

152. 55 Fed. Reg. 8,850-51 (1990) (to be codified at 40 C.F.R. § 300.430(f)(ii)(E)).

153. *See* discussion of Douglassville ROD, *infra* Section V.

enterprise.[154] The scientific uncertainties are vast because of: (1) the uncertainties associated with attempts to describe how contamination is spread throughout a site, especially where the contamination has seeped into the soil and groundwater and therefore is not within the view of investigators, (2) the uncertainties associated with the toxicological effects from the levels of the hazardous substances found at the site or from the levels that will be left at the site after implementing a remedy, and (3) the uncertainties associated with the degree of cleanup of hazardous substances that can be expected from various cleanup remedies which may be implemented.[155] Controversies have arisen in the Superfund because of these uncertainties and because: (1) the costs of cleanup of the sites are usually substantial and may vary considerably depending on their resolution; (2) the complexity of the cleanup endeavor requires that long engineering procedures be followed that include the acquisition of a great amount of data about site conditions and alternative remedies, and (3) EPA is under great pressure to get sites cleaned up in part because of a perceived failure in the early part of the Reagan Administration to accomplish cleanups.[156]

Furthermore, the Superfund law creates a serious conflict of interest for EPA. EPA is expected by Congress both to set cleanup standards that are protective of public health and the environment, taking cost into account only when comparing remedies that will achieve the environmental protection goals, and in addition use the fund to clean up as many sites as possible. If EPA sets cleanup standards in a way that is so very protective of the public health and the environment that cleanup costs skyrocket then the fund will be depleted quickly and EPA is likely to be criti-

154. For a general discussion of the technical complexity associated with the regulation of hazardous substances *see*, D. Brown, *supra* note 9 at 5; *see also* Latin, *Good Science, Bad Regulation and Toxic Risk Assessment*, 5 YALE J. ON REG. 89 (1988).

155. For a discussion of the scientific uncertainty associated with predicting the toxicological effects of various pollutants *see*, D. Brown, *supra* note 9. For a discussion of the scientific uncertainty associated with site characterization, *see* discussion, *infra*, Section IV(1).

156. For two recent studies that identify controversies and criticisms relating to EPA's most recent approaches to Superfund cleanups, *see* OFFICE OF TECHNOLOGY ASSESSMENT, U.S. CONGRESS, ARE WE CLEANING UP? 10 SUPERFUND CASE STUDIES (1988); ENVIRONMENTAL DEFENSE FUND, HAZARDOUS WASTE TREATMENT COUNCIL, NATIONAL AUDUBON SOCIETY, NATIONAL WILDLIFE FEDERATION, NATURAL RESOURCES DEFENSE COUNCIL, SIERRA CLUB, & U.S. PIRG, RIGHT TRAIN, WRONG TRACK: FAILED LEADERSHIP IN SUPERFUND CLEANUP PROGRAM (1988) [hereinafter "RIGHT TRAIN, WRONG TRACK"].

cized for failing to clean up sites. The conflict EPA faces between the need to keep cleanup standards tough enough to protect the environment while not depleting the available funds, combined with controversies related to cost and the speed of cleanup has created a troubling recipe for the poorly conceived public policy choices that EPA has made on cleanup standards.

A. *Scientific Uncertainty and the Identification of Hazardous Substances at the Superfund Site*

At the typical Superfund Site, one will often find a chemical soup of different hazardous chemicals.[157] These chemicals often will have seeped into the soils and groundwater and thereby become invisible to the investigator on the surface.[158] Contrary to the expectations of many, one cannot simply arrive at a site and begin a cleanup. The first major complex technical task that must be performed at a Superfund site is to determine the location and concentration of hazardous chemicals hidden from view. The government needs to employ a variety of technical experts and scientific disciplines, and provide analytic measurements that will enable it to define the problem, i.e., the extent and location of contamination. In a typical case the services of experts skilled in geology, hydrogeology, soils science, chemistry, analytic chemistry, well drilling, sampling methodology, and toxicology will have to be employed to determine what hazardous substances have contaminated the site, how far they have migrated on and beneath the surface, and in what concentrations they will be found at various locations throughout the site or at other locations where future contamination through soils, air, or water may occur.[159] In almost all Superfund cases that involve soil and groundwater contamination, some scientific uncertainty about the extent of the contamination will remain after measurements are made, either because scientific theory is weak about the properties of hazardous substances found at the site or data is incomplete about the presence of these substances.[160]

157. *See, e.g.,* discussion of pollutants at the Douglassville Superfund site, Section V, *infra* note 199. *See also* OFFICE OF TECHNOLOGY ASSESSMENT, U.S. CONGRESS, COMING CLEAN: SUPERFUND'S PROBLEMS CAN BE SOLVED. . . at 4 (1989).

158. *Id.*

159. For a description of EPA guidance on site characterization *see* ENVIRONMENTAL PROTECTION AGENCY, GUIDANCE FOR CONDUCTING REMEDIAL INVESTIGATIONS AND FEASIBILITY STUDIES UNDER CERCLA (1988).

160. *See infra* note 159 and accompanying text.

An EPA guidance document on Superfund cleanups identifies many issues relating to site contamination characterization for which scientific uncertainty can arise in a Superfund case.[161] It states that scientific uncertainty will arise when: (1) attempting to predict the nature, extent, and movement of contamination due to the source volume, concentration, and timing of release, the physical, chemical, and biological characteristics of contaminants, and the contaminant dispersion and diffusion; (2) determining the contaminant movement through soils due to hydraulic conductivity and soil water potential, the moisture content of soil, and the chemical and biological characteristics of soil; and (3) estimating the rate and direction of groundwater flow due to the hydraulic conductivity (viscosity, density, permeability), the anisotropy and heterogeneity of aquifer characteristics (porosity and organic carbon content), aquifer stresses (arising, for example, from groundwater pumping of other wells and infiltration, seasonal variation in groundwater levels), tidal/pressure effects, storage characteristics of the aquifer, the aquifer thickness and areal extent.[162] Some of these uncertainties could, of course, be reduced by gathering additional information but since testing is often very costly there is constant pressure on government officials to keep the data collection tasks to "reasonable levels."[163] For instance, it has been reported that it currently costs $10,000 to drill and properly case each monitoring well at one Pennsylvania site.[164] Because each site is required to have a minimum of four monitoring wells and the average water sample analysis to determine the existence of hazardous chemicals often costs in excess of $1000 per sample, it is easy to see how water sampling costs alone can create significant costs. This creates pressure on the regulatory agency to keep the costs within "reasonable" limits.[165]

Furthermore, some of the uncertainty mentioned above cannot be resolved through additional data collection, either because scientific theory is not available to eliminate or significantly reduce

161. *See* Guidance on Remedial Action, *supra* note 4, at 3.3.5.

162. *Id.* at 3.3.5.

163. *See* Texas Eastern Decree, *supra* note 79, in which it was reported by Texas Eastern Pipeline Company to the Commonwealth of Pennsylvania, Department of Environmental Resources that tens of millions of dollars have been spent on site characterization.

164. *Id.* This information was given verbally to Pennsylvania DER in the Texas Eastern Pipeline case *see supra* note 79.

165. *Id.*

the uncertainty, or because it would be necessary to completely dig up the site to determine site geological characteristics with a high degree of scientific certainty. As a result, the site characterization phase of Superfund cleanups often must rely upon simplifying assumptions that resolve the uncertainty. How these simplifying assumptions are made and characterized may depend on the analyst's values concerning the appropriate degree of environmental conservatism that should be built into assumptions as well as the amount of money that has been made available to define the problem.[166] The level of detail that is developed on a site characterization may be a function of the analyst's view of the amount of data that should satisfy the scientist before a potential problem is excluded from the analysis. In other words, the analyst's view of whether he or she has a burden of proving that a site contains additional pollutants not yet identified in previous analysis may determine how and what pollutants are ultimately identified as those which represent the threat posed to the public health created by the site. If the analyst does not identify how he or she resolved all uncertainties, then trans-scientific policy or ethical discourse about the nature of the danger posed by the site may be distorted by what appears to be neutral scientific descriptions of the site's contamination.

Given that data and theory gaps are likely to be large when one is attempting to accurately describe site contamination, the issue of how scientific uncertainty is resolved is a particularly important public policy question that is rarely discussed in Superfund documents.[167]

B. *Scientific Uncertainty Relating To The Risks Posed By Hazardous Substances Found At a Superfund Site*

To determine the magnitude of the health risks posed by hazardous substances at Superfund sites in order that priorities may be determined among potential sites and ultimate "acceptability" of Superfund remedies may be determined, quantitative risk as-

166. In a related matter, Serge Taylor reported that the determination of what methods and what resources the Army Corps of Engineers employs to predict the environmental impacts of a project often result from a negotiated settlement between the environmental analyst and the project manager, and frequently depend upon such nonscientific criteria as the amount of budget money that is available for the analysis. S. TAYLOR, MAKING BUREAUCRACIES THINK (1984).

167. *See. e.g.*, discussion of Douglassville ROD, Section V, *infra*.

sessments are performed by EPA.[168] Risk assessments attempt to describe the magnitude and probability of threats to the public health or the environment caused by hazardous substances at the site. A risk assessment is usually assumed to be comprised of four major components: (1) hazard identification, a determination of whether a substance will cause an adverse effect to health and the environment; (2) a dose-response assessment, an analysis of the relationship between an administered dose to humans or animals and the incidence of the adverse health effect; (3) exposure assessment, an analysis of the processes and pathways by which contact with a substance creates an opportunity for exposure; and (4) risk characterization, the process of identifying the incidence of adverse health effects under various exposure assessments.[169] Each of these major steps relies upon multiple analytical substeps.[170] For example, the National Academy of Sciences has identified fifty steps in the typical risk assessment of chemical carcinogenicity.[171] The number of scientific questions raised in risk assessment are numerous because of considerable uncertainty that exists about most of the steps in a risk assessment.[172] Scientific uncertainty exists in risk assessment because:

> (1) epidemiological data relating dose rates to human disease does not exist for most hazardous substances; (2) extrapolating dose-response results from animals to humans requires the selection of untested assumptions; (3) effects of exposure may take years or generations to materialize for chronic diseases; (4) human experimentation is excluded on ethical grounds; (5) experiments must assume some dose rates, thereby giving no information about other dose rates; and (6) exposure assessments must rely upon complex models that attempt to describe how pollutants may be transported through air, water,

168. For a discussion of the use of risk assessments in Superfund cases *see* D. Brown, *supra* note 9. *See also* Latin, *supra* note 154, and *Symposium: Risk Assessment In Environmental Law*, 14 COLUM. J. ENVTL. L. 289-624 (1989); Zamuda, *Superfund Risk Assessments: The Process and Past Experience at Uncontrolled Hazardous Waste Sites*, in PAUSTENBACH, *supra* note 9, at 266-96.

169. *See* D. Brown, *supra* note 9, at 184.

170. *Id.*

171. NATIONAL RESEARCH COUNCIL, RISK ASSESSMENT IN THE FEDERAL GOVERNMENT: MANAGING THE PROCESS (1983).

172. *Id.*

> and soil and thereby create exposure opportunities to animals and humans.[173]

Scientific uncertainty is found in risk assessment procedures, just as in the site characterization procedures mentioned above, either because a sound scientific basis for each step has not yet been developed, or because empirical data is inconclusive.[174] Since theory is weak or incomplete, risk assessment quantifications must rely upon the assessor making assumptions for which there is no *a priori* scientific basis that compels the choice of that assumption.[175] Risk assessment procedures, therefore, often rely upon value judgments rather than science. Because science can not determine which assumption should be chosen, choices are based upon the assessor's view of the appropriate degree of conservatism that should be included in the assumptions. Risk assessment procedures, therefore, often depend on value positions rather than science, although the value judgments embedded in the risk assessment are rarely identified or acknowledged.[176]

Because the mere selection of the dose-response curve from several available options can change the level of risk by many orders of magnitude, the potential prejudice of non-scientific influences in risk assessment is great. For instance,

> [o]ne model predicts the lifetime health risks from consuming drinking water containing fifty micrograms per liter of trichloroethylene (TCE) to be approximately 1%, while another predicts the risk to be less than 0.00000001%. As the authors of the article reporting these estimates note: '[t]hese estimates provide a range of uncertainty equivalent to not knowing whether one has enough money to buy a cup of coffee or pay off the national debt.'[177]

The many value assumptions that are necessary to and embedded in risk assessment thus make the apparent precision that is implied by quantification highly questionable. This discussion further shows that "risk-assessment efforts in regulatory proceedings seldom achieve professionally accepted standards of scien-

173. D. Brown, *supra* note 9, at 184. *See also,* Lepse, *Quantitative Risk Assessment in Regulation of Carcinogens,* 4 HARV. ENVTL. L. REV. 86 (1980); *see generally, Symposium on Risk Assessment, supra* note 9.

174. *See* D.Brown, *supra* note 9 at 188.

175. *Id.*

176. *Id.* at 190-92.

177. Krages, *Rats in the Courtroom: The Admissibility of Animal Studies in Toxic Tort Cases,* 2 ENVTL. LAW & LITIGATION 229, 243 (1987) (citing Cothern, Conigilio & Marcus, *Estimating Risk to Human Health,* 20 ENVTL. SCI. & TECH. 111, 115 (1986)).

tific validity and inevitably entail implicit or explicit policy judgments."[178]

Because these non-scientific assumptions drive much of the quantification in risk assessment, EPA has often been criticized for making conservative and therefore overly protective assumptions about risk assessments. These conservative assumptions are alleged to lead to a calculation that overstates the "actual risk." For example, the Reagan Administration Office of Management and Budget (OMB), has often made this charge.[179] One commentator, however, has concluded that:

> Risk assessors often respond to scientific uncertainties by adopting conservative safety-oriented positions on some important issues while they use best-current-scientific guess, middle of the range, methodological-convenience, or least-cost treatments on other material issues. EPA and other agencies have never explained the scientific or policy rationales underlying these inconsistent treatments of uncertainty, and risk managers may not recognize that substantial inconsistency exists.[180]

Another commentator has concluded:

(1) There is no such thing as "actual risk."

(2) Conservatism is inherently no more or less biased a method than alternative approaches.

(3) Only some conservative assumptions are gratuitous.

(4) Not all the inferences we make are made are in fact conservative.

(5) A cascade of truly conservative steps may still yield a reasonable estimate of risk.[181]

In this writer's experience, although many of the assumptions made by risk assessors are conservative and therefore tend to be environmentally protective, others suffer from the opposite defect and therefore may drive the quantification of the risk in such a way that the number may understate the actual risk.[182]

178. Latin, *supra* note 154, at 90.

179. *See* OFFICE OF MANAGEMENT AND BUDGET, REGULATORY PROGRAM OF THE UNITED STATES GOVERNMENT at xxii (1987).

180. Latin, *supra* note 154, at 94.

181. Finkel, *Is Risk Assessment Really Too Conservative?: Revising the Revisionists*, 14 COLUM. J. ENVTL. L. 427, 431 (1989). *See also*, Maxim, *Problems Associated With the Use of Conservative Assumptions in Exposure and Risk Analysis* in PAUSTENBACH, *supra* note 9, at 526-61.

182. The following represent experiences of the writer. Risk assessors in calculating a safe dose for a carcinogen will assume that the individual human receptor is the maximum exposed individual (MEI). The MEI, it is assumed, will be exposed for a 70 year period to

Risk assessment procedures are also controversial because there are many variables within risk assessment that are not dictated by any aspect of the toxicological sciences. These issues are sometimes referred to as risk-management questions, and are generally understood by environmental professionals to raise non-scientific policy questions.[183] For example, risk assessment quantifications must ultimately make assumptions about whether the risk assessment should be calculated based upon the proximity of people that currently live near a Superfund site or whether the calculation should assume that the site will be cleaned up so that all future land uses are possible.[184] In the later case the risk assessment will be calculated so that all water beneath the site

the carcinogen and may drink 2 liters per day of the contaminated water. This of course is a very conservative assumption because few people are threatened with exposure from a carcinogen for 70 years. However, in the same series of calculations on which the safe dose is estimated, the risk assessment quantification will often will be based on the following non-conservative assumptions: (1) The risk assessor will often assume that the highest soil or groundwater measurement represents the highest concentration of that carcinogen found at the site even though the number and placement of the monitoring points are limited because of the cost of monitoring and it is very possible that higher levels of contamination can be found at the site at locations not monitored; (2) The risk assessor will often not calculate the toxicological synergistic effects that may occur when the carcinogen of concern is mixed with other toxic substances found at the site; (3) The risk assessor will often assume that contaminated groundwater will move through geologic rocks very slowly while the contamination is taken up by the rocks by assuming a certain permeability for the aquifer rocks and a certain propensity of the contaminants to be bound up by the rocks through which the contaminated groundwater travels. In this way it is assumed that the contaminated groundwater will become dilute when mixed with other non-contaminated groundwater, however, groundwater may move very quickly and remain undiluted if the groundwater flows through open fractures rather than the semi-porous rocks or if the contaminants are mixed with fluids which will not allow the contaminants to become bound up with the rock material; (4) The risk assessor will often assume that the calculation of the risk to human receptors should be calculated at places where people are located at the time the calculation is made. In other words to determine the risk to humans at a particular site, the risk will be assessed based upon the location of existing drinking wells. This assessment may understate the risk to persons who move closer to the site in the future; (5) The risk assessment may assume that the dose defined as safe will represent the total dose that the human receptor will be exposed to in cases where it is possible that the human receptor may be receiving additional doses from other sources including ambient or background levels; (6) The risk assessment may be based upon animal data where humans are more sensitive to the carcinogen than the animal species that produced the carcinogenic response; (7) The risk assessment may be based on an extrapolation from animals to humans that is based on mass or surface area of the animals and a human which may underestimate the safe dose to an actual human; (8) The risk assessment may assume an average human response of a typical human receptor when certain individuals that are exposed may be unusually susceptible to the carcinogen.

183. *See* D. Brown, *supra* note 9, at 192.

184. Id. at 193.

meets appropriate criteria rather than the water that is currently used in existing wells. Additionally, a risk manager may have to choose between protecting people from contaminated soil by leaving some soil behind a fence or requiring that all the contaminated soil be completely removed or otherwise eliminated. These kinds of decisions are often made in the course of quantifying the risk although the non-scientific nature of these policy judgments are rarely disclosed in the quantification of the risk.[185] These quantifications appear to be scientifically based yet the quantification depends on answering a question that can not be answered by science alone and the nature of the question is inherently prescriptive rather than descriptive.

V. How Has EPA Made Remedy Selections Since SARA? A Case History: The Douglassville Disposal Site, Union Township, Berks County, Pennsylvania

How has EPA exercised the almost unlimited discretion to take cost into account in selecting a remedy in actual cases since the enactment of SARA? A report prepared by the Hazardous Waste Treatment Council and several environmental organizations entitled "Right Train, Wrong Track: Failed Leadership in the Superfund Cleanup Program" reviewed 75 RODs issued by EPA in 1987.[186] This report concluded that of the 75 RODs:

> *sixty-eight percent of the remedies selected in FY '87 failed to use any treatment whatsoever of the sources of contamination at Superfund sites.* Another 24% used only partial treatment or ineffective "treatment" options in the remedy selection process. Only 8% used treatment technologies to the maximum extent practical, as required by law.[187]
>
> EPA also ignored existing environmental standards, set cleanup goals unscientifically, exempted Superfund cleanups from the very environmental regulations it imposes on other waste management facilities (*i.e.* hazardous waste land disposal restrictions and liner requirements for landfills), and ignored

185. Many environmental professionals assert that risk management procedures should be separated from the more scientific risk assessment procedures so that interested parties can identify the transscientific issues that have been considered in a risk management calculation. *See id.* at 192. However, in actual practice risk management decisions are often not kept separate from risk calculation and it is therefore sometimes difficult to determine the policy considerations that have affected the "neutral" calculation of the risk.

186. Right Train; Wrong Track, *supra* note 156.

187. *Id.* at 2.

> the impact of Superfund sites on natural resources in the vast majority of its clean up decisions.[188]

In another study of EPA's implementation of SARA, the Office of Technology Assessment reviewed ten RODs issued after SARA and concluded:

> This report examines two fundamental questions about using technology to clean up toxic waste sites. *First*, is the Superfund program consistently selecting permanently effective treatment technologies which, according to SARA are preferable because they reduce 'toxicity, mobility, or volume' of hazardous wastes? The answer OTA finds is that it is not.
>
> *Second*, are land disposal and containment, both impermanent technologies, still being frequently used? The answer we find is yes.[189]

If these two studies are accurate, in actual cases EPA has reconciled the inherent conflict between large remedy costs and the law by minimizing cleanup costs. This article will next review one very recent Superfund record of decision (ROD) to see how the conflict between the law and costs was resolved.[190] On June 30, 1989, EPA issued a ROD on the Douglassville Superfund site in Union Township, Berks County, Pennsylvania. This case illustrates that many of the theoretical points made in this article thus far about unlawful exercise of discretion are confirmed through the analysis of an actual decision. The Douglassville ROD declares that:

> The selected remedy *is protective of human health and the environment, attains Federal and State requirements that are applicable or relevant and appropriate to this remedial action and* is cost effective. This remedy satisfies the statutory preference for remedies that employ treatment that reduces toxicity, mobility, or volume as a principal element and utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable.[191](emphasis added)

188. *Id.*

189. OFFICE OF TECHNOLOGY ASSESSMENT, ARE WE CLEANING UP? 10 SUPERFUND CASE STUDIES (June 1988).

190. The Record of Decision [ROD] is the Superfund decision document made available to the public in which EPA is required to explain its rationale for its selection of a remedy.

191. U.S. Environmental Protection Agency, Record of Decision, Douglassville Disposal Site, Union Township, Berks County, Pennsylvania, Declaration to the ROD at 2 (June 30, 1989). [hereinafter Douglassville ROD].

This ROD selects the remedy for the second of two response actions that address contamination of the site. The first response action addressed remedies associated with a por-

Is this remedy "protective of human health and the environment" and does it meet all ARARs as stated in the above declaration?

A. *Site Description, History, and Summary of Contamination*

The following facts about the site are extracted from the Douglassville ROD:

> The Douglassville Disposal Site occupies approximately 50 acres of land in Union Township, southeastern Berks County, Pennsylvania, along the southern bank of the Schuylkill River . . . . Within a 1/4-mile radius of the site there are approximately 23 housing units sheltering an estimated 58 residents. A state adult care facility, the Colonial Manor Adult Home, is located across Highway 724 from the site. The Borough of Pottstown, approximately 4 miles downstream from the site on the Schuylkill River, has an estimated population of 35,000 people. The town of Douglassville lies on the northern bank of the river approximately 1/2-mile northeast of the site and has a population of 2,500 people.
>
> The Schuylkill River borders the site to the north and to the east. This stretch of the river lies within the boundaries designated by the Pennsylvania Scenic Rivers Act of 1972 as a component of the Pennsylvania Scenic Rivers System. The river was so designated for the purposes of "conserving and enhancing its scenic quality and of promoting public recreational enjoyment in conjunction with various present and future uses of the river." The Schuylkill River is used extensively for municipal and industrial water supply, recreation, and waste assimilation. In the reach extending downstream of the Douglassville Disposal Site to the confluence with the Delaware River, seven public water supply users draw water directly from the Schuylkill River. The distance to the nearest public water supply intake is 4 miles at Pottstown. . . .
>
> The Douglassville Disposal Site was the place of operations of Berks Associates, Inc., since its inception in 1941. The nonoperating facility currently consists of a former waste oil processing area located in the southern portion of the site and various areas that were used for waste disposal. . . .
>
> In 1941, Berks Associates, Inc., began lubrication oil recycling operations at the site. Site operations also included recycling some waste solvents in the 1950's and the 1960's. Wastes generated from the oil recycling and solvent recycling process were

tion of the facility referred to as the former processing facility/tank farm area. The ROD for that action was signed in June of 1988. *See* Douglassville, June 30, 1989, ROD at 7 for further description of the previous ROD. The response action delineated in the June 30, 1989, ROD is focused on soil and ground water contamination at the site.

> stored in several lagoons located in the northern half of the site until 1972. In November of 1970, ten days of heavy rain caused the lagoons to overflow and to breach safety dikes causing a release of 2 to 3 million gallons of wastes which flowed down the Schuylkill River .... [T]he heavy rains of Hurricane Agnes caused the Schuylkill River to overflow its banks and inundate the entire site in June of 1972. An estimated 6 to 8 million gallons of wastes were released and carried by the floodwaters downstream for about 15 miles. During cleanup after the storm, the lagoons were drained and backfilled by EPA.
> Berks Associates, Inc., continued lubrication oil recycling operations until 1979 when the operator determined that operational corrections mandated by the PADER [the Pennsylvania Department of Environmental Resources] were cost prohibitive. Operations then turned to the practice of refining waste oils for use as fuel in industrial boilers. Beginning in 1979, oily waste sludge from the new refining process was landfarmed in the area near the old western lagoon. This practice was halted in 1981 when PADER mandated operational corrections to the landfarming practices.[192]

In late 1985, all oil recycling operations at the facility were completely discontinued.[193]

According to the Douglassville ROD, the site and adjacent areas contains soils, ground water, surface water, and sediments contaminated with hazardous substances.[194] "Contaminants included volatile organics (ketones, monocyclic aromatics, and chlorinated aliphatics), phenolic compounds, phthalate esters, polynuclear aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs) and various inorganic constituents, especially lead."[195] For purposes of soil remediation, the ROD breaks the site up into the following study areas:

> Area 1-Processing facility-2.9 acres.
> Area 2-Backfilled lagoon/filter cake-2.0 acres.
> Area 3-Landfarm-4.9 acres.
> Area 4-Sludge disposal area-2.7 acres.
> Area 5-Sludge disposal area-5.3 acres.
> Area 6-Possible landfarm area-3.3 acres.
> Area 7-Incinerator and surrounding area-acreage not calculated.
> Area 8-Drum and tanker area-1.4 acres.
> Area 9-Backfilled lagoon-1.3 acres.

192. *Id.* at 2-6.
193. *Id.* at 7.
194. *Id.* at 8-15.
195. *Id.* at 8.

Area 10-Drum, tank, and refuse area-0.9 acres.[196]

Soil contamination at the site was identified through more than 50 soil samples and 180 subsurface samples. Soil contamination within the areas is described by the ROD as follows:[197]

> Area 1-Principal contaminants were PAHs, PCBs and lead. Subsurface contamination was more extensive and was detected at depths up to 20 feet. Subsurface soil contaminants include volatiles, phenolics, phthalate esters, PAHs, PCBs and lead.
> Area 2-Principle contaminants include lead and PCBs for surface soil. Subsurface soil was more extensive and is primarily contaminated with volatiles, phthalate esters, PAHs, PCBs and lead. Contamination was detected up to a depth of 20 feet.
> Area 3-PCBs and lead are the primary surface soil contaminants. Subsurface soil contamination is not extensive.
> Area 4 and 5-Surface soil in these areas is contaminated with PAHs, PCBs and lead. Subsurface soil contaminants include volatiles, phenolics, phthalate esters, PAHs, PCBs and lead.
> Area 6-PCB and lead are the primary constituents detected in the surface soil. Subsurface soil contamination includes PAHs, PCBs and lead. Subsurface soil contamination was detected only adjacent to Area 5.
> Areas 7 and 8- No waste disposal was known to occur at Area 7. Only slight pollution occurs at Area 8.
> Area 9-Surface soil contaminants include phenolics, phthalate esters, PAHs and PCBs. Similar compounds, as well as various volatile organics, were detected in subsurface soil samples. Contamination was detected at depths up to 10 feet.
> Area 10-"Relatively low levels" of contamination were detected in this area. Surface soil was more contaminated than subsurface soil.

The ROD states the following conclusions in respect to groundwater contamination:

> Benzene, toluene, and vinyl chloride showed the highest concentrations of the contaminants in ground water collected at the site. Concentrations for these substances reached as high as 2,000 ppb (ug/1), 2,300 ppb, and 1,200 ppb, respectively. A number of other volatile organic compounds were also frequently detected in ground water samples. These included:
>
> Ethylbenzene; 1,2-dichlorobenzene; 1,1,1-trichloroethane; 1, 2-dichloroethane; trichloroethane; chlorobenzene; 1,4-dichlorobenzene; 1,1-dichloroethane; tetrachlorethane; 1,2-dichlorethane.

196. *Id.* at 12-13.
197. *Id.* at 9-11.

> These contaminants were detected in at least 20 of the 83 ground water samples collected during the Phase I and Phase II RIs [remedial investigations]. Lead, the predominant inorganic soil contaminant, was detected in 20 of 71 monitoring well samples. Dissolved lead concentrations reached as high as 227 ppb.[198]

B. *The Remedy Selected and Its Justification*

In selecting a remedy for the Douglassville site, EPA looked at twelve alternative remedies for site soil decontamination and four groundwater decontamination alternatives.[199] The cost of the twelve soil remediation alternatives ranged from zero dollars for the 'no action' alternative to $565,000,000 for the alternative that proposed to remove all contaminated soils for offsite incineration. The cost of the four groundwater remediation alternatives ranged from $150,000, for an alternative which would perform no remedial action except monitoring, to $19,525,000 for the most expensive pump and treatment alternative which would remove all contaminants.[200]

> The remedy selected for the site is identified in the ROD as follows:
> (1)Excavation and treatment, by onsight thermal treatment,of approximately 48,400 cubic yards of contaminated soils and sludges from Source Area 2, and oily sediments from the drainage ditch that runs from the site to the Schuylkill River. . . .
> (2)Solidification of the treated materials (ash) if it is EP toxic (hazardous).
> (3)Disposal of treated materials by backfilling into Source Area 2.
> (4)Capping the backfilled area with topsoil followed by revegetation.
> (5)Capping Source Areas 3, 6, and 9 with one foot of topsoil followed by revegetation.

198. *Id.* at 11.

199. *Id.* at 30-58. The soil remediation alternatives considered included: (1) No action; (2) Minimal action with fencing; (3) Capping; (4) Excavation, onsite incineration, offsite disposal; (5) Excavation, onsite incineration, onsite disposal; (6) Excavation, offsite incineration; (7) Onsite landfarming; (8) Excavation, extraction, offsite disposal; (9) Excavation, extraction, onsite disposal; (10) Excavation and onsite landfilling; (11) Excavation and offsite landfilling; (12) Excavation, thermal treatment, minimal action. Groundwater remediation alternatives considered include: (1) No action with monitoring; (2) ACL determination, minimal action; (3) Pumping and treating-granular activated treatment; (4) Pumping and treating-ozoneultraviolet treatment.

200. *Id.* at 52-53.

(6)Capping Source Areas 1, 4, and 5 with one foot of compacted flyash followed by two feet of soil with revegetation.
(7)Imposing deed restrictions to prevent soil disturbance and well drilling on the property.
(8)Establishing ACLs [alternative concentration limits] for ground water at levels that would not cause adverse effects on the Schuylkill River.[201]

The remedy selected for the site is estimated to cost as much as $39,280,670 for the soil cleanup[202], and $150,000 for the groundwater remedy.[203] EPA thus selected a remedy for the site that is estimated to cost a total of $39,430,000 versus the most expensive remedy that would have cost $584,525,000.

This remedy will leave all of the soil contamination in place, except for Area 2 and the oily sediments from the drainage ditches. Environmental mitigation is achieved from the effects of the rest of the contaminated soil by covering six of the ten areas with a cap. However, the ROD recognizes that the contaminated soils will continue to leak contamination into the groundwater after the remedy is implemented.[204]

The ACLs for ground water, and therefore the numbers which will constitute levels that will determine whether further cleanup is required, are identified in the ROD to be "the MAXIMUM CONCENTRATIONS listed in table 3."[205] (emphasis added). The maximum concentration levels identified in table 3 include the following concentrations, measured in micro-grams per liter:

benzene-2,000
toluene-2,300
vinyl chloride-1,200
lead-227[206]

Under the Safe Drinking Water Act, MCLs and MCLGs for the above contaminants are as follows, specified in micro-grams per liter:[207]

201. *Id.* at 54.
202. *Id.* at 59.
203. *Id.* at 52.
204. *Id.* at 61.
205. *Id.* at 54.
206. *Id.* at 14-18.
207. 40 C.F.R. § 140-47 (1988).

	MCL	*MCLG*
benzene:	5	0
toluene:	2,000	2,000
vinyl chl:	2	0
lead:	50	0

Quite remarkably, therefore, the Douglassville ROD identifies as an ARAR for groundwater contamination a number for lead that is 4.5 times less protective than the MCL, for benzene a number that is 400 times less protective than the MCL, and for vinyl chloride a number that is 600 times less protective. EPA calculated the carcinogenic risk of drinking the water beneath the site at 1.9×10^{-1}. EPA has also set cleanup levels which represent the most contaminated levels measured on the site. Thus, a person who would drink the water at the site would, according to the EPA calculations identified in the ROD, face a life time risk of 1.9 out of 10 in getting cancer.[208] This number is significantly outside the "acceptable" risk range identified by EPA in the proposed NCP.[209] The justifications given in the ROD for setting 'cleanup' standards at such very high levels include the fact that the groundwater flow is flowing away from those domestic wells that are currently using the aquifer for domestic drinking water purposes, there are no current or expected 'significant' impacts on the Schuylkill River from the site, and deed restrictions will prevent future water users from drinking the water.[210] Therefore, if EPA's assumptions about no impact from the site to the Schuylkill River are correct, an assumption that may be dubious given the kinds of technical uncertainties that are inherent in groundwater contamination projections,[211] the appropriateness

208. For identification of the risk posed by existing groundwater for household use, *see* Douglassville ROD, *supra* note 191, at 29.

209. *See* Section III(1) *supra*.

210. *See Id.* at 43, 44, 49, 54.

211. *See* Section IV(2) *supra*. The ROD contains only very sketchy conclusory statements on how EPA reached the conclusion that there is no impact from the site to the Schuylkill River. This writer questions these conclusions because of the data contained in the report which identifies high levels of river sediment contamination. *See* Douglassville ROD, *supra* note 191 at 20-24. However, without a complete analysis of the technical data, and, in particular, some understanding of where surface water and stream sediment samples were taken, information which is not available in the ROD, it is difficult to draw any conclusions about the reasonableness of the conclusions regarding the lack of impact of the site on the river.

Another related question, not addressed in the study, is whether any of the very considerable contamination in the Schuylkill River sediments has come from the site and, if so, why were these sediments not included in the site evaluation or the area to be remediated.

of the remedy selected by EPA depends upon a willingness to write-off the site for any future groundwater use or human activity that may disturb the capping of the site. Rather than a cleanup, the remedy amounts therefore to a mitigation of the site's impacts upon the environment coupled with a willingness to write-off a piece of Pennsylvania real estate of approximately 25 acres.[212]

C. *Legal Problems with the Douglassville Remedy*

The Douglassville remedy is also inconsistent with the Superfund and the NCP for the following reasons:

1. ACLs Trump MCLs as ARAR

The analysis in the ROD relies upon EPA's ability to use the alternate concentration level (ACL) process, a variance process under RCRA, to trump the Safe Drinking Water Act derived MCLs and MCLGs as applicable or relevant and appropriate cleanup standards in this case.[213] The ROD states that the groundwater aquifer is not currently being used as a drinking water source.[214] The ROD also acknowledges that the aquifer that has been contaminated is classified as a B-2 aquifer, which means that it has the potential for use as a potable water source.[215] Because it is the source of potable water, according to the NCP, MCLs for carcinogens shall be applicable.[216]

There is no authority in Section 121 of Superfund to ignore cleanup standards that are applicable or relevant or appropriate, therefore the use of the ACL process to trump MCLs is of questionable legal validity and is clearly inconsistent with the NCP.[217]

2. Failure to Find RCRA as Applicable or Relevant and Appropriate

EPA, in selecting the remedy uses both the RCRA variance procedures on ACLs to trump MCLs as cleanup standards and finds that the soils in Areas 1, 3, and 9 are RCRA regulated wastes because they will pass a RCRA toxicity test.[218]Nevertheless, EPA

212. *See*, for identification of acreage at the site, *supra* note 196.
213. *See* Section III(3) *supra*.
214. Douglassville ROD, *supra* note 191, at 29.
215. *Id.*
216. For discussion on the applicability of MCLs and MCLGs *see* Section III(B)(i), *supra*.
217. *See* for ARAR authority, CERCLA § 121, 42 U.S.C. § 9621 (Supp. V 1987).
218. Douglassville ROD, *supra* note 191, at 9.

fails to identify any other RCRA requirements as cleanup standards with the exception of those regulations that may relate to the land disposal of treated soils in Area 2 and regulations that govern an incinerator's air discharges that will be used to thermally treat the soils in Area 2.[219] None of the other closure requirements of RCRA that apply to the closure of a RCRA facility are identified as ARARs.[220] Obviously EPA has selectively identified those RCRA cleanup standards as ARARs that are consistent with the remedy that it wanted to select while ignoring others. EPA's selective application of RCRA regulations is clearly a strategy that permitted EPA to choose the least expensive groundwater remedy. Such an approach is obviously of questionable legal validity because EPA had to rely on the RCRA closure requirements to find a way to set groundwater cleanup standards at such a level that would allow it to pick a remedy that would provide for no groundwater treatment. EPA in this case has managed to assert that the RCRA closure regulations both are and are not ARARs.

3. Failure to Apply Federal Water Quality Criteria as ARARs

Section 121(d)(2) of Superfund requires that federal water quality criteria developed under the Clean Water Act shall be an ARAR where applicable or relevant and appropriate.[221] Since EPA's justification for the cleanup standards specified in this case was built upon assumptions relating to the effect and amount of the groundwater discharge from site into the Schuylkill River, the obvious ARAR for water discharging into the river would be federal water quality criteria. This is especially the case for groundwater at the point it discharges into the river. EPA's action of ignoring the water quality criteria as an ARAR for the Douglassville site, while setting the standards on the basis of the existing polluted groundwater quality of the site, must be seen as another disingenuous act of EPA to select only those ARARs that are consistent with its position on an affordable remedy.

219. *Id.* at 55-56.

220. *See. e.g.*, regulations that apply to post closure care of a RCRA facility at 40 C.F.R. §§ 264.117 to .120 (1986).

221. CERCLA § 121(d)(2), 42 U.S.C. § 9621(d)(2) (Supp. V 1987).

4. EPA's Failure To Apply Superfund Section 121(c)

In discussing the approved groundwater remedy, the ROD provides that: "Because hazardous substances will remain onsite following completion of the remedial activities, a review will be conducted within five (5) years of the initiation of remedial activities in compliance with Section 121(c) of SARA."[222] Section 121(c) of SARA states:

> If the President selects a remedy action that results in any hazardous substances or contaminants remaining at the site, the President shall review such remedial action no less than 5 years after the initiation of such remedial action no less than every five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgement of the President that action is appropriate at such site in accordance with section 9604 or 9606 of this title, the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such review, and any actions taken as a result of such review.[223]

The apparent intent of this section is to assure that whenever hazardous substances are left at the site, a fact which this provision of the statute seems to recognize may be practically necessary in some cases, the legal liability of a responsible person to do further cleanup as well as the governments duty to do further cleanup at a site may be triggered. This may occur if it is later determined that it is then practical to complete the cleanup and necessary to do so to protect the public health and the environment. This interpretation of this provision is supported by the following legislative history which states:

> The periodic review provision is intended to assure that Superfund cleanups keep pace with developing technologies and that remedial actions are upgraded to take advantage of such developing technologies. It is another technology-forcing provision. The ultimate goal of the Superfund Program must be to implement permanent solutions at all National Priorities List [NPL] sites. One way to accomplish this goal is to require periodic review and to assure that sites are not removed from the ambit of the program until such permanent solutions have been implemented.[224]

222. Douglassville ROD, *supra* note 191, at 54.
223. CERCLA § 121(c), 42 U.S.C. § 9621(c) (Supp. V 1987).
224. 132 CONG. REC. S14914-15 (Oct. 3, 1986).

In the Douglassville ROD, however, EPA interprets this section by establishing certain monitoring wells on the site as points of compliance where groundwater will be measured to see whether it exceeds the highly toxic cleanup standards levels.[225] If monitoring analyses in these wells show exceedences beyond the cleanup standards, the section 121(c) review may trigger additional groundwater remedial action at the site.[226] Under this interpretation of 121(c), therefore, EPA can only require additional cleanup, at the five year review intervals, if the water quality beneath the site exceeds the highest concentrations of contaminants already found on the site. Such an interpretation is in conflict with the clear meaning of Superfund section 121(c) because it does not provide for a review whenever "any" pollutants are left on the site but only for future situations where extraordinary and completely unexpected pollution is experienced.

5. Failure to Satisfy Other Legal Criteria For Remedy Selection

As the discussion indicated above, the recently amended NCP derives from the new Superfund section 121 nine criteria that are to be considered in selecting a remedy at a Superfund site:

(1) Overall protection of human health and the environment;
(2) Whether the remedy attains the applicable or relevant and appropriate requirements(ARARs) of Federal or State laws or warrants a waiver recognized by the statute;[227]
(3) The long term effectiveness and permanence of the remedy;
(4) The remedy's reduction of toxicity, mobility, or volume;
(5) The remedy's short term effectiveness;
(6) The remedy's implementability;
(7) The remedy's cost-effectiveness;
(8) The state's acceptance of the remedy;
(9) The community's acceptance of the remedy.[228]

225. Douglassville ROD, *supra* note 191, at 54.

226. *Id.*

227. Six waivers to meeting ARARs are recognized by Superfund § 121(d)(4), 42 U.S.C. § 9621(d)(4). These waivers are: (1) When the remedy is interim; (2) When there is greater risk to health and the environment through the implementation of the remedy; (3) When it is technically impractical to implement the remedy; (4) When an alternative remedy would acquire an equivalent standard of performance; (5) Where a state ARAR has been inconsistently applied; (6) When necessary for fund balancing. For a discussion of the ARAR waivers *see* Friedman, *supra* note 28, at 10131.

228. 55 Fed. Reg. 8,849 (1990) (to be codified at 40 C.F.R. § 300.430(e)(9)).

The previous analysis demonstrates that EPA's selection of the remedy in the Douglassville ROD fails to satisfy the first two criteria. The remedy selected neither is protective of the environment nor meets ARARs. The selected remedy also does not satisfy criteria (3) or (4) above that require that the remedy implement a permanent solution and reduce toxicity, mobility or volume. Although the extraction and thermal treatment that is to take place in Area 2 will lead to a permanent solution and reduce toxicity and mobility of the contaminants in that area, this area is less than ten percent of the total area contaminated at the site.[229] Moreover, although the ROD indicates that removing the pollutants in Area 2 will significantly reduce the contamination at the site because Area 2 is the most contaminated,[230] a chart included with the ROD indicates that Area 2 does not contain the highest concentrations for ANY of the categories of pollutants that have been found at the site.[231] This chart includes the following comparative information on the highest concentrations in parts per million for organics and parts per million for lead:

	AREA 2	*Highest AREA*
Keytones:	1,290	Area 5-3,184
Monocyclic Aromatics	36,770	Area 1-122,979
Chlorinatediphatics	Al-1,434	Area 1-238,406
Phthalate Esters	1,756	Area 1-69,958
Polynuclear-Aromatics	44,270	Area 5-87,917
Phenols	7,289	Area 5-46,176
PCBs	18,889	Area 4-29,790
Lead	1,090	Area 4-5,653

This analysis raises the obvious question, that is not answerable from the data displayed in the ROD — why the remedy provides toxic soil treatment for Area 2 and not some of the other areas that appear to have higher levels of contamination. This data also demonstrates that the proposed remedy cannot seriously be classified as one which proposes a remedy that is "a permanent solution" (criteria 3), one that represents treatment over containment, or one that significantly reduces toxicity, movement or volume of the contaminated soils or groundwater (criteria 4).

229. *See* description of areas, *supra* note 196 and accompanying text.

230. Douglassville ROD, *supra* note 191, at 61.

231. *Id.* at 10. This chart is entitled: RANGE OF WEIGHTED AVERAGE CONCENTRATIONS FOR CLASSES OF ORGANIC COMPOUNDS AND AVERAGE LEAD CONCENTRATIONS IN SOILS BY SOURCE AREAS IN PPB FOR ORGANICS AND PPM FOR LEAD (PHASE II RI) DOUGLASSVILLE DISPOSAL SITE.

Moreover, since all of the alternatives considered by the ROD "use technologies that are demonstrated and commercially available,"[232] the criteria of implementability (criteria 6), EPA cannot argue that it had to choose the remedy it selected because the others were not implementable. One must therefore conclude that the remedy chosen by EPA was selected in this case purely on the basis of cost and that EPA is willing to take the position that cost-effectiveness criteria (criteria 7), can trump the eight other statutory criteria which are referenced in the NCP.

4. Certain Conclusions About the Douglassville ROD

The Douglassville ROD dramatically demonstrates how pressures to keep costs of cleanup to 'reasonable' levels have driven EPA to ignore the prescriptive commands of the Superfund law. EPA could have selected the remedy chosen and been in less obvious conflict with the law if it used Superfund's ARARs waiver process or its fund balancing authority to support the remedy selected. Such an approach would, however, be tantamount to an admission by EPA that the remedy selected was less than adequate and that the groundwater beneath the site was being written-off for the time being because of cost considerations. EPA seems much more willing to find ways, no matter how legally questionable, to read the law in such a way that the cleanup standard provisions of other laws are found not to apply to Superfund cleanups. EPA thus wants to use reasoning that suggests that "factually" it has determined that it is in full compliance with the law and is fully protective of the environment, rather than admitting that it would prefer not to apply the law that is applicable or relevant and appropriate because of the high costs of cleanup that the application of the law would entail. In this way EPA can hide a political choice behind what appears to be a neutral factual conclusion. What the public sees, of course, are assertions by EPA that the remedy is "adequate' " rather than a more honest statement that acknowledges that the owners and operators of the site have managed to create such a serious environmental problem that it is now prohibitively expensive to cleanup the site in a way that would restore it for all future uses. The following statement contained in the Douglassville ROD must now be seen as the use of scientific jargon that masks important public policy choices:

232. *Id.* at 51.

> "The selected remedy *is protective of human health and the environment, attains Federal and State requirements that are applicable and appropriate to this remedial action and* is cost effective. This remedy satisfies the statutory preference for remedies that employ treatment that REDUCES TOXICITY, MOBILITY, OR VOLUME as a principal element and UTILIZES PERMANENT SOLUTIONS and alternative treatment technologies to the maximum extent practicable."[233](emphasis added)

In addition, there are numerous statements throughout the Douglassville ROD that appear to be scientific conclusions but under closer analysis must rest upon the non-scientific value positions of those who prepared those sections of the remedy. These statements include statements about the risk posed by the hazardous substances on the site,[234] and why no action need be taken about Areas 7,8, and 10. These type of statements appear to be purely scientific in nature. However, due to the many assumptions necessary for reaching the stated conclusions, the statements probably rest to a large extent, if not predominantly, on the value assumptions of the analyst or of EPA. The Douglassville ROD, however, identifies few of these non-scientific assumptions and for that reason the conclusions appear to be "factual" descriptions of site properties.

VI. CONCLUSION

The untold story about Superfund is that we as a society have managed to create such costly and serious environmental problems that hundreds of millions of dollars are sometimes necessary to clean them up fully. The story is untold because EPA insists on characterizing remedies that only partially mitigate the impact of the site on the environment as fully protective and in compliance with the law.

The issues and questions presented in most Superfund cases include incredibly complex technical questions which often cannot be answered by the state-of-the-art science that is available at this time. Superfund cases often push science well beyond the point where existing knowledge can be helpful. Because science often cannot answer questions such as what is the "actual" risk to human health or the environment that the site will pose after the mitigation remedy is implemented, non-scientific assumptions

233. Douglassville ROD, *supra* note 191, at Declaration to the ROD, at 2.
234. *Id.* at 25.

must be made. These assumptions must be understood as value questions because the answer to the questions ultimately turns on the degree of conservatism that will be assumed in calculating an "answer" when science cannot provide an answer. Superfund cases, moreover, not only create difficult public policy questions because of these inherently difficult technical or descriptive questions posed by the case but because of the enormous costs of cleaning up a site and the possibility that these non-scientific assumptions have to drive the costs even higher. For the Superfund administrator there is enormous tension, therefore, between the need to make conservative assumptions about how clean to make a site when science cannot describe what is safe, and the costs that such a cleanup would entail. Because of this dilemma, the normal and growing tendency of some government officials to hide political decisions behind what appear to be scientific and therefore neutral discourse is greatly exacerbated. In this climate, if individual administrators have certain non-scientific ideological positions on cost or cleanup levels, these positions can easily be hidden behind what appears to be objective scientific conclusions.

Although theorists would assume that in matters of difficult public policy, government bureaucrats must look to the legislature for its guidance on how to handle these non-scientific policy questions, the track record of the Reagan administration seemed to be one of cynical disregard for the legislative guidance on "how clean is clean?" Moreover, because some scientists support a personal commitment to higher levels of proof before they call something hazardous[235], controlling who the scientists are or what they say on Superfund cases is a very effective way of accomplishing political objectives through the use of 'scientific' jargon.

In fact one commentator states that [President] "Reagan chose science advisors that were more skeptical about adverse effects of pollution,"[236] and during his administration, on environmental matters, there was "a shift from an emphasis on reasonable judgement in the face of uncertainty to insistence on firm proof . . . . before action was taken."[237] Thus ideological positions were implemented by what appeared to be neutrally compelled scientific reasoning.

235. HAYS, *supra* note 14, at 344.

236. *Id.* at 496.

237. *Id.* at 412.

Another disturbing consequence of the shift that occurs when political questions become transformed into seemingly scientific questions, is that there is an enormous inequality in political power between those that can muster technical "expert" resources and those that cannot. As a consequence, in Superfund controversies, the more technical they become, the more removed they become from public view and less capable of being understood by local citizens whose interests may be affected. Perhaps as a consequence of the complexity of the issues in the Douglassville ROD, for example, the only group that submitted any comments on the sufficiency of the remedy was the Berks Associates Steering Committee, a group comprised of some of the potentially responsible parties.[238]

On environmental matters in the 1980's, according to one commentator, "those who controlled technical skills had far more leverage over the issues than those that did not."[239] Because of their technical complexity, therefore, Superfund cases can disenfranchise those who may be environmentally affected by the decision as well as those responsible parties who cannot afford to hire the technical resources needed to influence the decision.

The tension caused by high cost on the one hand and scientific uncertainty and technical complexity on the other, has led to a regulatory atmosphere in Superfund cases in which there is great cynicism about the law.[240] Because of these problems the following amendments to Superfund are recommended.

A. *Clear Legislative Definition of How Clean Is Clean*

Because the answer to the question of 'How Clean Is Clean?' is an ethical or political matter rather than a scientific one, Congress should insert into Superfund clear and unambiguous language on cleanup standards. This language should make it clear that only a remedy that completely and thoroughly restores a site to a pre-pollution condition is an "acceptable" level of remediation while recognizing that less than ideal cleanups may have to be accepted as interim remedies where the complete remedy is technically or economically unfeasible. This Superfund Amendment should

238. *See* Responsiveness Summary, An attachment to the Douglassville ROD, *supra* note 191.

239. HAYS, *supra* note 14, at 206.

240. This conclusion is based on this writer's discussion with some of the government employees who work in the Superfund program.

make it clear that cost should only be taken into account initially when choosing among remedies that will accomplish environmental goals. Specific guidance on how to arrive at cleanup standards for individual chemicals should be included. This section should state that legal liability for future cleanups shall remain until the site is restored to background, that is pre-pollution conditions. This section should further state that institutional controls such as deed restrictions and engineering controls such as fences shall not be considered as a valid method for making an otherwise unacceptable remedy acceptable, except as a temporary interim measure.

B. *Some Flexibility to Take Cost and Engineering Infeasibility Into Account For Remedies That Will Mitigate Environmental Impact*

Because we have managed as a society to create environmental problems that enormous amounts of money may not be able to clean up, some flexibility must be built into Superfund that will allow decision-makers to move off the "background" standard where the "background" levels are technically or economically infeasible. This Amendment should require that when a decision-maker accepts something less than a complete cleanup, reasons must be clearly stated and the remedy should be identified as one that "mitigates" rather than "remediates" the hazardous substance problem. This Amendment should retain legal liability of the PRPs for cleanup at background levels until the cleanup reaches this level. This provision should include some guidance limiting discretion on these "mitigation" cleanups so that public health is protected during the temporary period during which the "mitigation" remedy is accepted. For instance the statute should require that "mitigation" risk levels always protect humans at a $1x10^{-6}$ cancer risk level for a life time risk. In "mitigation" cases, engineering and institutional controls would be acceptable if necessary to protect public health and the environment. This Amendment should expand the concept of 121(c) of Superfund to provide for 5 year reviews of 'mitigation' cases that would be triggered for every case that is not complying with "background" levels.

C. *Greater Flexibility For Fund Lead Cases*

Under the existing law, the Government faces a conflict of interest in making a decision about the adequacy of a cleanup, since fund monies may not be sufficient to implement the cleanup at levels that are environmentally adequate. Superfund should be amended so as to give the Government flexibility to modify the requirements for the acceptability of cleanup levels, when the public funds are the source of cleanup. In these cases, of course, the government's choice of a cleanup standard should not impede appropriate additional recovery from responsible parties in order to attain the "background" standard.

Finally, Superfund cases and other environmental matters of great technical complexity must be understood as cases which raise important trans-scientific ethical and public policy questions. Congress should require that all Superfund decision documents identify all areas of technical uncertainty and the assumptions that were made to resolve these issues. Since there is no reason to believe that the technical complexity of environmental matters will decline in the near future, and because environmental matters must be fundamentally understood as questions of ethics and morality rather than as problems which can be answered through the "neutral" application of the descriptive sciences, those who make environmental decisions in the name of the public must be required to identify the prescriptive basis for those decisions.