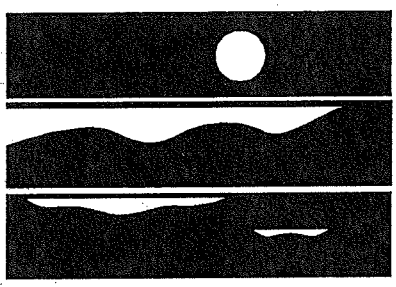
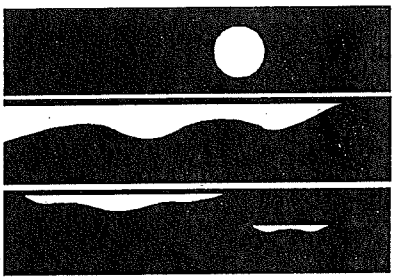


WASHINGTON STATE
DEPARTMENT OF
ECOLOGY

Final Environmental Impact Statement

Cleanup Standards

January 1991



Final Environmental Impact Statement

Cleanup Standards

Amendments to the
Model Toxics Control Act Cleanup Regulation

Chapter 173-340 WAC

Prepared by
Toxics Cleanup Program
Washington Department of Ecology
Mail Stop PV-11
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STATE OF WASHINGTON

DEPARTMENT OF ECOLOGY

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FINAL

ENVIRONMENTAL IMPACT STATEMENT

of

CLEANUP STANDARDS

Amendments to the Model Toxics Control Act Cleanup Regulation Chapter 173-340 WAC

Washington Department of Ecology

Prepared for Review by Citizens, Tribes, Business, Industry, Citizen's Groups, and Governmental Agencies

in compliance with

The State Environmental Policy Act (SEPA)
Chapter 43.21C of the Revised Code of Washington
as revised 1983

SEPA Rules
Chapter 197-11 Washington Administrative Code

Date of Issue:
January 16, 1991

Carol L. Fleshes
Responsible Official

STATE OF WASHINGTON

DEPARTMENT OF ECOLOGY

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The Department of Ecology is required under the Model Toxics Control Act to adopt and enforce cleanup standards for hazardous substances. This Final Environmental Impact Statement (FEIS) presents an analysis of alternative approaches for establishing cleanup standards. It has been prepared in accordance with the Washington State Environmental Policy Act (SEPA), Chapter 43.21C RCW and SEPA rules, Chapter 197-11 WAC. Based on a review of this environmental analysis, comments received from the public, and the statutory requirements under the MTCA, Ecology selected the combination alternative for establishing cleanup standards.

The seven alternatives evaluated in this EIS are:

Alternative #1: Proposed Action: Combination Alternative
Alternative #2: Background Alternative
Alternative #3: Risk-Based (#1) Alternative
Alternative #4: Risk-Based (#2) Alternative
Alternative #5: Applicable State and Federal Law Alternative
Alternative #6: Technology-Based Alternative
Alternative #7: No Action Alternative

The proposed action is an amendment to the Model Toxics Control Act Cleanup Regulation (Chapter 173-340 WAC). The amendments establish numerical cleanup levels for relatively straightforward cleanup actions and provides a process for establishing site-specific cleanup levels at more complex sites. The amendments also specify basic requirements for cleanup actions, specify criteria for selecting from among alternative cleanup actions, and establish requirements for leaking underground storage tank corrective actions. Key environmental issues associated with selecting from among the above alternatives include the following:

- Acceptable levels of cancer risk
- Appropriateness of establishing cleanup levels at concentrations below existing environmental standards
- Role of cost in establishing cleanup levels
- Role of cost in selecting cleanup actions
- Appropriate amount of flexibility to establish site-specific cleanup requirements
- Health risk assessment methods and procedures

Ecology held three public hearings in September 1990 to accept oral testimony and written comments on the proposed amendments and the Draft EIS. Based on public comment, Ecology has made the following changes to the proposed regulations and the EIS:

- Removed technical practicability from the list of factors considered when establishing cleanup levels

- Incorporated specific criteria for determining industrial site use

- Provided flexibility to demonstrate that ambient water quality criteria are not relevant and appropriate for a particular body of water

- Incorporated criteria for evaluating whether it is appropriate to develop alternate cleanup levels for shallow ground water discharging to surface waters

- Clarified that surface water standards would not be applied to stormwater that is in the process of being conveyed to a treatment system

- Incorporated revised parameters for fish consumption rate and frequency of contact with industrial site soils

- Clarified that closure requirements under Chapter 173-304 WAC represent a minimum requirement for cleanup actions performed at solid waste landfills

- Clarified that sediment cleanup actions performed under this chapter shall comply with the cleanup standards and plan submittal requirements in Chapter 173-204 WAC

- Clarified Ecology's expectation with respect to the use of various cleanup technologies

- Requires Ecology to provide opportunity for public review and comment of periodic reviews

- Provide the flexibility to utilize special testing procedures for stabilized soils

- Revised the rule to clarify that surface water monitoring should be performed as close as practicable to the ground water/surface water interface

- Reorganized and simplified the regulatory language

The adoption of the regulation will occur after Ecology receives advice and comment from the Ecological Commission.

Fact Sheet

Name of Proposal

Cleanup Standards

Nature of Proposal

The proposed action is to adopt new sections and amend existing sections to the Model Toxics Control Act Cleanup Regulation (Chapter 173-340 WAC). The amendments establish numerical cleanup levels for relatively straightforward cleanup actions and provide a process for establishing site-specific cleanup levels at more complex sites. The amendments also specify basic requirements for cleanup actions, specify criteria for selecting among alternative cleanup actions, and establish the requirements for leaking underground storage tank corrective actions.

Location of Proposal

The cleanup standards would apply on a statewide basis.

Alternatives

The Final EIS evaluated the following seven alternatives. Cleanup actions for each alternative shall utilize permanent solutions to the maximum extent practicable.

Alternative #1: Preferred Alternative: Combination - The cleanup standard is established on the basis of a risk assessment and applicable state and federal laws concentrations, provided that both are higher than the natural background concentration of the contaminant. Otherwise, the natural background concentration is chosen. This alternative provides some flexibility to consider net environmental impacts and technical issues in establishing cleanup levels.

Alternative #2: Background - The cleanup standard is established at the prerelease background concentration of each contaminant in each medium.

Alternative #3: Risk-Based (#1) - The cleanup standard is established at a level determined to be protective of human health and the environment based on the results of a risk assessment.

Alternative #4: Risk-Based (#2) - The cleanup standard is established at a level determined to be protective of human health and the environment based on the results of a risk assessment.

Alternative #5: Applicable or Relevant and Appropriate Requirements (ARARs) - The ARAR with the lowest concentration is chosen as the cleanup standard after all ARARs have been determined.

Alternative #6: Technology-Based - The cleanup standard is established at the lowest concentration level that is achievable by available cleanup technologies.

Alternative # 7: No-Action - The no-action alternative is equivalent to the ARAR alternative.

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Subsequent Environmental Review

Cleanup actions for individual hazardous waste sites will be reviewed for compliance with SEPA.

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Required Approvals

Adoption by the Washington State Department of Ecology.

Date of Issue

January 16, 1991

Date of Final Action

Adoption on January 25, 1991

Location of Background Information

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Cost of Document

The Final EIS is available at no charge, with a limit of one per person. Additional copies may be purchased for the cost of reproduction.

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Chapter 1
Summary

Introduction and Purpose

This document is a Final Environmental Impact Statement (Final EIS) which presents responses to comments made by public and private parties on the Draft EIS (Ecology, 1990) prepared by the Washington Department of Ecology (Ecology) to assess the impacts associated with Ecology's proposal to amend the Model Toxics Control Act Cleanup Regulation (Chapter 173-340 WAC). The amendments define procedures for establishing cleanup standards, criteria for selecting cleanup actions to comply with those standards, and requirements for corrective actions at leaking underground storage tanks.

General goals to be served by the proposed action are protection of human health and the environment, scientific and legal defensibility, consistency with other state and federal requirements, efficient cleanup of contaminated sites, and an appropriate balance between statewide consistency and site-specific flexibility.

Ecology's comprehensive regulation, The Model Toxics Control Act Cleanup Regulation (Chapter 173-340 WAC), provides the overall implementation framework. This regulation has been developed in two phases. The Phase I portion defines the administrative process for identifying, investigating, and cleaning up hazardous waste sites. Phase I became effective on May 4, 1990.

Phase II includes the provisions for establishing cleanup standards, selecting cleanup actions, and performing corrective actions at leaking underground storage tanks. The Phase II amendments - the subject of this EIS - were proposed on August 1, 1990. The amendments were formulated based on an analysis of other state and federal approaches and comments from other state and federal agencies, various Ecology programs, and Ecology's Science Advisory Board. Public critique also provided an invaluable contribution during the development process.

The remainder of this EIS provides a summary of impacts, a description of the final action and alternatives, an evaluation of impacts, the proposed amendments (Appendix A), and public comments and responses. All documents are available for review.

Summary Of Alternatives

Six alternative approaches to developing cleanup standards were evaluated in the Draft EIS. Based on public comment, a seventh alternative (Alternative #4 - Risk-Based Cleanup Standard #2) was identified and incorporated into the Final EIS. A detailed discussion of the standard setting process for each alternative can be found in Chapter 4 of the Draft EIS (Ecology, 1990). The seven alternatives are described below. Cleanup actions for each alternative shall utilize permanent solutions to the maximum extent practicable.

Alternative #1: The Preferred Action. Combination Alternative.

Cleanup levels would be set at risk-based concentrations which are at least as stringent as applicable state and federal laws. These levels may be modified within a limited range based on considerations of technical feasibility, net environmental protection, and background concentrations. Cleanup levels would be established for each hazardous substance in each medium and then modified to take into account mixtures of hazardous substances and exposure via more than one medium.

Alternative #2: Background-Based Cleanup Standards.

Cleanup levels would be set at levels equal to the background concentration or practical quantitation limit of each hazardous substance in each medium. Under this alternative, background would be defined as the concentration or level of a hazardous substance in the environment at or near the facility that cannot be attributed to any release from the site or other human activities in the local area.

Alternative #3: Risk-based Cleanup Standards (#1).

Cleanup levels would be set at levels that are protective of human health and the environment as determined through an assessment of the health risks associated with each hazardous substance in each medium (for example, ground water). Cleanup levels for individual hazardous substances would then be modified to take into account mixtures of hazardous substances and exposure via more than one medium.

Alternative #4: Risk-Based Cleanup Standards (#2).

Cleanup levels would be established using procedures similar to Alternative #3, except that the risk-based cleanup level for carcinogens would be 100-fold higher.

Alternative #5: Applicable State and Federal Laws.

Cleanup levels would be set at levels that meet or exceed standards established under applicable state and federal laws, including Section 121 of CERCLA/SARA. Section 121 requires the use of all legally applicable or relevant and appropriate requirements (ARARs) for each hazardous substance in each medium. The ARAR with the lowest concentration would be used to establish the cleanup level.

Alternative #6: Technology-Based Cleanup Standards.

Cleanup levels would be set at concentrations that can be achieved through the application of best available cleanup technologies.

Alternative #7: No-Action.

No new standards would be set for cleanup of hazardous waste sites. Because Ecology is currently required by law to promulgate cleanup levels, this alternative is not considered to be a legal option. However, even if Ecology declined to adopt new cleanup levels, the use of the strictest ARARs would still be required by the Model Toxics Control Act (MTCA). Therefore, for the purposes of this EIS, the No-action Alternative is considered to be equivalent to the ARAR alternative and has not been evaluated separately.

Summary of Impacts of the Alternatives

The long-term environmental impacts asociated with residual levels of hazardous substances tend to be directly related to cleanup levels for a particular site. More stringent cleanup levels are generally associated with lower long-term environmental impacts. This contrasts with the general relationship between cleanup levels and the short-term environmental impacts which occur during a cleanup action. In these cases, environmental impacts tend to be inversely related to the cleanup level (i.e. the more stringent the cleanup level, the greater the potential for short-term adverse environmental impacts).

In general, implementation of the proposed amendments (Combination Alternative) will result in residual levels of hazardous substances at least as stringent as those established under existing procedures. While reducing the potential for long-term impacts on human health and the environment, the use of lower cleanup levels for carcinogens may increase the potential for adverse impacts during cleanup actions. Those impacts may include increased worker exposure to hazardous substances, habitat destruction, and increased transportation impacts.

The relative impacts of the remaining alternatives show considerable variability depending on the hazardous substance and media of concern. However, the Background alternative tends to result in the most stringent cleanup levels while the Technology-Based and Risk-Based (#2) alternatives result in the least stringent cleanup levels.

The Model Toxics Control Act expresses a preference for the use of permanent solutions generally involve the use of some type of treatment technology (incineration, bioremediation, etc). Treatment technologies frequently have a greater potential for short-term adverse impacts relative to cleanup actions which rely solely on capping and other containment technologies. However, the long-term protection associated with the use of permanent solutions is usually superior to containment options.

Mitigation Measures

In general, cleanup actions represent measures to mitgate the problems associated with past releases of hazardous substances. However, in performing those actions, there is always the potential to increase existing problems or create new ones. Most of the impacts identified in the EIS can be mitigated through the use of one or more mitgation measures. Examples of potential mitigation measures are summarized in Chapter 4. The actual measures used at a particular site will depend upon the hzardous substances present, the environmental setting, and the type of cleanup technologies utilized at a site.

Unavoidable Adverse Impacts

The correction of contamination problems at hazardous waste sites may result in some unavoidable adverse impacts. Ecology will generally be faced with balancing the short-term adverse impacts associated with the actual cleanup action (incineration, biotreatment, etc.) and the long-term impacts associated with residual levels of hazardous substances. The proposed amendments are structured in a manner that facilitates site-specific decisions which minimize overall adverse impacts.

Decision Process

The Draft EIS assessed the impacts of six alternative approaches for establishing cleanup standards and selecting cleanup actions. The Final EIS identifies the final requirements, including modifications based on written comments and public testimony. Based on public comment, Ecology has also included an evaluation of a seventh alternative (Risk-Based Alternative #2) in the Final EIS.

The action described in this Final EIS constitutes Ecology's preferred course of action. The action is comprised of procedures for establishing cleanup standards, criteria for selecting cleanup actions to comply with those standards, and requirements for performing corrective actions at leaking underground storage tanks.

As a final step, Ecology has forwarded the proposed action and accompanying documentation to the Washington State Ecological Commission for advice and guidance under the authority of Chapter 173-120 WAC.

Future Environmental Review

The environmental review of the amendments is completed with the publication of this Final EIS, and subsequent review by the Washington Ecological Commission (see decision process above). However, individual site cleanup actions will undergo further environmental review under the authority of SEPA, where applicable.

Chapter 2
Background

Statutory Background

Over the last ten years, Ecology has used several statutory authorities to require site cleanups. Throughout the late 1970s and early 1980s, the state Water Pollution Control Act (Chapter 90.48 RCW) and state Hazardous Waste Management Act (Chapter 70.105 RCW) were used as the primary authorities for cleanup of hazardous waste sites. In 1984, Ecology developed a final cleanup policy with technical criteria for determining cleanup levels on a site-specific basis. This 1984 policy is generally referred to as the *How Clean Is Clean* policy. (The complete text of the *How Clean Is Clean* policy is provided in the Technical Appendices to the Draft EIS (Ecology, 1990).)

Passage of the state's Hazardous Waste Cleanup Act in 1987 provided a comprehensive statutory authority covering the identification, characterization, and cleanup of hazardous waste sites. This law also created a trust fund, financed by a new tax on hazardous substances, to support the state program. The Hazardous Waste Cleanup Act of 1987 was in effect for 16 months before being replaced by the Model Toxics Control Act which became effective in March 1989.

The Model Toxics Control Act

In November 1988, Washington voters passed the Model Toxics Control Act (MTCA). This statute, subsequently codified as Chapter 70.105D RCW, establishes the basic authorities and requirements for cleaning up hazardous waste sites in a manner that will protect human health and the environment. It also includes a tax on hazardous substances to finance the state program. RCW 70.105D.030(2)(d) directs Ecology to adopt and enforce:

"[m]inimum cleanup standards for remedial actions at least as stringent as the federal cleanup standards under section 121 of the federal cleanup law, 42 U.S.C. 9621 and at least as stringent as all applicable state and federal laws, including health-based standards under state and federal law."

With respect to selecting remedial actions for individual sites, RCW 70.105D.030(1)(b) specifies that "[i]n conducting, providing for, or requiring remedial actions, the department shall give preference to permanent solutions to the maximum extent practicable and shall provide for or require adequate monitoring to ensure the effectiveness of the remedial action."

The Federal Cleanup Law

The Federal cleanup law referenced in RCW 70.105D.030(2)(d) is the Comprehensive Environmental Response Compensation and Liability Act of 1980 as amended by the Superfund Amendments and Reauthorization Act of 1986 (hereinafter referred to as CERCLA). Under Section 121(b) of CERCLA, EPA is required to "select a remedial action that is protective of human health and the environment, that is cost-effective, and that utilizes permanent solutions and alternate treatment technologies or resource recovery technologies to the maximum extent practicable."(A complete summary of Section 121 of CERCLA is provided in the Technical Appendices to the Draft EIS (Ecology, 1990).)

Section 121(d) specifies that protection of human health and the environment is to be achieved, at least in part, by identification and compliance with "applicable or relevant and appropriate standard, requirement, or criteria, or limitation ... for a hazardous substance, pollutant, contaminant, remedial action, or location...." (commonly referred to as ARARs).

Two other subsections in Section 121 of CERCLA have been discussed in the context of the Model Toxics Control Act. First, Section 121(d)(4) specifies that EPA may waive compliance with ARARs in limited situations, as long as the cleanup is protective of human health and the environment. The second provision is Section 121(c) which provides that if EPA "selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, [EPA] shall review such remedial action no less frequently than each 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."

Applicable State and Federal Laws

RCW 70.105D.030(2)(d) specifies that minimum cleanup standards shall be at least as stringent as "applicable state and federal laws." This term is similar, but not identical, to the federal term, "applicable or relevant and appropriate requirements"

(ARARs). As discussed in Chapters 3 and 4, Ecology has proposed to define "applicable state and federal laws" to include both "legally applicable" and "relevant and appropriate" requirements.

Section 121(d) refers to ARARs, but does not define them. The definition is found in the National Contingency Plan (EPA, 1990) which establishes a two-step process for identifying ARARs. Under this process, a requirement is first evaluated to determine if it is legally applicable. The basic criterion for determining whether a requirement is applicable is that it applies as a matter of law. For example, the state's water quality standards are legally applicable requirements for waters of the state. If a particular requirement is not legally applicable, it may be judged to be "relevant and appropriate." A law or regulation is relevant and appropriate if it addresses problems "sufficiently similar to those encountered at the CERCLA site that it's use is well suited to the particular site...."

The Regulatory Dilemma

The cleanup standard amendments attempt to deal with the complex issue of "how clean is clean." Resolution of this issue requires information on (1) hazardous substance levels, (2) the potential for such substances to migrate from the site, and (3) the potential for those hazardous substances, either individually or in combination, to cause adverse health or environmental effects. From a regulatory perspective, the process of collecting and interpreting this information is complicated by the fact that many gaps remain in our scientific understanding of the exact relationships between exposure to hazardous substances and the adverse health or environmental effects resulting from such exposures.

This type of regulatory dilemma is neither new nor unique to the Department of Ecology. Indeed, Ecology and other regulatory agencies face the same difficulties that public officials have faced in the past. Dr. Richard Bates (former Science Director for the Food and Drug Administration) described those similarities in his written comments on the Occupational Safety and Health Administration's cancer policy. He stated:

> A classic episode in the history of disease prevention took place in London in 1854. An epidemic of cholera occurred in the neighborhood around Broad Street. John Snow, the hero of the story, studied the habits of the victims and found that almost all obtained their water from the well on Broad Street. Swift action was taken; the pump was closed down and the epidemic rapidly subsided. This disease was caused by exposure to the bacterium *Vibrio cholerae*. One can imagine the reaction that might occur today if it were proposed to close down the pump on the basis of evidence of the kind obtained by John Snow. Many scientists would point out that it had not been conclusively demonstrated that the water was the cause of the disease. They would be troubled because of the lack of satisfactory theoretical knowledge to explain how the water could have caused the disease. Furthermore, other habits of those who had become ill had not been adequately investigated, so it would not be possible to rule out other causes of the disease. The scientists would have been correct. Others would have pointed out that some members of the community who drank from the Broad Street well had not succumbed to cholera. Thus, even if there were something wrong with the water, there must be other factors involved and if we could control these we would not have to be concerned about the water. The conclusions are also correct. Some who consumed water from the Broad Street well would have objected to closing it because the taste of water from other wells was not a agreeable. Finally, if the pump had been owned by an individual who sold the water, he would certainly have protested against closing down his business on the basis of inconclusive evidence of hazard. (Bates, 1978, pp. 1-2)

Dr. Bates concluded that this story highlights several key concepts that should be kept in mind by government agencies charged with the responsibility of regulating hazardous substances:

- If human disease is to be prevented, it is often necessary to control exposures for which there is some evidence of hazard before that evidence has reached the point that scientists would universally regard as conclusive;

- Development of a disease in any individual is the result of complex interactions of a variety of factors including genetic susceptibility, exposure to other environmental pollutants, age, nutrition, etc.; and

- The incidence of disease in a population can be reduced by reducing exposure to hazardous substances or by measures designed to reduce the susceptibility of individuals.

Ecology finds this advice to be particularly relevant to the cleanup of hazardous waste sites. Several sections of the MTCA (RCW 70.105D.010, .030(2)(d), .030(5), and .040) appear to reflect the Initiative drafter's recognition that conclusive medical or scientific evidence may not exist for many hazardous substances. Nevertheless, the law mandates that cleanup standards be developed and used to define cleanup requirements for contaminated sites in the State of Washington. Consequently, Ecology believes it would be inconsistent with its statutory obligations to delay actions in the hope that science will provide definitive answers on the issue of "How Clean is Clean." Although encouraged by the promising developments in the areas of toxicology and risk assessment, the Department is aware it is operating "on the frontiers of scientific knowledge" (IUD vs. Hodgson, 1974), but with a "command to act" (Ethyl Corp vs. EPA, 1975). In this light, Ecology's rulemaking efforts have been directed towards constructing a rational and efficient regulatory framework that recognizes the fluid and developing nature of scientific knowledge. The Department believes that the standards create a framework for regulatory action which will provide a uniform and reasonable response to site cleanup. The standards, Ecology believes, will permit the agency to complete cleanup actions in a timely and efficient manner without imposing unreasonable limits on the consideration of meaningful scientific advances.

The cleanup standards represent a combination of scientific policies and technical procedures for establishing cleanup requirements. The Department recognizes that some issues normally raised and considered on individual sites have been limited or resolved in this rulemaking. Ecology intends to limit the issues in future cleanup actions to those topics and issues specific to a particular hazardous substance or site. The validity of more general policy issues are not to be the subject of individual cleanup actions. Consequently, Ecology believes this approach will allow staff to act with greater certainty and efficiency in framing and resolving the critical technical issues associated with individual cleanup sites.

Ecology's Regulatory Goals

The development of the amendments involved considering and balancing a number of proposed issues and interests. The proposed amendments were developed to satisfy the following six goals or objectives:

- Remediation of contaminated sites to levels that are protective of human health and the environment. Ecology's foremost goal was to develop standards that are protective of human health and the environment. Protection is defined to include both current and future generations and susceptible subgroups, such as small children, that are particularly sensitive to hazardous substances;

- Scientifically and legally defensible cleanup standards. An important goal was to develop standards that are scientifically and legally defensible. Toward that end, Ecology reviewed the scientific literature and consulted with members of the Science Advisory Board and other individuals experienced in the areas of risk assessment. Where conflicting opinions or recommendations exist, Ecology has attempted to balance the various positions to arrive at a scientifically defensible and workable approach;

- Performance of cleanup actions in a manner that is consistent with existing state and federal regulatory programs. The MTCA requires that minimum cleanup standards be at least as stringent as applicable state and federal laws. In developing the proposed amendments, Ecology has attempted to rely on requirements established under these other authorities and avoid creating duplicate requirements. However, contaminated sites are frequently more complex than situations addressed by existing programs. Consequently, Ecology has attempted to provide an approach that supplements existing requirements to address situations where multi-media contamination and mixtures of hazardous substances are present;

- Efficient cleanup of contaminated sites. An important objective of the proposed amendments is to increase the efficiency of site cleanup. By resolving fundamental pol-

icy issues, the proposed amendments represent an attempt to reduce the amount of flexibility in the present system which serves to heighten uncertainty rather than predictability. In doing so, Ecology hopes to create a system which focuses available funds on site cleanup and minimizes cleanup standard negotiation or litigation;

- Use of a consistent approach for assessing and managing health risks. In the past, there has been considerable variability in both the quality and methodologies used to develop cleanup levels. Through the development of the proposed amendments, Ecology hopes to ensure that consistent procedures are used to assess and manage health risks; and

- Provide some flexibility to address individual site characteristics. In developing the proposed amendments, Ecology has tried to balance the goals of regulatory consistency and efficiency with the need to provide some flexibility to address individual site characteristics.

Ecology's Rulemaking Approach

In developing the cleanup standards, Ecology has also attempted to address the concerns and opinions of a wide range of interest groups. Ecology formed the Cleanup Standards Work Group to facilitate discussion during the development of the proposed amendments. Formed in March 1989, the work group is composed of representatives from environmental groups, business, Indian Tribes, and other government agencies. Also in March 1989, the Department held a series of scoping workshops to obtain public comments and opinions on issues related to the development of the cleanup standards and the preparation of this EIS.

Under RCW 70.105D.030(4), Ecology was required to establish a five-member Science Advisory Board. The Board is specifically charged with providing objective scientific advice on cleanup standards and other scientific matters. The five-member Board was appointed in April 1989.

During the last year, Ecology prepared several review drafts of the amendments which were distributed for review by the Board and the Work Group. In March 1990, the Department distributed a draft of the standards for public review and comment. A series of nine public workshops were held to solicit public comment and discuss concerns. After Ecology incorporated changes into the amendments as a result of public comment, the proposed amendments were published in the State Register on August 1, 1990, concurrently with publishing the draft EIS in the SEPA Register. Four informational meetings and three public hearings on the proposed rule and Draft EIS were conducted to allow for informal and formal review. The final proposal and EIS reflect changes made as a result of written comments and public testimony.

Issues Associated With The Amendments

Issues that affect the approach to setting cleanup levels were widely discussed during the drafting of the proposed amendments. Comments on many of the issues were specifically solicited as part of public workshops and scoping meetings. The Science Advisory Board, an Ecology staff work group, and an external work group devoted much of their time to careful examination of these issues. Ecology also requested opinions from the Attorney General's Office regarding several legal issues. Several of the most important issues are briefly identified below and are discussed in detail in Chapter 3 in the Draft EIS (Ecology, 1990).

Appropriate Level of Protection for Human Health and the Environment

The choice of what level of protection to use in setting cleanup levels is one of the most important management decisions associated with the cleanup standard amendments. With respect to noncarcinogens, Ecology is proposing to define protection of human health in terms of concentrations that prevent all known or anticipated acute or chronic toxic effects. For carcinogens, Ecology is proposing to define protection in terms of a range of acceptable cancer risk from 1 in 1,000,000 to 1 in 100,000. These proposals are similar to approaches being used by other regulatory programs within Ecology, consistent with other state and federal cleanup programs, and similar to levels of protection that have been required at individual cleanup sites in this state and other parts of the country.

Methods For Characterizing and Quantifying Human Health and Environmental Risks

Ecology has proposed rules which define the detailed procedures for establishing site-specific cleanup levels. These procedures are modeled upon the methods developed by the U.S. Environmental Protection Agency and other groups and individuals experienced in risk assessment procedures. The Department recognizes that there are many areas of controversy associated with risk assessment (whether risk assessments should use worst-case or average exposure assumptions, what approaches should be used to extrapolate from high level exposures in test animals to low level exposures in the human population, etc) and will continue to monitor future developments in these areas. Methods for assessing risks to ecological communities are still in the early stages of development.

Methods for Characterizing and Considering Scientific Uncertainty

A number of different types of uncertainties must be considered when performing risk assessments. These uncertainties are associated with the variables used to predict exposure and toxicity, regression models, methods for predicting the toxicity of a contaminant to a species from tests on another species, and in the exposure models. A variety of methods can be used to characterize and communicate these uncertainties so that appropriate risk management decisions can be made.

Uniform Statewide vs. Site-Specific Standards

In developing the proposed amendments, Ecology has attempted to design an approach which provides a workable balance between (1) approaches that specify uniform cleanup levels that would be applied to all sites within the state and (2) approaches that require cleanup levels be developed on a site-by-site basis. In striking that balance, the Department has evaluated the trade-offs between flexibility and predictability/consistency. For example, as the standards become more flexible, the ability to consider site-specific conditions is increased. However, as flexibility is increased, regulatory predictability is reduced and the possibility of unwarranted differences in cleanup levels across sites is increased. Increased flexibility also places greater technical review and negotiation demands on Ecology staff, consultants, and the regulated community. The simplicity or complexity of the cleanup levels will also be affected by the choice of uniform vs. site-specific standards. In general, the use of a site-specific approach increases the length and complexity of the regulations. This is particularly troublesome for small businesses. However, if the procedures for establishing site-specific cleanup levels are not clearly specified in the regulations, the effects of site condi-

tions on cleanup levels could become subject to competing interpretations, adversely affecting the clarity and implementability of the regulations.

Definition of Applicable or Relevant and Appropriate Requirements

RCW 70.105D.030(2)(d) requires that the cleanup standards be at least as stringent as Section 121 of SARA and all applicable state and federal laws, including health-based standards under state and federal law. Two primary issues are associated with this requirement. First, there is the issue of what constitutes an applicable state and federal law. As noted above, Ecology has proposed to define the term "applicable state and federal laws" to include both "legally applicable" and "relevant and appropriate" requirements. Ecology has proposed to adopt the federal definitions for these terms as specified in the National Contingency Plan (U.S. EPA 1990b). Second, there is the issue of whether Ecology should provide the flexibility to waive compliance with applicable state and federal laws on a site-specific basis. Although such provisions appear in the federal cleanup law and the previous state law, the MTCA is silent on this issue. Given the explicit provisions in the previous state law and the lack of such provisions in MTCA, provisions for waiving compliance with applicable state and federal laws were not incorporated into the proposed amendments.

Statutory Preference for Permanent Solutions

When selecting cleanup actions for particular sites, the MTCA requires that Ecology give preference to permanent solutions to the maximum extent practicable. Ecology defines permanent solutions as those cleanup actions which require no further actions (including long-term monitoring) at the cleanup site or at an offsite location where hazardous substances from the site might be taken for treatment or disposal (such as a landfill), other than the approved disposal of any residue from preferred treatment technologies. A determination of whether a cleanup action for a particular site is permanent to the maximum extent practicable is based on an evaluation of several factors including a number of technical, community, and economic factors.

Relationship Between Cleanup Levels and Technical Possibility

Technically possible is defined as "capable of being designed, constructed, and implemented in a reliable and effective manner, regardless of cost." With respect to the relationship between technical possibility and cleanup levels, two situations may arise. First, technically possible levels may represent concentrations that are below health-based levels. In these situations, cleanup

levels could be technology-based. This is consistent with the philosophy behind the state's antidegradation policy. On the other hand, technically possible levels may represent concentrations substantially above health-based levels. Ecology recognizes that such situations may arise and the proposed rules provide some flexibility to modify cleanup levels based on considerations of technical possibility. The Department also recognizes that currently available analytical procedures place practical constraints on its ability to enforce cleanup level requirements, and the proposed amendments address those constraints. Finally, the proposed amendments provide considerable flexibility to address technical possibility through the selection of cleanup actions for a particular site.

Role of Cost in Selecting Cleanup Levels and Cleanup Actions

Costs have traditionally been one of the primary concerns in defining cleanup levels and selecting cleanup actions to achieve those levels. In contrast to the federal cleanup law, the MTCA does not include specific language regarding the role of cleanup costs in making these determinations. Only in the requirement that Ecology give preference to permanent solutions to the maximum extent practicable does the MTCA include a provision that could be interpreted to include cost considerations. The proposed amendments specify that practicability, which considers cleanup costs, is one factor in selecting cleanup actions, but do not allow consideration of cost in establishing cleanup levels.

Points of Compliance and Restoration Time Frames

Demonstrating compliance with established cleanup levels at a site is an important component of cleanup actions. This involves specifying where on the site the cleanup level must be met ("points of compliance"), how long it takes for a site to meet cleanup levels ("restoration time frame"), and conducting sufficient monitoring to demonstrate that the cleanup standards have been met and will continue to be met in the future.

State Environmental Policy Act Review of Site-Specific Cleanup Decisions

In contrast to the federal cleanup law and the previous state law, the MTCA does not explicitly exempt site cleanup decisions and actions from complying with permit or regulatory review requirements, including the State Environmental Policy Act (SEPA). Consequently, proposed cleanup actions at state hazardous waste sites will be subject to SEPA review. SEPA compliance may involve a determination of nonsignificance (DNS), preparation of a mitigated DNS, or the preparation of an EIS.

Relationship Between the Federal Superfund Program and the Model Toxics Control Act

The federal Superfund program and the MTCA have very similar goals for hazardous waste site cleanup. A given hazardous waste site in Washington may be subject to cleanup under either or both of these programs. In those instances, the MTCA Cleanup Regulation will be considered a legally applicable requirement.

Procedures for Updating and Revising Cleanup Levels

Ecology is committed to assuring that sound scientific judgment is used in establishing cleanup levels for hazardous substances. Concerns have been expressed that the proposed amendments do not provide the flexibility to incorporate new scientific information. To address these concerns, Ecology has explicitly provided several mechanisms for responding to the expanding scientific knowledge and important scientific developments. First, WAC 173-340-702(6) states that Ecology "shall consider new scientific information when establishing cleanup levels...." Second, WAC 173-340-702(3) requires Ecology to review and, if appropriate, revise the cleanup standards no less frequently than once every five years. Third, the proposed amendments include several provisions for utilizing new scientific information on a site-specific basis. For example, the most up-to-date toxicity values (reference doses and carcinogenic potency factors) will be utilized at individual sites.

Chapter 3
Description of the Alternatives

The following sections describe the alternatives to be evaluated for setting cleanup standards for ground water, surface water, marine water, soil, and air at hazardous waste sites in Washington State. First, the development of the alternatives is described. Then each of the alternatives is evaluated and summarized. A more detailed description of the alternatives is contained in Chapter 4 of the Draft EIS (Ecology, 1990).

Development of the Alternatives for Setting Hazardous Waste Site Cleanup Standards

The alternative approaches to setting cleanup standards evaluated in this EIS were developed after consideration of a number of factors. First, the basic approaches to setting cleanup levels used in other federal and state programs discussed were reviewed. Second, the language of the MTCA was considered. The MTCA did not mandate the use of a specific approach, but certain requirements were identified, such as protection of human health and the environment, and compliance with ARARs. Third, Ecology's existing *How Clean Is Clean* policy (Ecology, 1984) was reviewed. Finally, public comments were evaluated and a risk-based alternative at 10^{-4} was evaluated.

In addition to the four basic alternatives initially identified, a fifth alternative was considered. This alternative was suggested by MTCA language that required *both* compliance with ARARs *and* protection of human health and the environment. Because risk assessments and ARARs do not always result in the same value for a given hazardous substance, the lower of the values could be used to comply with the language of the MTCA. For different hazardous substances, different alternatives would be lowest. For example, the water quality criterion for the protection of aquatic life results in the lowest value for copper, while the human health-based risk assessment results in the lowest value for benzene. Because of these differences, a fifth alternative was developed that combined elements of more than one basic alternative.

The exact form that this alternative would take was determined in part by the strengths, weaknesses, and impacts of the five basic alternatives evaluated in this EIS. The preferred combination alternative draws on the strengths of these alternatives. In the following chapters, the combination alternative is evaluated along with the five basic alternatives and the no-action alternative.

The seven alternatives evaluated in this document are:

- **Alternative #1: The Preferred Alternative: Combination Alternative**—Cleanup levels would be chosen for each hazardous substance in each medium on a substance-by-substance basis. Standards for individual hazardous substances would then be modified to take into account total risks, where known, of substances when combined. Cleanup actions must use permanent solutions to the maximum extent practicable.

- **Alternative #2: Background Alternative**—Cleanup levels would be set using the background concentration or practical quantitation limit of each hazardous substance in each medium. Background would be defined as the concentration or level of a hazardous substance in the environment at or near the facility that cannot be attributed to any release from the site or other human activities in the local area. Cleanup actions must use permanent solutions to the maximum extent practicable.

- **Alternative #3: Risk-Based Alternative (#1)** – Cleanup levels would be set through an assessment of risk to human health and the environment for each hazardous substance in each medium. Standards for individual hazardous substances would then be modified to take into account the total risks from hazardous substances when combined. The risk level is set at a one-in-a-million excess cancer risk for carcinogens. Cleanup actions must use permanent solutions to the maximum extent practicable.

- **Alternative #4: Risk-Based Alternative (#2)** – Cleanup levels would be set as described above, except with a risk level of one in ten thousand. Cleanup actions must use permanent solutions to the maximum extent practicable.

- **Alternative #5: Applicable State and Federal Laws Alternative**—Cleanup levels would be designed to meet or exceed standards established under applicable state and federal laws, including Section 121 of CERCLA/SARA. Section 121 requires the use of all legally applicable or relevant and appropriate requirements (ARARs) for each hazardous substance in each medium. The ARAR with the lowest concentration would be chosen as the standard in each case. Cleanup actions must use permanent solutions to the maximum extent practicable.

- **Alternative #6: Technology-Based Alternative**—Cleanup levels would reflect the lowest concentration level that can be achieved by the best available cleanup technology. Cleanup actions must use permanent solutions to the maximum extent practicable.

- **Alternative #7: No-Action Alternative**—No new standards would be set for cleanup of hazardous waste sites. Because Ecology is currently required by law to promulgate cleanup levels, this alternative is not a legal option. However, even if Ecology declined to adopt new cleanup levels, the use of the strictest ARARs would still be required by the MTCA. Therefore, for the purposes of this EIS, the no-action alternative is equivalent to the ARAR alternative and will not be evaluated separately. Cleanup actions must use permanent solutions to the maximum extent practicable.

Regulatory requirements are commonly expressed in one of three ways. These are narrative, process-based, and numerical standards. **Narrative standards** are descriptive and do not include numbers or processes for arriving at numbers. An example of a narrative standard is:

> *"The standard for arsenic shall be set at a level that is protective of human health and the environment."*

Process-based standards describe the methods to be used to arrive at site-specific or hazardous substance-specific concentrations. The process-based standard may describe specific methodologies and assumptions to be used, or it may allow some variation within a range of methodologies or assumptions. An example of a process-based standard is:

"The standard for arsenic shall be set for each site at the level that is protective of human health at that site, using the equations and assumptions set forth in Appendix F of this document."

Numerical standards are specific numbers that are applied at all sites. An example of a numerical standard is:

"The standard for arsenic in soil shall be 50 mg/kg."

The alternatives evaluated in this EIS are combinations of all three approaches. In this way, a number may be set as a standard, but these numbers can be modified according to site-specific criteria. A detailed discussion of the standard-setting process for each alternative can be found in Chapter 4 of the Draft EIS (Ecology, 1990).

Alternative #1: The Preferred Alternative. The Combination Alternative

The combination alternative is the proposed action which is an amendment to the Model Toxics Control Act Cleanup Regulation (Chapter 173-340 WAC). The proposed amendments would establish numerical cleanup levels for relatively straightforward cleanup actions and provide a process for establishing site-specific cleanup levels at more complex sites. These rules will be applied to hazardous substances in ground water, surface water, marine water, soil, and air. The proposed amendments also include provisions for selecting cleanup actions and performing leaking underground storage tank (LUST) corrective actions.

The proposed amendments would apply to owners and operators of facilities (commonly referred to as hazardous waste sites) where there has been a release or threatened release of hazardous substances that may pose a threat to human health or the environment. These facilities include locations where hazardous substances have entered ground water, fresh and marine surface water, soils, air, sediments, or combinations of these media.

The proposed amendments include a number of key provisions which are summarized below. The complete regulation is available upon request from the Department.

General Requirements

There are ten sections within the proposed amendments that include provisions that apply to hazardous substances in all media. These include:

Overview of Cleanup Standards - WAC 173-340-700 provides an overview of the methods for establishing cleanup standards. This involves specifying hazardous substance concentrations that protect human health and the environment ("cleanup levels"), and the location on the site where cleanup levels must be attained ("points of compliance"), and additional regulatory requirements that apply because of the type of cleanup action and/or site location.

Administrative Principles for Cleanup Standards - WAC 173-340-701 summarizes key principles underlying the cleanup standards.

General Policies - WAC 173-340-702 summarizes several policies the Department will use to ensure cleanup standards are established and implemented in a scientific and technically sound manner.

Use of Method A - WAC 173-340-704 describes the basic requirements for establishing cleanup levels.

Use of Method B - WAC 173-340-705 describes the basic requirements for establishing cleanup levels.

Use of Method C - WAC 173-340-706 describes the basic requirements for establishing cleanup levels.

Analytical Considerations - WAC 173-340-707 defines the procedures for addressing analytical limitations when evaluating compliance with cleanup standards.

Human Health Risk Assessment Procedures - WAC 173-340-708 defines the basic risk assessment framework that the Department will utilize to establish cleanup levels.

Applicable State and Federal Laws - WAC 173-340-710 defines the criteria for determining what requirements are applicable state and federal laws. Ecology has proposed to define this term to include both "legally applicable" and "relevant and appropriate" requirements. The proposed definitions for these terms and

criteria for judging individual laws and regulations are virtually identical to provisions included in the National Contingency Plan (EPA, 1990).

Definitions - WAC 173-340-200 has been amended to incorporate those terms that are unique to cleanup standards and LUST portions of the regulation.

Cleanup Standards

There are six sections that provide more detailed procedures for establishing cleanup standards in the various environmental media. Each section defines the reasonable maximum exposure for that media, applicable state and federal laws, risk assessment procedures for hazardous substances, and points of compliance. The six sections include:

- Ground Water Cleanup Standards - WAC 173-340-720
- Surface Water Cleanup Standards - WAC 173-340-730
- Soil Cleanup Standards - WAC 173-340-740
- Industrial Soil Cleanup Standards - WAC 173-340-745
- Cleanup Standards to Protect Air Quality - WAC 173-340-750
- Sediments Cleanup Standards - WAC 173-340-760

The sediment cleanup standards are being reserved until Ecology's Sediment Management Unit has adopted regulations under Chapter 173-203 WAC defining a comprehensive approach for managing sediments.

Selection of Cleanup Actions

There are five sections that specify requirements for selecting and implementing cleanup actions. These include:

Selection of Cleanup Actions - WAC 173-340-360 defines the basic requirements for cleanup actions under this chapter and procedures for documenting cleanup decisions. Under the proposed amendments, cleanup actions must meet certain threshold requirements including protection of human health and the environment, compliance with cleanup standards, compliance with applicable state and federal laws, and monitoring to assure the effectiveness of the cleanup. In addition, the cleanup actions

must use permanent solutions to the maximum extent practicable, provide for a reasonable restoration time frame, and consider public concerns.

Periodic Review - WAC 173-340-420 defines the requirements for periodically reviewing cleanup actions. The proposed amendments specify that in situations where residual hazardous substances exceed Method A or B cleanup levels or if conditional points of compliance are approved, the Department shall review the cleanup action at least once every five years to assure that human health and the environment is being protected.

Institutional Controls - WAC 173-340-440 defines the general requirements for restricting site use where hazardous substances are left on-site as part of the cleanup action. Under the proposed amendments, institutional controls which restrict the use of the site and affected natural resources shall be required when residual levels of hazardous substances exceed Method A or B cleanup levels or a conditional point of compliance is established. The institutional controls would generally be described in a restrictive covenant which, at a minimum, shall specify measures to protect human health and the environment and maintain the integrity of cleanup measures.

Releases from Underground Storage Tanks - WAC 173-340-450 responds to the need to address the corrective action requirements outlined in the federal Underground Storage Tank rules. The proposed amendments specify additional requirements for UST owners and operators regulated under Chapter 90.76 RCW. These include reporting of confirmed releases within 24 hours, follow-up investigations, free product removal and immediate assessment and reduction of the threat to human health and the environment at the site. A written report describing the site and remedial actions must be submitted within ninety days of release confirmation. If appropriate, UST owners and operators must also conduct and report and additional cleanup actions.

Analytical Procedures - WAC 173-340-830 defines standard analytical methods for use in the investigation and cleanup of hazardous waste sites.

Derivation of Cleanup Standards Under the Combination Alternative

Establishing cleanup standards requires specification of (1) hazardous substance concentrations that protect human health and the environment ("cleanup levels") (2) the location or the site where those cleanup levels must be attained ("points of compliance"), and (3) additional regulatory requirements that apply to a cleanup action because of the type of action and/or the location of the site. The proposed amendments provide three methods for establishing cleanup levels.

Method A Cleanup Levels

The proposed amendments specify that Method A may be used to establish cleanup levels for routine cleanup actions or at sites with relatively few hazardous substances. Cleanup levels would be established at concentrations specified under applicable state and federal laws or in cleanup level tables included in the regulations. For other hazardous substances, Method A cleanup levels would be established at natural background concentrations or the practical quantitation limit.

Method B Cleanup Levels

Method B cleanup levels would be established using a combination of ARARs and risk assessment methods, as follows: if one or more ARARs are available for a hazardous substance, the lowest of the ARARs would be used as long as the ARAR is not associated with a risk level greater than $1x10^{-5}$. If the ARAR is associated with a risk level greater than $1x10^{-5}$, or if no health-based ARAR is available, the risk-based concentration ($1x10^{-6}$ risk level for carcinogens and a hazard quotient of 1.0 for non-carcinogens) would be used. Either must be above the natural background concentration; otherwise, the natural background concentration would be used.

Concentrations for individual hazardous substances would be adjusted to take into account exposure to multiple hazardous substances and exposure through multiple exposure pathways. In the majority of cases, cleanup levels must attain a total site cancer risk of $1x10^{-5}$ and a hazard index of 1.0. The exception is that cleanup levels for individual hazardous substances would not be established at levels below natural background concentrations. As with all of the alternative approaches, Ecology's ability to enforce a particular cleanup level is constrained by current analytical capabilities. Consequently, a cleanup level would be considered to have been attained if the measured concentration of a hazardous substance was below the PQL. The proposed amendments specify that if the PQL is higher than the particular cleanup level, it is considered to have been attained if the PQL is not

greater than ten times the method detection limit or is not greater than the PQL established by EPA. EPA defines the practical quantitation limit as the "concentration at which the hazardous substance can be measured by good laboratories under normal operating conditions, within specified limits of precision and accuracy" (U.S. EPA, 1989d).

Method C Cleanup Levels

Method C cleanup levels would be established in a manner similar to Method B except that acceptable risk levels for individual carcinogens would be based upon an excess cancer risk of $1x10^{-5}$. Method C could be used only where Methods A and B would result in cleanup levels that (1) are below area background levels, (2) are technically impossible to achieve, or (3) would result in a significantly greater overall threat to human health or the environment.

Alternative #2: The Background Alternative

The background alternative consists of a series of requirements for establishing cleanup standards and selecting cleanup actions. The background alternative differs from the proposed action in that, under the background alternative, cleanup levels would be established at levels equal to background concentrations of hazardous substances in all affected media. Although simple in concept, implementation of this alternative is complicated by the fact that there are several possible definitions of background. Natural background concentrations are those that existed prior to any human activity, while prerelease background concentrations are those that take preexisting contamination from other releases or human activities into account. For purposes of defining this alternative, *background concentration* is defined as the concentration of a hazardous substance in the environment at or near the facility that is not attributable to any release at the site or localized human activities. This is similar to the definition of natural background concentration in the proposed regulation (WAC 173-340-200).

Several states have used background concentrations to define cleanup requirements. Oregon has published rules that require cleanup to natural background concentrations where feasible. In Massachusetts, the statutory cleanup goal is to attain prerelease background concentrations. Site closure requirements for haz-

ardous waste management facilities under Washington's Dangerous Waste Regulations are also defined in terms of prerelease background conditions.

Derivation of Cleanup Standards Under the Background Alternative

Standards under the background alternative could be derived in several ways. For routine sites, a regional background documented in the literature or a background determined for another site in the same general area could be used (assuming data are of a known and acceptable quality). For larger, more complex sites, site-specific background studies and review of historical data might be required. If the background concentration is less than the PQL, the PQL would be used to determine compliance with the standard. PQLs used to determine compliance with the standard would be no higher than those established by EPA.

Alternative #3: Risk-Based Alternative (#1)

The risk-based alternative (#1) consists of a series of requirements for establishing cleanup standards and selecting cleanup actions. The risk-based alternative differs from the proposed action in that cleanup levels would be established solely on the basis of risk assessment. Cleanup levels would be established at concentrations that are protective of both human health and the environment. Such concentrations would be established using procedures that relate acceptable levels of hazardous substance exposure to allowable concentrations of hazardous substances in the environment. Cleanup levels for noncarcinogens would be established at concentrations which are estimated to result in no acute or chronic toxic effects. For carcinogens, cleanup levels would be based upon a lifetime excess cancer risk of $1x10^{-6}$. This represents the level of exposure conservatively estimated to result in no more than one chance in a million of developing cancer over a lifetime (70 years).

Risk assessment is an established method to estimate the probability of adverse health effects that may result from exposure to a toxic agent. Assessing risks from exposure to toxic hazardous substances consists of the following steps:

- **Hazard identification** – Qualitative evaluation of the potential for a substance to cause adverse health effects (for example, birth defects or cancer) in animals or in humans

- **Dose-response assessment**—Quantitative estimate of the relationship between the dose of a substance and the probability and magnitude of an adverse health effect

- **Exposure assessment**—Characterization of the populations exposed to the toxic hazardous substances of concern; the environmental transport and fate pathways; exposure pathways; and the magnitude, frequency, and duration of exposure

- **Risk characterization**—Estimation of risk for the health effect of concern based on information from the first three steps.

An indication of toxicity is derived from the dose-response relationship measured for the hazardous substance of concern. The form of the dose-response relationship for carcinogens is assumed to be fundamentally different from that for noncarcinogens (U.S. OSTP, 1985). The lack of a demonstrated threshold in dose-response relationships for carcinogens (U.S. EPA, 1980, 1986b; U.S. OSTP, 1985) implies some risk of cancer even at very low doses of the carcinogen. For noncarcinogens, there is usually a dose below which no adverse biological effects are observed. This dose is called a *threshold dose*.

The toxicity of a carcinogen is generally represented by a *carcinogenic potency factor* (CPF), a measure of the cancer-causing potential of a substance (typically estimated as the upper 95 percent confidence limit of the slope of a straight line calculated by the linearized multistage procedure or another appropriate model). The CPF is calculated from human epidemiology studies or animal bioassays. Correction factors are applied to convert values derived from animal studies to values appropriate for humans.

A noncarcinogen is characterized by a *reference dose* (RfD), an estimate of the daily intake that is unlikely to produce an appreciable risk of adverse health effects during a lifetime, even in sensitive individuals. The reference dose is calculated from the no observed adverse effect level (or the lowest observed adverse effect level, if the former is unknown) in humans or animals by dividing this level by a safety factor between 10 and 1,000. This safety factor takes into account differences within and between species and differences in the duration of the studies.

substances when environmental conditions, such as pH, chemical hardness of water, and temperature, vary. Therefore, on a statewide basis, previously developed standards that are protective of most plants and animals would be used when available. Because of the variability of responses to hazardous substances by plants and animals at a site, no single model is appropriate for use at all sites. Ecology is currently evaluating ecological risk models for use in developing cleanup levels at hazardous waste sites, and will be addressing this issue in a subsequent rule amendment.

Guidelines that can be used to assess risk to plants and animals on a statewide basis include the EPA acute and chronic ambient water quality criteria for the protection of freshwater and saltwater organisms. These criteria are expected to be protective of 95 percent of the aquatic species in the United States (U.S. EPA, 1986g). However, these criteria were developed based on average species response and may not be fully protective of sensitive subspecies or life cycle stages. No standards for soil, air, or ground water are presently available for the protection of plants and animals.

Alternative #3: Risk-Based Alternative (#2)

The risk-based alternative (#2) consists of a series of requirements for establishing cleanup standards and selecting cleanup actions. This alternative is identical to the previous alternative except that cleanup levels for carcinogens are established on the basis of an excess lifetime cancer risk of one-in-ten-thousand ($1x10^{-4}$).

Alternative #4: Applicable or Relevant and Appropriate Requirements Alternative

This alternative consists of a series of requirements for establishing cleanup standards and selecting cleanup actions. It differs from the proposed action in that cleanup levels would be based upon existing federal and state environmental protection standards. The MTCA requires Ecology to publish cleanup levels that are "at least as stringent as the cleanup levels under Section 121 of the federal cleanup law, 42 U.S.C. Sec. 9621, and at least as stringent as all applicable state and federal laws, including

health-based standards under state and federal law." Section 121 of CERCLA/SARA requires the use of all applicable or relevant and appropriate requirements. These requirements are commonly called ARARs.

Applicable requirements are legally enforceable requirements that specifically address a hazardous substance, cleanup action, medium, location, use, or other circumstance at the site of interest. *Relevant and appropriate requirements* are those that, while not legally applicable, address situations sufficiently similar to those encountered at a particular site that their use is well suited to the site in question. Ecology proposes to define "applicable state and federal laws" to include both applicable requirements and relevant and appropriate requirements (see WAC 173-340-710).

ARARs are used to establish cleanup levels in many states. For example, Minnesota, Ohio, Florida, Massachusetts, California, New York, and New Jersey use federal and state laws and regulations, alone or in combination with a risk-based approach, to establish cleanup levels.

Derivation of Cleanup Standards Under the ARAR Alternative

In many cases, more than one ARAR exists for a given hazardous substance in a given medium. Because the MTCA requires that the cleanup levels be at least as stringent as any ARARs, the most stringent ARAR would be chosen as the standard for each hazardous substance. Categories of ARARs that would be considered include those protective of human health, those protective of the ecological community, and those relating to public welfare. Several ARARs are available or proposed for hazardous substances in surface water, marine water, soil, and air.

These include Maximum Contaminant Level Goals (MCLGs), primary Maximum Contaminant Levels (MCLs); secondary MCLs, Washington's drinking water standards, surface water standards, ambient water quality criteria, and Dangerous Waste Regulations.

Alternative #5: Technology-Based Alternative

The technology-based alternative consists of a series of requirements for establishing cleanup standards and selecting cleanup actions. It differs from the proposed action in that cleanup levels would reflect the lowest concentration of hazardous substances that can be achieved by the best available treatment technology. The process of setting these standards would not specifically take into consideration protection of human health and the environment. Instead, it would focus on the level of cleanup that can actually be achieved using current technology. Setting standards below the limits of technical achievability would require such measures as the containment of hazardous substances on-site, the removal of hazardous substances to an off-site location, or the development of new technologies for the cleanup of hazardous substances.

Technology-based standards are currently used in the Clean Air Act and the Clean Water Act to regulate emissions from automobiles and smokestacks and to establish effluent limits for wastewater treatment plants, respectively. In addition, the state Water Pollution Control Act requires the use of "all known, available, and reasonable methods of treatment" (AKART) for discharges to surface water and ground water.

Derivation of Cleanup Standards Under the Technology-Based Alternative

The achievable concentration for each hazardous substance would be ascertained by reviewing the literature and/or performing treatability studies and then determining the range of effluent concentrations that could be achieved by various technologies for remediation of each medium. The lowest of these concentrations would be chosen. Many treatment efficiencies depend on the initial concentration of the hazardous substance or are expressed as a percentage of the initial concentration.

Alternative #7: No-Action Alternative

Under this alternative, no new cleanup levels for hazardous waste sites would be set. Since the MTCA requires Ecology to promulgate cleanup levels that are at least as stringent as ARARs, the no-action alternative is not a legal option.

In the absence of regulations, and in the period of time preceding the promulgation of these proposed standards, ARARs would apply to any cleanup actions undertaken in the State of Washington. In these situations, the use of the strictest of these ARARs can be considered a reasonable definition of the no-action alternative. The ARARs that would apply in the absence of regulations are the same ARARs considered under the ARAR alternative. For the purposes of this EIS, the no-action alternative is considered to be identical to the ARAR alternative and has not been evaluated separately.

Chapter 4
Affected Environment and Significant Impacts of the Alternatives

This chapter presents an assessment of impacts associated with the implementation of the proposed amendments, as well as the impacts of the various alternatives. In the interest of clarity, the text of this Final EIS relies on summaries of information already presented in the Draft EIS (Ecology, 1990), rather than repeating the information here.

The purpose of this section is to evaluate the potential adverse environmental impacts associated with performing cleanup actions under the various alternate approaches described in Chapter 3. The proposed amendments will influence the nature, magnitude, and probability of adverse impacts by specifying requirements for the following:

Selection of cleanup levels: The long-term environmental impacts associated with residual levels of hazardous substances tend to be directly related to cleanup levels for a particular site. More stringent cleanup levels are generally associated with lower long-term environmental impacts. This contrasts with the general relationship between cleanup levels and the short-term environmental impacts which occur during a cleanup action. In these cases, environmental impacts tend to be inversely related to the cleanup level (i.e. the more stringent the cleanup level, the greater the potential for short-term adverse environmental impacts).

Selection of cleanup actions: The Model Toxics Control Act expresses a preference for the use of permanent solutions to the maximum extent practicable. Permanent solutions generally involve the use of some type of treatment technology (incineration, bioremediation, etc.). Treatment technologies frequently have a greater potential for short-term adverse impacts relative to cleanup actions which rely solely on capping and other containment tech-

nologies. However, the long-term protection associated with the use of permanent solutions is usually superior to containment options.

The evaluation of the environmental impacts associated with the various alternatives is qualitative since actual site impacts will vary with site-specific conditions. The relative impacts of each alternative were estimated and determinations made as to whether the alternative will increase the potential for adverse impacts relative to the impacts associated with existing laws and regulations.

Under the No-Action Alternative, Ecology would not develop new cleanup standards. Cleanup requirements would continue to be established on a case-by-case basis. In the past, ground water cleanup levels have generally been based on existing standards (i.e. state and federal drinking water standards). Consequently, this alternative is considered to be equivalent to Alternative #6 and has not been evaluated separately. As noted in Chapter 5 below, Ecology believes that the statutory directive to develop cleanup standards precludes Ecology's implementation of this alternative.

In performing this evaluation, the following assumptions were made:

- The Model Toxics Control Act's preference for cleanup actions that involve "permanent solutions to the maximum extent practicable" will lead to increased use of treatment technologies.

- The land disposal restrictions being implemented as a result of the Hazardous and Solid Waste Amendments (HSWA) of 1984 will reduce the reliance on off-site disposal of untreated materials.

- Sufficient treatment capacity is available to handle wastes from sites being cleaned up under the Model Toxics Control Act. However, without additional in-state capacity, contaminated materials may have to be transported long distances prior to treatment.

- The proposed amendments will not impact the number of sites undergoing cleanup under the MTCA. Listing decisions will continue to be made on the basis of site hazard assessments.

Ground Water

Affected Environment

Statewide, approximately 80 million acre-feet of ground water is stored in near-surface aquifers. The average annual replenishment of these aquifers is 7.5 million acre-feet (Wash. St., *et al.*, 1989). These resources are highly variable in terms of their susceptibility to contamination from hazardous waste sites. Susceptibility is a complex function of several factors including the permeability of the geologic materials overlying an aquifer, depth to ground water, rainfall, and type of hazardous substance.

An administrative classification under the Safe Drinking Water Act (40 CFR 149) lists aquifers requiring special protection because they are sole sources of drinking water for large communities. The aquifers designated or petitioned as sole-source aquifers in Washington include aquifers underlying the Spokane Valley, Lewiston Basin in Asotin County, western Pierce County, Cedar Valley in King County, Cross Valley, the Newberg and Tulalip areas in Snohomish County, and Whidbey and Camano Islands in Island County. The ground water resources of the State of Washington are described in greater detail on pages 5-1 through 5-5 of the Draft EIS (Ecology, 1990) and in "The State of the Environment Report" (Wash. State, *et al*, 1989).

Significant Impacts of the Alternative

WAC 173-340-720 of the proposed amendments specifies requirements for cleanup actions involving contaminated ground water. The proposed amendments include: (1) criteria for defining current and potential future sources of drinking water; (2) procedures for establishing numerical cleanup levels; (3) requirements for establishing points of compliance; and (4) statistical procedures for evaluating compliance with ground water cleanup levels. In addition, WAC 173-340-360(7) of the proposed amendments specifies minimum requirements for ground water restoration actions.

Impacts to ground water resources are generally directly related to the quality and quantity of the resource. Under the criteria in the proposed amendments, it is anticipated that most ground waters in the state will be considered current or potential future sources of drinking water. Consequently, implementation of the proposed amendments may provide a small amount of additional protection relative to the ARAR or No-Action Alternative. The largest differences will occur in situations where cleanup levels

for carcinogens are more stringent than applicable state and federal laws due to the presence of multiple carcinogens and/or the potential for exposure via several pathways.

With respect to the other alternatives, the Background and Technology-Based (for volatile hazardous substances) Alternatives would generally provide greater ground water protection (more stringent cleanup levels), particularly for noncarcinogenic substances. In addition, the Risk-Based Alternative (#1) would result in very low ground water cleanup levels for carcinogenic substances. The ARAR Alternative would result in intermediate values similar to those under the No-Action Alternative. Finally, implementation of the Risk-Based Alternatives for noncarcinogens, the Risk-Based (#2) Alternative for carcinogens, and the Technology-Based Alternative for some metals, pesticides, and semi-volatile substances would generally result in less ground water protection (higher cleanup levels) than under the No-Action Alternative. It is important to recognize that the availability of effective cleanup technologies will limit what can be accomplished under all of the alternative approaches, and in some cases may lead to unavoidable adverse impacts.

In contrast to the relationship between cleanup levels and ground water quality, increased cleanup levels will generally result in greater impacts on ground water quantity. For example, increased remediation requirements may result in ground water depletion. The potential for salt water intrusion may also be increased in areas adjacent to marine waters as more stringent cleanup levels are established.

Mitigation Measures

The proposed amendments include several provisions which may serve to mitigate adverse effects. For example, the potential for ground water depletion and/or salt water intrusion could be considered when establishing a reasonable restoration timeframe and longer timeframe with less intensive pumping rates could be selected. Such factors might also be considered when evaluating whether ground water restoration is practicable (See WAC 173-340-360(7)).

Unavoidable Adverse Impacts

Recent data from ground water cleanup projects suggest that available technologies are taking much longer to implement and in some instances are not as effective as originally anticipated

(OTA, 1989). In addition, analytical constraints may limit Ecology's ability to measure and enforce extremely low cleanup levels.

Surface Water

Affected Environment

The state is divided into eight drainage basins, of which the Puget Sound and Upper Columbia are the largest. East of the Cascade Mountains (70 percent of the total land area), surface water drains primarily into the Columbia River. West of the Cascade Mountains and East of the Olympic Mountains (20 percent of the total land area), surface water drains into Puget Sound. West of the Olympics (10 percent of the total land area), surface water drains into the Pacific Ocean. The average annual runoff statewide is 26 inches per year. There are 40,838 miles of rivers in Washington and over 8000 lakes (Wash. St., *et al*, 1989).

The state water quality standards (Chapter 173-201 WAC) classify the surface waters of the state according to use. Class AA and Lake Class are used to designate rivers and lakes, respectively, whose water quality shall exceed criteria for all beneficial uses, including water supply; fish and shellfish migration, rearing, spawning, and harvesting; wildlife habitat; recreation; stock watering; and commerce and navigation. Although any contamination of surface water resources is considered important by Ecology, degradation of Class AA and Lake Class waters is of special concern because of the pristine nature of these waters. The following surface waters are classified AA or Lake Class:

- All surface waters lying within national parks, national forests, and wilderness areas;
- All lakes not otherwise classified and their feeder streams;
- Reservoirs with a mean detention time of greater than 15 days;
- Tributaries to Class AA waters; and
- Specific rivers designated as Class AA by WAC 173-201-080.

Wetland areas are also provided special protection by various state and federal laws, including Section 404 of the Clean Water Act. In addition, surface waters used as drinking water sources are of special interest. Surface water resources of the state are described in greater detail on pages 5-5 through 5-9 of the Draft EIS (Ecology, 1990).

Significant Impacts of the Alternative

The proposed amendments (WAC 173-340-730) specify requirements for cleanup actions involving contaminated surface waters. The proposed amendments specify that surface water cleanup standards would be based on estimates of the highest beneficial use that a body of surface water could be expected to sustain, either currently or in the future. These standards would be applicable to bodies of water that are threatened or potentially threatened by sites defined in the MTCA. The proposed rule identifies (1) applicable state and federal laws, (2) procedures for establishing cleanup levels for hazardous substances not addressed under applicable state and federal laws, and (3) procedures for establishing points of compliance. WAC 173-340-710 of the proposed amendments specifies that discharges of hazardous substances to waters of the state must be provided with "all known available and reasonable methods of treatment" (AKART). Impacts to surface water resources are generally directly related to the quality and quantity of the resource. Consequently, implementation of the proposed amendments may provide a small amount of additional protection relative to the ARAR or No- Action Alternative. The largest differences will occur in situations where cleanup levels for carcinogens are more stringent than applicable state and federal laws due to the presence of multiple carcinogens and/or the potential for exposure via several pathways.

With respect to the other alternatives, it appears that different alternatives result in the lowest concentration for different classes of substances. Consequently, it is expected that there would be considerable site-specific variations in the relative stringency of the alternatives depending on the types of substances present at the cleanup site. For example, the Background Alternative would tend to have the lowest concentrations for metals, the Technology-Based Alternative would result in the lowest concentrations for noncarcinogenic volatile hazardous substances, and the Risk-Based (#1) and ARAR Alternatives would generally provide the lowest concentrations for carcinogens. The ARAR Alternative would result in lower concentrations in sur-

face water than in ground water because, in addition to human health, toxicity to aquatic life would be considered in establishing surface water concentrations.

Mitigation Measures

Where cleanup actions adversely impact surface waters, it may be possible to mitigate those impacts by phasing cleanup actions or performing actions during high-flow periods of the year. In other instances, adverse impacts can be mitigated through the use of additional treatment processes and/or discharging process wastewaters to publicly owned treatment works (POTWs). Impacts associated with increased peak flows following site capping can be minimized through the use of retention ponds, etc.

Unavoidable Adverse Impacts

Requiring contaminated sites to meet surface water standards generally will require treatment of surface water runoff, treatment of discharges from cleanup technologies (such as ground water treatment), and reduction in ground water flows to surface water. The level of treatment will vary with the degree of stringency of the cleanup standards. In general, more stringent treatment measures will require the use of more complex treatment systems and additional resources. In addition, implementation of site cleanup measures may require approval of dilution zones which could result in temporary exceedances of water quality standards.

Marine Waters

Affected Environment

Marine areas of the state include Puget Sound and its inlets, Hood Canal, Admiralty Inlet, Possession Sound, Strait of Juan de Fuca, Rosario Strait, Saratoga Passage, Skagit Bay, Padilla Bay, Bellingham Bay, waters in and around the San Juan Islands, Strait of Georgia, Grays Harbor, Willapa Bay, and the Pacific Ocean off the west coast to the Olympic Peninsula. Chapter 173-201 WAC designates marine water uses.

Significant Impacts of the Alternative

Relative impacts of the various alternatives are generally proportional to the cleanup levels. Analysis of the alternatives for setting cleanup levels indicates that the background alternative would likely have the lowest concentrations for most hazardous

substances. Both the proposed amendments (Combination Alternative) and the Technology-Based Alternative are expected to result in cleanup levels similar to those established under the No-Action Alternative, although the technology-based requirements for metals would be fairly high. The ARAR and Risk-Based (#1) Alternatives tend to result in the highest cleanup levels for noncarcinogens and the lowest for carcinogens. However, in some cases the ARAR and Risk-Based (#1) Alternatives do not provide concentrations as low as those for surface water because drinking water is not considered. In addition, the Technology-Based Alternative would not provide cleanup levels for metals that are as low as those for other water media because salinity interferes with the treatment process. The Risk-Based Alternative (#2) would generally result in the highest cleanup levels.

Mitigation Measures

The mitigation measures available for marine waters are similar to those discussed under surface waters.

Unavoidable Adverse Impacts

The unavoidable adverse impacts for marine waters are similar to those discussed under surface waters.

Soils

Affected Environment

There are considerable variations in soil characteristics throughout the state. These are summarized in Chapter 5 of the Draft EIS (Ecology, 1990).

Significant Impacts of the Alternative

WACs 173-340-740 and 173-340-745 specify requirements for cleanup actions involving contaminated soils. The proposed amendments provide the flexibility to consider site uses when establishing soil cleanup levels. Alternate site uses include residential, industrial, commercial, agricultural, and recreational. For all site uses, the proposed amendments require that soil cleanup levels be established at concentrations which prevent exceedances of the ground water cleanup standards. Under the proposed amendments, soil cleanup levels would be established at concentrations equal to 100 times the ground water cleanup level unless it could be demonstrated on a site-specific basis that

higher soil concentrations will protect ground water. The proposed amendments also specify procedures for establishing cleanup levels based on the potential for direct contact, inhalation of resuspended soils, and other potential exposure pathways. Finally, the proposed amendments specify that soil cleanup levels must generally be met throughout the site. In the case of cleanup levels based on direct contact, soils below 15 feet do not require further action.

Soil cleanup levels under the proposed amendments are anticipated to be at least as stringent as those established under the ARAR and No-Action Alternatives. The approach for addressing threats to ground water is similar to that in the Ecology *How Clean is Clean* Policy (Ecology, 1984). The procedures for addressing health threats associated with direct contact supplement those and may result in more stringent cleanup levels for those substance which tend to bind to soil particles.

With respect to the other alternatives, the Background Alternative would generally provide the lowest cleanup levels. The proposed amendments, the ARAR, and the No-Action Alternatives generally provide the next lowest cleanup levels. The Risk-Based Alternatives (#1 and #2) tend to result in the highest cleanup levels. Cleanup levels under the Technology-Based Alternative tend to be similar to the Background Alternative for organic hazardous substances.

Cleanup actions to address soil contamination have the potential to create numerous impacts on human health, plants and animals, land use, and transportation. These impacts are discussed below.

Mitigation Measures

Mitigation measures for soils are undertaken generally to eliminate or minimize threats to human health, plants, and animals. Examples of such measures are summarized in those sections.

Unavoidable Adverse Impacts

With respect to contaminated soils, Ecology will generally be faced with the task of minimizing both the short-term impacts to workers and off-site populations as well as the long-term health impacts associated with residual hazardous substances. Correcting historical contamination problems at individual sites will require Ecology to strike an appropriate balance between short- and long-term health impacts and will likely result in some un-

avoidable adverse impacts. Where deeper soils become contaminated as a result of hazardous substance migration, removal and/or treatment may not be feasible.

Air

Affected Environment

Air quality in Washington is highly variable and is a complex function of population density, emission sources and rates, and climate. In general, air quality is better in rural areas than in more populated urban areas. The air resources in the State of Washington are described in greater detail on pages 5-14 through 5-17 of the Draft EIS (Ecology, 1990) and in "The State of the Environment Report" (Wash. St., *et al*, 1989).

Significant Impacts of the Alternative

The proposed amendments (WAC 173-340-750) specify requirements for cleanup actions involving releases of hazardous substances into the ambient air. The proposed amendments specify that cleanup standards to protect air quality would generally be based on protecting human health and the environment in a residential setting. The proposed rule identifies (1) procedures for establishing cleanup levels for hazardous substances not addressed under applicable state and federal laws, (2) procedures for establishing points of compliance, and (3) averaging times to be used when evaluating compliance. WAC 173-340-710 of the proposed amendments specifies that best available control technologies shall be applied to emissions of hazardous substances resulting from cleanup actions.

The proposed amendments are expected to result in residual air concentrations similar to those under the ARAR and No-Action Alternatives. The Risk-Based Alternative (#1) generally will result in the lowest residual concentrations; the Technology-Based Alternative and Risk-Based Alternative (#2) would generally provide the highest concentrations. The relatively high residual concentrations associated with the Technology-Based Alternative is based on concentrations left in soils by the Technology-Based Alternative for soils. Capping of those soils with clean materials would eliminate future releases.

In contrast to the relationship between cleanup levels and ambient air impacts (i.e. lower cleanup levels - lower impacts), the increased treatment requirements associated with lower cleanup levels may increase the disposal requirements for carbon absorption units or scrubber sludges. In addition, greater use of treatment technologies will tend to increase air emissions and increase the need for pollution control equipment.

Mitigation Measures

Use of best available control technologies will reduce air emissions. Soil wetting and use of dust suppressants will reduce wind-blown dust levels during construction and site use activities. Development and implementation of health and safety programs will reduce worker exposure to vapors and windblown particulates. Cleanup actions can be scheduled in a manner that reduces the potential for air emissions or the accumulation of hazardous substances under stagnant air conditions.

Unavoidable Adverse Impacts

Cleanup actions involving the removal or treatment of hazardous substances will unavoidably produce air emissions.

Human Health

Affected Environment

In 1987, there were 4,481,100 residents in the State of Washington (Wash. St., *et al*, 1989). Approximately 77 percent of the state's residents live in areas west of the Cascades, primarily in the Puget Sound area with 50% residing in three counties (King, Pierce, and Snohomish). Other significant population centers include Spokane County (7.9 percent), Yakima County (4.1 percent), and Clark and Cowlitz Counties along the Columbia River (6.5 percent).

The known hazardous waste sites are concentrated in the area of greatest population. Over 84 percent of the sites are west of the Cascades, located primarily around Puget Sound. Spokane County and Yakima County have 3.4 and 4.2 percent of the sites, respectively. Eleven percent are in Clark and Cowlitz Counties, primarily along the Columbia River.

Population growth patterns and variations in susceptibility to hazardous substances are described in greater detail on pages 5-17 through 5-21 of the Draft EIS (Ecology, 1990).

Significant Impacts of the Alternatives

Alternative #1 - Proposed Action: Combination Alternative.

The proposed amendments specify that "all cleanup actions conducted under this chapter shall protect human health and the environment; shall comply with cleanup standards (WAC 173-340-700 through 173-340-760); shall comply with applicable state and federal laws (See WAC 173-340-710); and shall provide for compliance monitoring (WAC 173-340-410). Under the proposed amendments, cleanup levels for noncarcinogens are established at levels estimated to result in no acute or chronic toxic effects. With respect to carcinogens, cleanup levels for individual carcinogens are generally based on an excess cancer risk of 10^{-6} with some flexibility to utilize applicable state and federal laws or a risk level of 10^{-5}. In all cases, the total excess cancer risk for the site cannot exceed 10^{-5}.

On-site Workers. Construction and operation of cleanup measures often involve extensive physical disturbance of hazardous substances in soils, tanks, and other containers. This increases the potential for (1) inhalation of volatile substances or particulate matter generated during construction, (2) direct contact with hazardous substances, and (3) fires and explosion. In general, regulatory requirements which result in more stringent cleanup levels and greater use of treatment technologies will increase the potential for adverse health effects among on-site workers. Although site- and substance-specific requirements will vary, the stringency of the proposed action with respect to cleanup levels is not expected to be significantly greater than the ARAR and No-Action Alternatives. However, it is anticipated that the proposed amendments will result in an increased use of treatment technologies and consequently will increase the potential for adverse health effects among workers. For example, formation of toxic by-products during chemical and biological treatment processes is a potential problem associated with the use of those technologies. In addition, as more complex technologies are utilized, the potential for releases due to human error (resulting from mismatches between people and the equipment they are responsible for) may increase.

Off-site Populations. Adverse health effects in off-site populations may result from exposure to contaminants released during a cleanup action. Of particular concern are the inhalation of vapors and other particulates released during soil excavation, ingestion of dust deposited in nearby areas, inhalation of hazardous substances released during air stripping or other treatment processes, or exposure to contaminated wastewater discharged to surface waters or local POTWs. Although these exposures tend to be temporal in nature, significant short-term exposures may occur.

Although site- and substance-specific requirements will vary, the stringency of the proposed amendments with respect to cleanup levels is generally not expected to be significantly greater than the ARAR and No-Action Alternatives. In situations where cleanup levels for carcinogens are more stringent than applicable state and federal laws due to the presence of multiple carcinogens and/or the potential for exposure via several pathways, the potential for off-site impacts would be slightly increased.

Transportation-Related Injuries. The excavation of contaminated soil and transport to off-site treatment and disposal facilities may result in an increase in the number of transportation-related injuries. In order to estimate the increased risk of accidental deaths associated with the transportation of cleanup wastes, it is necessary to estimate the fatality rate per truck mile and the average haul distance for cleanup wastes. Based on data from the Washington Department of Transportation, it is estimated that fatal accidents involving trucks in Washington State occur at a rate of about 1.8 per 100 million miles traveled (DOT, 1989). The number of miles traveled during a typical site cleanup is approximated by the round-trip mileage between Seattle and the nearest hazardous waste disposal facility. Most wastes from Washington have been transported to a disposal site in Arlington, Oregon, which is 300 miles from Seattle, or 600 miles round-trip. Based on this information, each truckload of soil removed from a site would be associated with an increased risk of transportation-related deaths of 1.1×10^{5}.

The number of truckloads of material that would need to be removed from hazardous waste sites in the future under the proposed amendments is not expected to be significantly greater than under the ARAR and No-Action Alternatives. In addition, the estimated number of trucks involved with the transport of hazardous wastes represent a small percentage of the overall truck traffic in the state (approximately 1 in 300 to 1 in 400).

Consequently, implementation of the proposed amendments is not expected to result in a significant increase in transportation-related injuries.

Long-Term Health Effects. Residual hazardous substances may result in adverse impacts on human health. The combination alternative considers cross-media impacts and is protective of human health. Cleanup levels under this alternative are expected to be at least as stringent as those under the ARAR and No-Action Alternatives.

Alternative #2: Background Alternative.

Alternative #2 is similar to Alternative #1 except that cleanup levels would be established at concentrations equal to either background concentrations or practical quantitation limits. If adopted, this alternative would generally result in more stringent cleanup levels than under the ARAR and No Action Alternatives (particularily for noncarcinogenic substances). Implementation of this alternative would increase the potential for adverse impacts during cleanup actions (on-site workers, off-site populations, and transportation-related injuries), while reducing the potential for long-term human health impacts associated with residual hazardous substances.

Alternative #3: Risk-Based Alternative (#1).

The Risk-Based Alternative is generally protective of human health. However, when cross-media impacts are considered, very high standards for noncarcinogens (such as those that would result from the Risk-Based Alternative in soils) could result in impacts in other media, such as in ground water.

Alternative #4: Risk-Based Alternative (#2).

Alternative #4 incorporates the risk assessment procedures included in Alternative #3, but utilizes an acceptable cancer risk level of one-in-ten thousand. Under this alternative, cleanup levels for both carcinogens and noncarcinogens would generally be higher (less stringent) than those under the ARAR and No-Action Alternatives. In general, implementation of this alternative would reduce the potential for adverse impacts during cleanup actions (on-site workers, off-site populations, and trans-

portation-related injuries), while increasing the potential for long-term human health impacts associated with residual hazardous substances.

Alternative #5: Applicable State and Federal Law Alternative.

Under this alternative, cleanup levels would be based on applicable state and federal laws. This alternative does not include specific procedures for (1) establishing cleanup levels for individual hazardous substances not regulated under other laws or regulations and (2) adjusting individual cleanup levels to take into account multiple hazardous substances, exposure via multiple pathways of exposure, and new scientific information. Consequently, implementation of this alternative may not be protective of human health in all situations. In addition, this alternative would have to be supplemented with one of the other alternatives to address hazardous substances not regulated under applicable state and federal laws.

Alternative #6: Technology-Based Alternative.

This alternative would result in cleanup levels being established at concentrations that are achievable using available technologies. For some volatile hazardous substances in water and certain organics in soils, cleanup levels under this alternative would be more stringent than levels under the ARAR and No-Action Alternatives. However, in other situations, technology-based requirements will often be significantly higher than those established under existing procedures. For example, this alternative would result in particularly high risks for metals, semivolatile organic compounds, and pesticides, because these hazardous substances cannot always be effectively removed from the environment to safe levels. Consequently, the implementation of this alternative would reduce the potential for adverse impacts during cleanup actions (on-site workers, off-site populations, and transportation-related injuries), while increasing the potential for long-term human health impacts associated with residual hazardous substances.

Mitigation Measures

Worker exposures and adverse health effects resulting from cleanup activities can, to a large degree, be mitigated by occupational health and safety practices and the implementation of

site-specific health and safety plans. The proposed amendments also provide the flexibility to consider "overall human health and environmental protection" (including worker health and safety and off-site impacts) when selecting cleanup actions (See WAC 173-340-360(5)) and establishing cleanup levels (See WAC 173-340-706).

Potential adverse impacts among off-site populations can be mitigated through the use of appropriate pollution control devices. For example, the use of carbon adsorption units for air stripping towers can significantly reduce the amount of hazardous substances released into the atmosphere. In other instances, it may possible to schedule activities to minimize adverse impacts (i.e. avoid excavation of vapor contaminated soils during the summer months). In addition, the proposed amendments provide the flexibility to consider "net environmental impacts" (including short term impacts to nearby communities) when selecting cleanup actions (WAC 173-340-360(5)) and establishing cleanup levels (WAC 173-340-706) for individual sites. For example, concerns about exposure to nearby communities might lead to the selection of a cleanup action involving treatment of highly contaminated soils and in-place capping of soils with low to moderate levels of contamination instead of using the treatment technology for all site soils.

Greater use of treatment technologies will probably reduce the amount of long-distance hauling of cleanup wastes and therefore may serve to reduce the potential for transportation-related injuries. In addition, the proposed rule provides the flexibility to consider ways to minimize the need for long-distance hauling of cleanup wastes (and the potential for transportation-related injuries) when selecting cleanup actions and establishing cleanup levels. However, once it is determined that off-site transport of cleanup wastes is necessary, mitigation options are limited. Routing trucks through areas with low traffic volume, scheduling trips for off-peak hours, and designing emergency response plans can help to reduce the chances of accidents. However, such measures deal with only part of the problem; the Office of Technology Assessment (OTA, 1986) estimates that more than 50 percent of the risk associated with the transport of hazardous waste is related to "driver error."

Human health impacts associated with residual hazardous substances can generally be mitigated through a combination of land and resource use restrictions. For example, sites that still present health hazards after cleanup can be fenced off and access can be

restricted. Industrial or commercial facilities may be allowed on certain sites, but residential use or development would not be permitted. If drinking water or irrigation water remains contaminated after cleanup, either these water uses could be prohibited and alternative water supplies could be developed, or the water could be treated before use. Containing surface water runoff and preventing infiltration (by installing surface water collection systems, barriers, and caps) could deter further contamination of ground water and surface water from hazardous substances left in on-site soils.

Unavoidable Adverse Impacts

On the majority of cleanup sites, Ecology will be faced with the task of minimizing both the short-term health impacts to workers and off-site populations as well as the long-term health impacts associated with residual hazardous substances. Correcting historical contamination problems at individual sites will require Ecology to strike an appropriate balance between short- and long-term health impacts and will likely result in some unavoidable adverse impacts.

Plants and Animals

Affected Environment

The distribution of plant and animal resources is summarized on pages 5-21 through 5-26 and Chapter 10 of the Draft EIS (Ecology, 1990). These materials also identify plants and animals that are classified as threatened or endangered by the U.S. Fish and Wildlife Service, the Washington State Wildlife Commission, and/or the Washington Department of Natural Resources.

Significant Impacts of the Alternatives

Alternative #1 - Proposed Action: Combination Alternative.

The proposed amendments specify that "all cleanup actions conducted under this chapter shall protect human health and the environment; shall comply with cleanup standards (WAC 173-340-700 through 173-340-760); shall comply with applicable state and federal laws (WAC 173-340-710); and shall provide for compliance monitoring (WAC 173-340-410). Under the proposed amendments, Method B cleanup levels must be established at concentrations which are estimated to result in no adverse effects

on the protection and propagation of aquatic and terrestrial life. Method C cleanup levels must be established at concentrations which are estimated to result in no significant adverse effects on the protection and propagation of aquatic and terrestrial life.

Plants. Many site cleanup activities involve soil excavation or capping which results in the complete destruction of existing habitat including removal of existing vegetation and damage or loss of topsoil. Such impacts may occur at the cleanup site or at off-site locations which serve as sources of capping or fill material. In addition, air emissions associated with air stripping and other site cleanup activities may result in vegetation damage in adjacent areas. Implementation of the proposed amendments is anticipated to result in impacts similar to those under the ARAR and No-Action Alternatives. The greater emphasis on treatment technologies may produce mixed effects. On the one hand, greater use of treatment technologies may increase the need for auxiliary structures such as treatment facilities and access roads, thereby increasing the amount of habitat destruction. On the other hand, such a shift may also result in a reduced need for capping materials which would reduce off-site impacts on plant habitat. In general, the overall significance of cleanup-related adverse impacts on plant life is probably minimal. The majority of cleanup sites in the state are commercial or industrial in nature, and plant life will already have been significantly reduced or eliminated as a result of past practices.

Aquatic Organisms. A large proportion of sensitive aquatic areas, such as rivers used by anadromous fish, pass through areas with numerous hazardous waste sites. Cleanup actions may result in adverse impacts on a variety of aquatic organisms including fish, shellfish, plankton, and benthic infauna. These impacts may arise as a result of (1) discharge of untreated or partially treated wastewater and surface water runoff, (2) increased or decreased surface water flows, and (3) spills of hazardous substances and other contaminants.

Many soil and ground water cleanup measures result in the generation of contaminated wastewater. In addition, rain water may come into contact with contaminated materials and increase the runoff of hazardous substances. Under current state law, all wastewaters must be treated with "all known, available, and reasonable methods of treatment" (AKART) prior to being released into waters of the state. Where the discharge of wastewater treated with AKART will result in violations of the water quality standards, Ecology may require additional treatment or authorize

temporary reductions in water quality through the use of dilution zones. These zones would be specified in the waste discharge permit for a site. Based on a review of currently available water treatment technologies and past experience at cleanup sites, it appears that dilution zones may be needed at some sites. Impacts associated with these partially treated wastewaters and authorization of dilution zones are related to increases in (1) turbidity and siltation, and (2) hazardous substances concentrations. Freshwater fish are generally more sensitive to hazardous substances than are marine species and are therefore more susceptible to hazardous substances released from cleanup sites. In addition, metals are generally more bioavailable in freshwater than marine waters.

Cleanup actions may also influence the quantity of water in a stream or water body. For example, remediation of contaminated ground water or surface water via the removal or isolation of the contaminated water may result in reduced water availability in aquifers or streams. Elimination of a ground water resource can also lead to reduction of surface water flows that are fed by the aquifer. These impacts may occur at considerable distances from the cleanup site. Reduced water flow can eliminate habitat for fish and other aquatic species and can reduce long-term or seasonal water availability for streamside vegetation and associated animal communities. In general, the impacts occurring during cleanup actions under the proposed amendments are anticipated to be similar to those under the ARAR and No-Action Alternatives.

In order to evaluate the relative long-term impacts, a maximum tolerable concentration (MTC; the concentration at which most species will not experience toxic effects) was estimated for the most sensitive species. The MTCs for selected hazardous substances and sensitive species or groups of species in various media are shown in Table 15 of the Draft EIS (Ecology, 1990). The table includes data for a variety of aquatic and terrestrial species. The data are drawn principally from Eisler (1985; 1986a,b,c; 1987; 1988a,b; 1989), which directly address toxicities to wildlife. Although this database is not comprehensive, it appears that none of the alternative approaches for setting cleanup levels would result in concentrations consistently below the MTCs for all hazardous substances. However, the proposed amendments provide the flexibility to utilize available data to establish more stringent requirements for individual sites. Consequently, the

proposed amendments are anticipated to result in reduced impacts on aquatic organisms relative to the ARAR and No-Action Alternatives.

Terrestrial Organisms. Site cleanup actions may result in the destruction of wildlife habitat and cause significant adverse impacts to terrestrial wildlife. For example, the construction of roads, wells, water-tight enclosures, or treatment facilities, generally results in the physical disruption of wildlife habitat. In addition, releases of hazardous substances during the construction and operation of cleanup technologies may adversely affect animal communities. The types of wildlife and number of species impacted will depend upon the type of habitat being destroyed. For example, cleanup actions performed in open areas generally will impact smaller animals and relatively less diversified communities than actions performed in forested areas. A comparison of the locations of sensitive ecosystems and hazardous waste sites indicates that a majority of hazardous waste sites are isolated from sensitive terrestrial areas.

The significance of impacts to terrestrial species will also depend upon the availability of nearby habitats to assimilate displaced wildlife. However, the overall significance of the proposed amendments with respect to impacts on terrestrial wildlife during cleanup actions is probably minimal. The majority of cleanup sites in the state are commercial or industrial in nature and animal communities will already have been significantly reduced or eliminated as a result of past practices. Consequently, cleanup actions performed under all of the alternatives are anticipated to provide increased environmental protection.

Alternative #2: Background Alternative.

Alternative #2 is similar to Alternative #1 except that cleanup levels would be established at concentrations equal to either background concentrations or practical quantitation limits. If adopted, this alternative would generally provide greater protection to plants and animals, particularily for noncarcinogenic substances relative to the ARAR and No-Action Alternatives. However, the background alternative is expected to increase the potential for adverse impacts associated with the implementation of cleanup measures.

Alternative #3: Risk-Based Alternative (#1).

Cleanup levels under this alternative are based generally on human health considerations. For carcinogens, human-health-based levels are generally protective of plants and animals. However, cleanup levels based on noncarcinogenic human health effects may not provide adequate long-term protection for plants and animals. This is a problem particularily where there is the potential for cross-media effects (such as those that might occur as a result of hazardous substances leaching from soils to groundwater).

Alternative #4: Risk-Based Alternative (#2).

This alternative would result in residual concentrations that are not protective of the environment about 50 percent of the time and consequently would have the potential for significant long-term impacts on the environment. However, this alternative would tend to reduce the impacts on plants and animals associated with performing cleanup actions relative to the ARAR and No-Action Alternatives.

Alternative #5: Applicable State and Federal Law Alternative.

Under this alternative, cleanup levels would be based on applicable state and federal laws, including state water quality standards and criteria. However, this alternative does not include specific procedures for (1) establishing cleanup levels for individual hazardous substances not regulated under other laws or regulations (many existing standards are based on human health considerations and do not specifically address plants and animals), and (2) adjusting individual cleanup levels to take into account multiple hazardous substances, exposure via multiple pathways of exposure, and new scientific information. Consequently, implementation of this alternative may not be protective of plants and animals in all situations. It would have to be supplemented with one of the other alternatives to address hazardous substances not regulated under applicable state and federal laws.

Alternative #6: Technology-Based Alternative.

This alternative would result in cleanup levels being established at concentrations that are achievable using available technologies. The Technology-Based Alternative would result in residual concentrations that are not protective of the environment about 50 percent of the time and consequently would have the potential for the most significant long-term impacts on the environment. However, this alternative would tend to reduce the impacts on plants and animals associated with performing cleanup actions.

Mitigation Measures

Where there is a potential for adverse environmental impacts on plants during cleanup actions, potential mitigation measures include the relocation of disturbances, such as site access roads, to less critical or previously disturbed areas, and replacement of damaged vegetation and topsoil after site cleanup activities are completed.

In those situations where adverse impacts on terrestrial organisms are identified, mitigation may be accomplished by (1) temporary or permanent relocation of species, (2) relocation of disturbances to less critical or previously disturbed habitats, or (3) reconstruction of the damaged habitat after the cleanup action has been completed.

Impacts to plants and animals cannot be as easily mitigated as impacts to human health because of the difficulty in restricting the behavior of plants and animals. However, certain measures can be taken. For instance, the impacts of residual soil contamination on plants and animals can be mitigated by capping the site; however, during capping and construction at a site, the amount of habitat available is reduced. Larger animals can be prevented from entering a site by fencing the site appropriately. If a stream runs through a contaminated site, it may be possible to divert the stream around the site. In general, many of the same mitigation measures that were applicable during cleanup action may also be applied after the site has been cleaned up.

Unavoidable Adverse Impacts

Similar to the situation with human health, Ecology will be faced with the task of minimizing the short-term impacts on plants and animals as well as the long-term impacts associated with residual hazardous substances. Correcting historical contamination problems at individual sites will require Ecology to strike an appropri-

ate balance between short- and long-term health impacts and will likely result in some unavoidable adverse impacts to plants and animals.

Land and Water Use

Affected Environment

The distribution and intensity of land and water uses in the State of Washington are defined primarily by the distribution of natural resources and the population. The varied and rich natural resource base of Washington supports a wide variety of land and water uses ranging from consumptive uses such as drinking water, fisheries, forestry, and agriculture, to nonconsumptive uses such as recreation and tourism. The distribution of land and water uses in the State of Washington is described in greater detail on pages 5-23 through 5-35 and Chapter 11 of the Draft EIS (Ecology, 1990).

Significant Impacts of the Alternatives

Most land uses are incompatible with the contamination problems present at hazardous waste sites. Cleanup actions may temporarily increase land use impacts through the implementation of measures which result in short-term increases in the release of hazardous substances and/or physical interferences associated with the use of heavy equipment. In general, the degree to which the actual cleanup action impacts land or resource use is a function of how long it takes to complete the cleanup action. The timeframes required for remediation are determined by the cleanup levels for individual substances and the cleanup technologies used to attain those levels. In most cases, more stringent cleanup standards and the use of treatment technologies will result in longer remediation periods, and therefore greater impacts on land or resource uses. In the extreme, cleanup standards that are below technically achievable levels may require permanent or semipermanent land-use restrictions.

Alternative #1 - Proposed Action: Combination Alternative.

Drinking Water. Cleanup levels for current and potential future sources of drinking water would protect this use. However, in terms of impacts during cleanup actions, the proposed amendments will have two primary effects. First, at cleanup sites where contaminated ground water is considered a current or potential source of drinking water, the ground water will generally be unavailable for this use during the period of active ground water restoration. Cleanup levels for some carcinogens may be more stringent than those under the ARAR and No-Action Alternative and, consequently, longer periods of time will generally be required to complete ground water restoration (EPA, 1989). The increased restoration timeframes may be significant for some contaminants and some geological settings.

Second, the proposed amendments, by creating a shift toward the use of treatment-based technologies, may also reduce the potential for future impacts on drinking water following the containment of hazardous substances. From this perspective, more stringent soil cleanup levels will also provide some prevention benefits in terms of ground water protection beyond the current situation.

Fisheries. Generally, cleanup levels under the proposed amendments would protect fisheries. However, the construction and operation of cleanup actions may adversely impact these resources as a result of (1) the discharge of untreated or partially treated wastewater, (2) increased or decreased surface water flows, and (3) spills of hazardous substances. The potential for such impacts under the proposed amendments is similar to that for the ARAR and No-Action Alternatives.

Agriculture. Construction and operation of cleanup actions may impact agricultural land uses through the continued loss of property use, reductions in crop yield to loss of topsoil or exposure to hazardous substances, or reductions in the amount of water available for irrigation. These impacts are anticipated to be of minimal significance on a statewide basis given that (1) the size of most cleanup sites is extremely small in comparison to the total agricultural acreage in the state, and (2) the use agricultural sites undergoing cleanup have already been impacted as a result of past practices.

Ranching. Cleanup actions may result in localized impacts on ranching. However, on a statewide basis, these impacts are anticipated to be of minimal significance because (1) few cleanup sites are in close proximity to ranching areas, and (2) the size of most cleanup sites is extremely small in comparison to statewide ranching areas.

Hunting. Cleanup actions may result in localized impacts on hunting. However, on a statewide basis, these impacts are anticipated to be of minimal significance because (1) few cleanup sites are in close proximity to hunting areas, and (2) the size of most cleanup sites is extremely small in comparison to statewide hunting areas.

Forests and Logging. Cleanup actions may result in impacts on forests and logging. However, on a statewide basis, these impacts are anticipated to be of minimal significance because (1) few cleanup sites are in close proximity to forests and logging areas and (2) the size of most cleanup sites is extremely small in comparison to statewide forests and logging areas.

Recreation. Significant impacts on recreational use of surface waters are most likely to occur in Lake Sammamish, Lake Washington, Green River, sections of the Columbia, and the Yakima River. However, the relative magnitude of these impacts under each of the alternatives cannot be evaluated.

Industrial and Commercial. Many urban and suburban land uses are incompatible with the construction and operation of cleanup actions. Implementation of short-term cleanup actions, such as tank removals, may necessitate the temporary closure of commercial and industrial businesses. Cleanup actions requiring lengthy treatment or operation-and-maintenance periods may result in the prohibition of certain activities at the cleanup site. Such prohibitions would be incorporated into a restrictive covenant required under the proposed amendment (WAC 173-340-440). By providing the flexibility to develop industrial soil cleanup levels that are less stringent than those for residential areas, Ecology has reduced the potential for such impacts on industrial and commercial land uses.

Residential. Residential site use is generally incompatible with the construction and operation of cleanup actions. As with industrial site uses, cleanup actions requiring lengthy treatment may

preclude continued use of residential property. Establishing industrial soil cleanup levels may preclude future use of a site for residential purposes.

Alternative #2: Background Alternative.

Alternative #2 is similar to Alternative #1 except that cleanup levels would be established at concentrations equal to either background concentrations or practical quantitation limits. Cleanup action-related impacts on drinking water may be somewhat greater than under the proposed amendments, particularly for noncarcinogenic substances.

Alternative #3: Risk-Based Alternative (#1).

Implementation of the Risk-Based Alternative (#1) is expected to result in exceedances of primary MCLs for some noncarcinogens. In addition, residual levels of hazardous substances under this alternative may exceed secondary MCLs.

Alternative #4: Risk-Based Alternative (#2).

Implementation of the Risk-Based Alternative (#2) is expected to result in exceedances of primary MCLs for some carcinogens and noncarcinogens. In addition, residual levels of hazardous substances under this alternative may exceed secondary MCLs.

Alternative #5: Applicable State and Federal Law Alternative.

The impacts associated with this alternative are similar to those under the proposed amendments (Alternative #1).

Alternative #6: Technology-Based Alternative.

Implementation of the Technology-Based Alternative is expected to result in increased impacts on drinking water, agriculture, and fisheries relative to the ARAR and No-Action Alternatives.

Mitigation Measures

During the period of active ground water restoration, ground water will generally be unavailable for use as a source of drinking water. Potential mitigation measures include the use of alternate water supplies and treatment. Generally, site cleanup actions will limit or preclude certain site use activities. These impacts can be minimized by phasing activities or scheduling cleanup actions around ongoing activities.

Unavoidable Adverse Impacts

Site cleanup actions will adversely impact site uses during construction and operation. In addition, technology limitations associated with ground water restoration may result in unavoidable adverse impacts on drinking water.

Transportation

Affected Environment

Areas where transportation impacts may occur are defined by the physical distribution of hazardous waste sites and by the locations of available disposal or treatment facilities. Transportation corridors between hazardous waste sites and disposal or treatment locations would bear the greatest impacts from cleanup operations. Hazardous waste sites are distributed throughout the state, but are most numerous in the areas of Puget Sound, Vancouver, Yakima, Spokane, and Longview. Landfilling of hazardous wastes is frequently used as a disposal method. Currently, the primary hazardous waste landfill in the Washington-Idaho-Oregon area is located in Arlington, Oregon, approximately 125 miles east of Portland, adjacent to the Columbia River.

The highways used to transport wastes to Arlington, Oregon, are a combination of interstate and U.S. highways. Wastes from the Puget Sound region are transported mainly along Interstate 5 to Interstate-205 near Portland and then along Interstate-84 in Oregon. Interstate-405 may also be used in the Seattle area. These roads would carry most of the truck traffic related to the cleanup of hazardous waste sites.

Wastes coming from central Washington would travel along Interstate-82 and U.S. 97. Population densities are very low in this region, with the exception of Ellensburg, Yakima, Richland, Pasco, and Kennewick. Hazardous waste sites located near Spo-

kane send remedial wastes to Arlington via Interstate-90 and U.S. 395. Interstate-84 in Oregon would be used to some degree by vehicles coming from Washington.

Significant Impacts of the Alternatives

Alternative #1 - Proposed Action: Combination Alternative.

Local Transportation Impacts. Local transportation impacts will generally be associated with vehicles entering and leaving the cleanup site. The specific impact on local traffic depends on a variety of site-specific factors including quality of roads, population around the site, existing traffic patterns, degree of congestion, and remedial technologies used at the site. Traffic around a site may also be affected by spills or emergencies at the site. Traffic impacts near individual sites are expected to be most severe during the period of initial remediation. For example, at a site where 1,000 tons of soil need to be removed, 45 truckloads would be required over a period of one week. Larger sites might require a month or more to remove all site wastes. Following this period, minor impacts may continue to occur, associated with long-term monitoring at the site. These long-term traffic impacts are expected, for the most part, to be insignificant. In general, the proposed amendments are not anticipated to result in significantly greater impacts on local traffic than those under the ARAR and No-Action Alternatives.

The proposed amendments may also result in increased traffic around treatment and disposal sites. Ecology estimates that site cleanup wastes account for 27 percent of the volume of wastes transported by truck from Washington to Oregon, Idaho, and other states (U.S. EPA, 1988d). Washington State contributes over 95 percent of the total wastes hauled to Arlington, Oregon (U.S. EPA,1988d). The proposed siting of one or more hazardous waste incinerators in central Washington could result in significant traffic and infrastructure impacts in the immediate area of the proposed incinerators. These traffic impacts would need to be addressed in the EISs prepared for the proposed incinerators.

Impacts on Long-Distance Traffic Volume. Impacts on long-distance traffic volume may include an increase in the volume of truck traffic or a change in the patterns of long-distance hauling. Of the approximately 234,000 tons of hazardous waste generated in Washington in 1987, approximately 64,000 tons was considered one-time waste derived largely from site cleanups (Ecology,1989e). Therefore, hazardous waste generated from remedial

activities in 1987 accounted for approximately 27 percent of the waste produced in Washington in that year. A few specific sites may account for most of the cleanup-related wastes produced in any given year. Sites such as the ASARCO smelter in Tacoma and Western Processing in Kent contributed most of the site cleanup wastes that were produced in the year those cleanups commenced. If site cleanups generate more wastes, there will be an increased need for hauling wastes off-site and, in turn, increased traffic. However, as discussed in the Draft EIS (Ecology, 1990), none of the alternatives are anticipated to have significant impacts on long-distance traffic volume.

Hazardous Waste. Spills associated with transporting hazardous wastes may also affect transportation. Spills of hazardous wastes along transportation routes will result in road closures and negative impacts on traffic. The number of spills is expected to increase if more wastes are transported by truck.

It is estimated that in Washington large trucks are involved in 180 accidents per one-hundred-million vehicle miles (DOT, 1989). Some of these accidents may involve spills of hazardous materials. Because the Interstate-5 corridor passes through some of the most congested areas in Washington State and includes sections where construction is ongoing, these statistics may be considered a worst-case analysis for large freeways that pass through level terrain. Hauling routes that include smaller freeways and mountain passes may have higher accident rates. Using the assumptions outlined above (based on 1987 data), the number of accidents due to long-distance hauling of hazardous wastes from cleanup sites is approximately three per year. By comparison, there have been an average of seven hazardous materials-related accidents involving large trucks on Interstate-5 each year (DOT, 1988).

Alternative #2: Background Alternative.

This alternative is similar to Alternative #1 except that cleanup levels would be established at concentrations equal to either background concentrations or practical quantitation limits. If adopted, this alternative would generally result in greater transportation impacts than those under the other alternatives. This would be particularily true for sites contaminated with non-carcinogenic hazardous substances.

Alternative #3: Risk-Based Alternative (#1).

If adopted, this alternative would generally result in transportation impacts similar to the ARAR and No-Action Alternatives.

Alternative #4: Risk-Based Alternative (#2).

If adopted, this alternative would generally reduce transportation impacts relative to the ARAR and No-Action Alternatives.

Alternative #5: Applicable State and Federal Law Alternative.

If adopted, this alternative is expected to result in transportation impacts similar to the No-Action Alternative.

Alternative #6: Technology-Based Alternative.

If adopted, this alternative would generally reduce transportation impacts relative to the ARAR and No-Action Alternatives.

Mitigation Measures

Various measures may be implemented to mitigate these impacts. One measure that may allow site remediation to occur without imposing undue hardship on local residents is building or improving of roads surrounding hazardous waste sites or treatment and disposal facilities. Traffic may be directed away from the site, and vehicles entering or leaving the site may be scheduled to arrive and depart during non-peak traffic hours. Emergency response plans should be in place so that spills or other emergencies can be handled in an efficient and safe manner. Finally, adding noise barriers and wetting road surfaces to decrease noise and dust may be required at some sites.

Mitigation of these impacts can be performed by scheduling long-distance hauling through major urban areas during non-peak hours, thus avoiding impacts on traffic volume and reducing the chances of accidents. Impacts of spills resulting from highway accidents can be mitigated by efficient implementation of emergency response plans equipped to deal with hazardous waste spills along major hauling routes. Brett *et al.* (1989) have concluded that the potential human health and environmental risks associated with a transportation-related spill of contaminated materials on

land are likely to be small. Their conclusion is based on the assumptions that the total amount of dust and vapors from a single spill pile would be limited and would likely be contained and promptly cleaned up.

Finally, the statutory requirement for treatment to the maximum extent practicable is expected to result in greater demand for technologies to treat hazardous substances on-site.

Unavoidable Adverse Impacts

The vast majority of cleanup actions result in increased traffic flow in and out of the site. The significance of such increase will vary from site to site.

Programmatic Impacts

Programmatic impacts are defined as impacts on state programs, planning, and resources. These programmatic impacts reflect the cumulative impacts of statewide application of the standards. These impacts will depend, in part, on the strictness of the standards (higher vs. lower standards) and how that factor affects the extent and type of cleanup at hazardous waste sites. Three types of programmatic impacts have been identified:

- **Capacity of Treatment, Storage, and Disposal Facilities**—More strict cleanup levels may increase the annual volume of site cleanup wastes and the demand for available treatment, storage, and disposal capacity.

- **Property Transfers**—The addition of a site to the hazardous sites list may create uncertainty in the purchase or development of a site. This uncertainty will be reduced once the site is removed from the list. The cleanup levels are also likely to be considered by private parties involved in property transfers at unlisted sites.

- **State Resources**—Ecology's resources for managing site investigations and implementing cleanup actions are limited. Action at some sites may be deferred because of these resource limitations. More stringent cleanup levels will result in more comprehensive cleanups at each site and more sites requiring periodic review, potentially limiting the number of sites that can be addressed each year.

The willingness of PLPs to perform voluntary site cleanups may also decrease as the cleanup levels become more strict. Therefore, negotiations, enforcement actions, and appeals may be required to enforce cleanup requirements, which will further defer action at a site. Deferral of site cleanup actions, particularly at highly contaminated sites, may result in significant impacts from continuing uncontrolled release, migration, and exposure to hazardous substances at relatively high concentrations.

These programmatic impacts are described in greater detail in Chapter 12 of the Draft EIS (Ecology, 1990). In general, programmatic impacts will increase as the stringency of the cleanup requirements increase. The Background Alternative is anticipated to result in significantly greater programmatic impacts relative to the ARAR and No-Action Alternatives. The Combination Alternative (Proposed Amendments) may also result in greater programmatic impacts.

Chapter 5. Comments of the Draft EIS and Responses to Comments

This chapter presents the public comments on the Draft EIS and Ecology's responses to those comments. Comments were made in oral testimony at the three public hearings and in letters submitted by interested individuals and organizations. Ecology has prepared a Responsiveness Summary which provides detailed responses to comments on the proposed amendments. This document is available upon request from the Department.

The chapter begins with a summary of the public review process, which includes a schedule of the remaining steps in the regulation adoption process. Comment summaries and responses are addressed next, followed by comment letters and a summary of the public hearing testimony.

Public Review Process

During the development of the cleanup standards, Ecology solicited comments from the Cleanup Standards Work Group which is comprised of representatives from local and federal government, tribal governments, environmental groups, business interests, environmental consultants, and the Underground Storage Tank Work Group. A preliminary draft of the amendments was issued on March 9, 1990, and distributed to over 250 parties for review and comment. Ecology's Science Advisory Board also provided advice and guidance with respect to the scientific and technical aspects of the rule.

The proposed rule was published in the August 1, 1990, Washington State Register as WSR 90-15-066. The formal comment period extended from August 1 until September 17, 1990. Printed notice of the public comment period and workshop dates was mailed directly to over 1,800 interested citizens, environmental organizations, and special interest groups.

Informational Meetings

Informational meetings were held in four locations to provide the public with an opportunity to informally discuss the proposed regulations and related issues with Ecology staff. Announcements of the meetings were published in a newspaper in Centralia, Vancouver, Seattle, Longview, Bellevue, Tacoma, and Olympia. The workshops were held as follows:

- August 13, 1990, Tacoma, World Trade Center Meeting Room, 3600 Port of Tacoma Road, 1:00 p.m.
- August 14, 1990, Vancouver, Clark Co. P.U.D. Community Room, 1200 Fort Vancouver Way, 7:00 p.m
- August 15, 1990, Seattle, Mountaineers Club Tahoma Room, 300 Third Avenue West, 7:00 p.m.
- August 16, 1990, Lacey, Energy Facility Site Evaluation Council Hearing Room, 4114 Sixth Avenue South, 1:00 p.m.

Public Hearings

Three public hearings were held on the proposed rule. Notice was sent to the Olympia offices of the United Press International and the Associated Press, and was placed in newspapers in the following cities: Bellevue, Centralia, Ellensburg, Kennewick, Longview, Olympia, Pasco, Richland, Seattle, Spokane, Tacoma, Vancouver, Walla Walla, Wenatchee, and Yakima.

Staff also informally discussed the proposed regulations and related issues prior to the following hearings:

- September 6, 1990, Seattle Mountaineers Club Skagit Room, 300 Third Avenue West, 7:00 p.m.
- September 10, 1990, Richland, Federal Building Auditorium, 825 Jawdin Avenue, 7:00 p.m.
- September 11, 1990, Spokane, County Health District Building Conference Room #140, West 1101 College Street, 7:00 p.m.

Schedule of Remaining Steps

The schedule for the remaining steps is as follows:

- Receive advice and comment from the Ecological Commission — January 24, 1990
- Adopt regulations — January 25, 1991
- Effective date of the amendments — February 25, 1991

Comments and Responses

The following is Ecology's response to comments on the Draft EIS. The comments are divided into a series of topic areas. Given the relatively small number of comments received on the Draft EIS, the person(s) making a particular comment is(are) identified and included in the comment abstract. Each comment is then followed by Ecology's Response.

Scope of the Draft EIS

Comment #1

Ms. Linda Larson and Mr. Daniel Syrdal observed that the bulk of the Draft EIS is devoted to justifying Ecology's policy decisions instead of analyzing the environmental impacts of the proposed regulation. They expressed the opinion that portions of the Technical Summary, Chapters 1 - 4, and Chapter 14 were particular problems. They recommended that Ecology's policy agenda be separated from the environmental analysis in order to provide a more objective evaluation of the environmental impacts.

Ecology's Response

The purpose of the Draft EIS is to provide decisionmakers and the public with an environmental analysis that assists everyone in making informed decisions. The State Environmental Policy Act (SEPA) grants latitude for the lead agency to determine if a format other than the standard one is more appropriate, with additional flexibility available on a nonproject proposal like this one. Ecology agrees that while policy considerations should not be a major focus of an environmental impact statement, it is essential to identify them in the beginning of the draft EIS. However, Ecology does agree that Chapter 14 (Evaluation of the

Alternatives) would be more appropriately located in the appendix because it describes the evaluation process, so the Final EIS does not contain this Chapter.

Comment #2

Ms. Lynda Brothers expressed the opinion that the Draft EIS should have included an evaluation of economic impacts associated with the choice of cleanup standards.

Ecology's Response

SEPA does not require an analysis of the cost of an action. As WAC 197-11-450 states, "For the purposes of complying with SEPA, the weighing of the merits and drawbacks of the various alternatives need not be displayed in a monetary cost-benefit analysis and should not be when there are important qualitative considerations."

An economic analysis of the proposed cleanup standards was presented in a separate Economic Impact Statement. The Regulatory Fairness Act (Chapter 19.85 RCW) requires state agencies to evaluate the economic impact of a rule on a significant number of small businesses, and present mitigation measures, if possbile, to help reduce any disproportionate impacts. The Economic Policy Act (Chapter 43.21 RCW) requires agencies to evaluate economic impacts of the proposed action to assure they are given appropriate consideration.

Range of Alternatives

Comment #3

Mr. Daniel Syrdal and Ms. Linda Larson expressed the opinion that Ecology should have evaluated an alternative based upon an incremental cancer risk of one-in-ten thousand (10^{-4}).

Ecology's Response

Comment noted. Ecology has expanded the list of alternatives to include a risk-based alternative based on an excess lifetime cancer risk of one-in-ten thousand (10^{-4}). See Alternative #4: Risk-based Cleanup Standards (#2).

Comment #4

Ms. Linda Larsen and Mr. Daniel Syrdal expressed the opinion that the No-Action Alternative should have been evaluated as equal to existing state laws because Ecology is not required to

promulgate rules under the Model Toxics Control Act. They noted that state laws do not require automatic consideration of the lowest standards at a site and, consequently, the No-Action Alternative should not be considered equivalent to the ARAR alternative.

Ecology's Response

Based on advice from the Office of the Attorney General, Ecology believes that Chapter 70.105D RCW does not provide the flexibility to forego promulgation of cleanup standards at least as stringent as the federal cleanup law and other applicable state and federal laws. Given the federal requirement for compliance with "legally applicable" and "relevant and appropriate" requirements, Ecology believes it is appropriate to consider the No-Action Alternative as equivalent to the ARAR Alternative. Further elaboration of this point is available in Manning (1989).

Range of Impacts

Comment #5

Ms. Lynda Brothers commented that additional efforts should be made to evaluate the impacts of institutional controls (WAC 173-340-440). She observed that institutional controls may impact property uses and transactions.

Ecology's Response

Ecology has acknowledged that the cleanup standards may have positive and negative impacts on property transfers. On the one hand, well-defined cleanup standards may actually increase property transfer by reducing some of the uncertainties associated with the current situation. On the other hand, stringent cleanup standards may increase the number of sites where contaminated materials are managed in-place and concerns about long-term liability may limit property transactions. In general, the need for institutional controls and the subsequent impacts on land uses and property transfers are expected to increase with more stringent cleanup standards. These relationships were discussed in Chapter 12 of the Draft EIS and are summarized in Chapter 4 of the Final EIS.

Comment #6

Mr. Jeff Belfiglio observed that each truckload of dirt removed from a site poses a greater risk to the public than is allowed under the proposed amendments. He recommended that Ecology reconsider the absolute floor of a one-in-one-hundred-thousand cancer risk level.

Ecology's Response

While cleanup actions are normally undertaken to mitigate problems associated with past releases of hazardous substances, Ecology recognizes that such actions may also create unintended short-term impacts. Ecology believes that the regulation provides an appropriate level of flexibility to consider such impacts in selecting from among several types of cleanup actions (see WAC 173-340-360).

Scope of Analysis

Comment #7

Ms. Linda Larson and Mr. Daniel Syrdal expressed the opinion that the alternatives analysis should compare residual levels of contamination to existing levels of contamination rather than to background concentrations.

Ecology's Response

Ecology believes the approach utilized in the Draft EIS is appropriate.

Comment #8

Ms. Linda Larson and Mr. Daniel Syrdal expressed the opinion that additional information on available mitigation measures and unavoidable adverse impacts should be provided.

Ecology's Response

Comment noted. Ecology has provided additional information in the Final EIS. However, Ecology recognizes that these descriptions should not be considered adequate replacements for site-specific evaluations of mitigation measures and unavoidable adverse impacts.

Comment #9

Ms. Lynne Stembridge and Mr. Robert Cook commented that the site scenarios in Appendix H were inadequate because they were based on the MEPAS (Multimedia Environmental Pollutant Assessment System) model. Ground water modeling does not con-

sider the geology at Hanford which permits rapid movement of contamination via the aquifer to the river. MEPAS also incorrectly assumes that evaluating impacts on human health is protective of natural resources or ecosystems.

Ecology's Response

The five site scenarios and remedial technologies were included in the appendix to provide generic information. MEPAS is a computer model that prioritizes hazardous waste sites according to their potential hazard to public health. Ecology agrees that the MEPAS model may not utilize all available information. However the modeling was performed in order to provide a measure of the relative magnitude of impacts associated with residual concentrations of hazardous substances under the various alternatives. MEPAS does allow a comparison of various site scenarios and the impact of different alternatives across the range of scenarios.

Comment #10

Ms. Lynne Stembridge and Mr. Robert Cook recommended that the site scenarios (Appendix H) and remedial technologies (Appendix I) be modified to include assessments of radionuclides.

Ecology's Response

Ecology agrees that additional requirements are needed for radionuclides. Ecology is currently working with the Department of Health to address the issue of radionuclides in greater detail in a subsequent amendment to the rule. As part of that effort, additional evaluation of remedial technologies will be performed.

Comment #11

Mr. Kenneth Weiner expressed the opinion that the site scenarios were not helpful in trying to understand how the rule works in practice.

Ecology's Response

Comment noted. Ecology agrees that the site scenarios may require some clarification. Ecology intends to include similar scenarios in guidance and training materials for implementing the rule. However, the site scenarios are not critical to the evaluation of impacts and have not been included in the Final EIS.

Comment #12

Ms. Linda Larson and Mr. Daniel Syrdal commented that the Draft EIS suggested that additional quantitative analysis of impacts would occur in the Final EIS, not in the Draft EIS, which contradicts the major purpose of SEPA.

Ecology's Response

All available quantitative information was evaluated in the Draft EIS.

Comment #13

Ms. Linda Larson recommended that the paragraph on arsenic on page 13-1 be deleted because ASARCO disagrees with the statement on page 13-1 that the operation of its smelter in Tacoma contributed to the area-wide elevation of arsenic concentrations in Puget Sound.

Ecology's Response

Comment noted. Ecology believes there is sufficient evidence to support the conclusion that emissions from the ASARCO smelter have contributed to elevated background concentrations of arsenic in portions of the Puget Sound area.

Comment #14

Ms. Lynne Stembridge and Mr. Robert Cook suggested that ecological risk assessment parameters should have been evaluated. They suggested that cleanup standards should specify that an average population does not vary by 5% using a 95% confidence factor. The impact on indicator or limiting species should be considered. Estimates of the effects on species from experts in the evaluation of ecological contaminants should be used in the impact assessments. They also asserted that risk-based definitions that apply to the various components of the environment, including species, are necessary to clarify the action required by the rule.

Ecology's Response

Ecology has already begun working with its Science Advisory Board to develop the ecological risk assessment component of the rule that will be incorporated into this rule at a later date. If applicable, Ecology will prepare a supplemental EIS to address those amendments.

Comment #15

Mr. Robert Cook and Ms. Lynne Stembridge recommended that the definition of "hazardous substance" be clarified to indicate that it does include radionuclides.

Ecology's Response

Comment noted. The term "hazardous substance" does include radionuclides. Ecology has revised the rule to clarify this point.

Comment #16

Mr. Robert Cook and Ms. Lynne Stembridge recommended that the definition of "applicable or relevant and appropriate requirements" be expanded to include relevant laws from other states.

Ecology's Response

Under the federal cleanup law, an applicable or relevant and appropriate requirement is a state-specific determination, and EPA reinforced this view in the final National Contingency Plan. Washington State laws, for example, would not be applicable requirements for cleanup actions in Florida. Ecology has chosen to define applicable state and federal laws in this regulation to include both legally applicable and relevant and appropriate requirements.

Comment #17

Ms. Lynne Stembridge and Mr. Robert Cook recommended that risk-based quantitative definitions be incorporated into the rule to quantify unacceptable "threats."

Ecology's Response

The rule contains risk-based definitions similar to those under other state and federal rules. Ecology believes these definitions are sufficient to determine unacceptable "threats."

Comment #18

Ms. Lynne Stembridge and Mr. Robert Cook expressed the opinion that the term "threat to public health or the environment" used in Ecology's *Final Cleanup Policy* in Appendix E and the term "threats to human health and the environment" from the Model Toxics Control Act may be inconsistent with each other. They stated that the definition from Chapter 173-340 WAC is the more appropriate of the two definitions.

Ecology's Response

The 1984 policy is included in the Technical Appendices in order to provide a better understanding of past policies. The terms in the 1984 policy and the rule mean essentially the same thing, with the words evolving from "or" to "and," meaning the threat can exist for either one. "Public health" has also been expanded to the more protective phrase "human health."

Comment #19

The concerns raised by Mr. Bill Sullivan have been addressed in the Responsiveness Summary on the proposed amendments.

Written and Oral Comments

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October 1, 1990

RECEIVED
OCT 0 1 1990
ECOLOGY

Mr. David Bradley:
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Department of Ecology
Mail Stop PV-11
Olympia, WA 98504-8711

Re: State Register 90-15-066, Public Consent

Dear Dave:

I wish to make one brief comment on the proposed cleanup standards. I will not repeat the many comments I have submitted as part of the Cleanup Standards Work Group, but I do appreciate the opportunity to have participated in that process. Instead, I wish to draw your attention to an issue which caught my eye on page 7-13 of the Draft Environmental Impact. It states there that each truckload of soil removed from a site in Seattle to Arlington, Oregon, poses an increased risk of transportation-related deaths of 1.1×10^{5} [sic - I assume this was meant to be 10^{-5}]. In comparison, the greatest lifetime incremental risk of cancer allowed at a cleanup site, even under conditional cleanup levels, is 10×10^{-5}.

In other words, each truckload of dirt removed from a site poses a greater risk to the public than is allowed from the site for a lifetime of exposure. It thus seems clear that to the extent the cleanup standards require soil removal to lower cancer risks from 1.0×10^{-5} to 1.0×10^{-6} in order to attain compliance cleanup levels, they pose a net risk to the public. This is the concept Dr. Landau has espoused on the Scientific Advisory Board.

In short, Ecology should reconsider its absolute floor of a 1.0×10^{-5} risk level, and re-examine whether conditional cleanup

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levels are appropriately available where attaining compliance cleanup levels would result in a net risk to the public.

Sincerely yours,

DAVIS WRIGHT TREMAINE

Jeff Belfiglio

JB:sbc

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Bellevue/October 1, 1990

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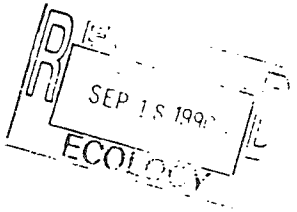
LYNDA L. BROTHERS

September 17, 1990



VIA TELEFAX, HARD COPY TO FOLLOW

David Bradley
Toxics Cleanup Program
Department of Ecology
Mail Stop PV-11
Olympia, Washington 98504-8711

RE: State Register 90-15-066, Public Comment

Dear David:

The Department of Ecology ("DOE") is to be congratulated for the effort and innovation incorporated into the Proposed Amendments to Ch. 173-340 WAC ("Amendments"). However, the Amendments are not consistent with the statutory authority granted to DOE, and fail to adequately consider economic and cost impacts. The Amendments are based upon a risk based analysis which fails to consider certain major costs in the determination of cleanup standards and the Economic Impact Statement is based on an irrelevant cost analysis model. The Amendments raise serious policy and legal questions as to the authority of the DOE to require institutional controls, and the EIS and the Economic Impact Analysis both fail to evaluate the impacts of such institutional controls. The Economic Impact Statement sets forth cost mitigation measures which are neither established by rule or policy as required in compliance with the Regulatory Fairness Act.

1. Institutional Controls in the Amendments are beyond the authority granted to DOE, and not evaluated in either the Environmental Impact Statement ("EIS") or the Economic Impact Statement ("Statement").

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Proposed WAC 173-340-440 requires,

> Institutional controls that restrict the use of the site and natural resources affected by releases of hazardous substances from the site shall be required to assure continued protection of human health and the environment or integrity of an interim action or clean up action . . . .

The "institutional controls" are to take the form of "a restrictive covenant executed by the property owner and recorded with the register [sic] of deeds for the county in which the sit is located." Id.

Nowhere in the Model Toxics Control Act ("MTCA") is DOE granted authority to require restrictive covenants or to require the recordation thereof with the county. Absent such delegation of authority by statute proposed WAC 173-340-440 exceeds DOE's authority and should be deleted from the proposed regulation. See e.g., Kaiser Aluminum v. Pollution Control Hearings Board, 33 Wn. App. 352 (1982). We recognize that under certain circumstances DOE may seek to place limitations of the use of property, however such limitation can be accomplished through th use of existing administrative procedures.

The EIS fails to evaluate any of the impact of the institutional controls contained in the proposed WAC 173-340-440. The failure to analyze the impacts of institutional controls is significant and the omission distorts the conclusio reached in the EIS. Experience indicates that such restriction limit the uses and transferability of property. To require institutional controls where a clean up[1] has been conducted is tantamount to an unconstitutional taking of property. The environmental impacts of institutional restrictions on property

[1] Although WAC 173-340-173(5) provides for the removal of restrictive covenants under certain circumstances, that subsection does not alter this analysis, since it has not been sho when or how many, if any, sites will qualify for removal of the covenants.

have been ignored in the EIS; such impacts may include expansion of industrial facilities into previously unused, residential or otherwise "clean" properties and lost opportunities for clean up actions at contaminated.

The Economic Impact Statement fails to address the costs associated with imposition of institutional controls. These cost may represent a disproportionate burden for small businesses.

In conclusion, proposed WAC 173-340-440 should be deleted. It exceeds the authority granted to DOE, its impacts were not evaluated in the EIS, and its economic impacts on small business has not been evaluated.

2. Costs have not been adequately considered in the clean up standards under the Amendments, the Economic Impact Statement or the EIS.

First, as you and I have discussed on numerous occasions, Section 3(2)(d) of the MTCA requires inclusion of the requirements of CERCLA Section 121, which expressly require the consideration of cost in the choice of clean up standard.[2] In addition, consideration of cost is clearly contemplated by Section 3(1)(b) which requires consideration of practicability in the choice of remedial actions. The courts have consistently interpreted practicability to include cost considerations. It is interesting to note that LOE's existing regulations alsc make it clear that cost considerations are paramount throughout the remedial process. Payment of DOE's remedial action costs is discussed in WAC 173-340-550 which limits recovery of costs to those "reasonably attributable to the site." Also, DOE requires consideration of cost in the feasibility studies required under WAC 173-340-350. Third, DOE has premised its analysis in the Economic Impact Statement on the availability of mitigation measures for costs associated with implementation of the Amendments, reiterating the economic and cost impacts on small business.

[2]The legal support for this position has been supplied to DOE in the past, both in verbal and written comments and therefor is not included here.

The Economic Impact Statement ("Statement") is based on a model which does not accurately reflect the provisions of the proposed Amendments. The Statement employs the Environmental Protection Agency's Cost of Remedial Action ("CORA") Model, yet nowhere in the Statement is that usage justified. The CORA model contains assumptions unique to the federal program. The Statement recognizes, but fails to rectify, this problem. See, Statement at 2. Further, the EIS makes clear that the federal and state clean up programs are different. See, for example, the following:

> Ultimately, Ecology would have legal authority to take independent action at the site and impost the MTCA clean up levels.

EIS at 3-36.

> This requirement does not preclude the adoption of state standards that are stricter than federal standards.

Id.

> . . . the proposed MTCA rules are designed to be more uniform than the Superfund rules, with less flexibility available in determining site-specific clean up levels.

EIS at 3-37.

The cumulative effect of the above statements in the EIS indicate that the MTCA rules are very different from the Federal clean up program. Yet the Economic Statement is based upon the CORA model which is based on the federal Superfund program. . .

The Discussion of alternatives in the EIS apparently fails to fully consider the impact of different options for evaluating cost. At page 3-31, the EIS sets forth certain options for the evaluation of cost, yet the impact of those options are evaluated.

Thank you for the opportunity to comment upon the proposed Amendments, Environmental Impact Statement and the Economic

Impact Statement. For the reasons stated above, we believe the DOE should consider alterations to the Amendments. Please don't hesitate to call if you have any questions.

Very truly yours,

DAVIS WRIGHT TREMAINE

Lynda L. Brothers

LLB:pd

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2552 Harris Avenue
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September 15, 1990

David Bradley
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Elena Guilfoil
Department of Ecology
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Dear Ms Guilfoil and Mr. Bradley:

Enclosed are comments on the proposed amendments to the Model Toxics Control Act Cleanup Regulation, Chapter 173-340 WAC and the respective Draft Environmental Impact Statement.

Sincerely,

F. Robert Cook

Enclosure as noted:

ENCLOSURE TO LETTER OF SEPTEMBER 15, 1990

SUBJECT: COMMENTS ON MODEL TOXICS CONTROL ACT PHASE II RULEMAKING AND DRAFT ENVIRONMENTAL IMPACT STATEMENT--

FORMAT--To identify the section, subsection or paragraph in the proposed rules--including existing Phase I rules already promulgated--for which a specific comment applies, the comment will be preceded with the appropriate section, subsection, etc. number, for example, 120 (2) (b). The common chapter designator in the Washington Administrative Code (WAC), WAC 173-340 for the Model Toxics Control Act Cleanup Regulation, will be omitted for purposes of brevity. The draft to which the comments apply is the July 18, 1990 draft of this chapter.

Comments on the Draft Environmental Impact Statement are listed under that respective heading. Applicable sections or text are identified with each comment.

DRAFT ENVIRONMENTAL IMPACT STATEMENT--

1. Per Appendix H the ground water modeling of the HEPAS code used by the Department of Ecology (DOE) does not appear to provide for distribution in discrete pathways, for example, fracture zones and buried ancestral stream beds of high conductivity, now covered by deposited soils. Such features in the geology at Hanford provide the most rapid transit times for the groundwater in the unconfined aquifer from contaminated zones to the river and are appropriate to consider in evaluating effects of spreading contamination and its concentration. This mode of ground water distribution is of most importance at Hanford in transport of water from waste disposal areas to the river and areas of the hospitable environment.

2. Per Appendix H it is indicated that the HEPAS code allows evaluation of the dose via ANY possible pathway, and DOE indicates it is satisfactory for evaluating the relative impact of various alternatives of cleanup standards. However, DOE indicates that the intent of the impact statement is also to determine the effects on natural resources. Considering the fact that terrestrial and aquatic plants and animals are considered natural resources, any methodology selected to evaluate impacts should be able to consider these parts of the natural resource. Therefore the conclusion that human health effects are sufficient to determine the relative impacts of various cleanup standards is invalid. In many cases flora and fauna may be grossly affected, for example, in salt water ecosystems, and human health would not be effected. In desert ecosystems, the same might be true. Drinking water in both cases may not be a pathway of importance in determining effects on humans.

Regarding the stated capabilities of HEPAS in Table H-1,

evaluation of the relative effects on terrestrial and aquatic plants and animals as well as human populations. For example, modeling should provide for the evaluation of atmospheric deposition on terrestrial animals as well as terrestrial plants. Likewise groundwater drinking and ingestion/inhalation interactions should consider effects on terrestrial animals, including birds. Bioaccumulation in the terrestrial predator animal chain should be considered and should take into account the ingestion of aquatic animals. (The effect of DDT on predator birds is a classical example of why such a mechanism should be considered.)

3. Risk based effects on populations of flora and fauna species should be established by DOE and used in establishing cleanup actions for each site considered. For example, an appropriate statement of risk might be as follows:

> "Cleanup of hazardous substances shall with 95% confidence be such as to assure no greater than either a 5% increase or decrease in the 10-year average population measured in appropriate units -- individuals per unit area or volume-- for any given species native to the site being considered over a period of 10 generations of the species or 10 years whichever is greater."

Using such a design base for cleanup, the impact statement should consider indicator or limiting species impact. Without it the Statement is incomplete. The fact that good models are not available to assess individual species effects from specific contaminants is not a valid reason for ignoring this issue. Estimates of effects on species from experts in the evaluation of ecological contaminants should be used in the impact assessments.

And even though effects on species of various hazardous substances may not be readily apparent, it is important to establish design bases for specifying what is acceptable and what is not acceptable. As the technical capability develops for assessing species by species risks, the pertinent acceptance standards will be available for determining the acceptability of future cleanup actions.

4. In reviewing the subject Draft Environmental Impact Statement, it is difficult from the definition of "hazardous substance" to ascertain that radio nuclide toxicity is included within the scope of this term.

The Statement should make it clear that the rule and the Impact Statement cover the consideration of cleanup of toxic radio nuclides. To this end specific site scenarios (Appendix H) and remedial technologies (Appendix I) should be modified to incorporate items that address radio nuclides. For example, a

site at Hanford should be considered together with the remedial technology applicable.

5. The term "threat to the public health or the environment" is used in the DOE's Final Cleanup Policy, dated July 10, 1984, (Appendix E of the Impact Statement). The term "threats to human health and environment" is used in the Model Toxics Control Act under declaration of policy. The definition of these terms may be consistent or may not.

The definitions should be incorporated into the definitions of Chapter 173-340 WAC and utilized appropriately in the Impact Statement. In this regard it is recommended that risk-based quantitative definitions be incorporated into the Chapter to quantify unacceptable "threats". As noted above, risk-based definitions that apply to the various components of the environment, including species, are necessary to clarify the action required by the Chapter.

6. The Technical Summary discusses the definition of "applicable or relevant and appropriate requirements." This section does not directly address the relevant laws in other states. The impact statement should include a review of laws in other states and provide evidence that the standards being proposed are at least as stringent as the "applicable" laws in other states. In this regard the term "applicable" appears to reflect its synonymous meaning "relevant" for purposes of Washington State rules under Chapter 173-340 WAC.

It is obvious that the actual laws in other states do not "legally apply" to the State of Washington. DOE's adopted wording "legally applicable" in the definitions and usage section of 173-340 WAC is unfounded. Relevancy is the key determining factor in deciding the use of cleanup standards specified by laws (and hence state rules) in other states.

Had it been intended by MTCA that the definition proposed by DOE be consistent with that in the National Contingency Plan, such definition would have been incorporated into MTCA.

Thus, the proposed definition of "applicable state and federal laws" incorrectly and/or ambiguously delimits consideration of any other state's law or requirement through the use of "and" instead of the word "or". As indicated above there are no "legally applicable" laws for residents of Washington in other states's statutes. The following words are suggested to correct this ambiguity:

"Applicable state and federal laws" as used in context of the specification of cleanup standards means all relevant current laws and corresponding implementation rules and

requirements, any of which reasonably could apply to sites in Washington, promulgated by any federal or state authority or state citizenry."

The additional definitions of "legally applicable requirement" and "relevant and appropriate requirements" in the Draft rules should also be modified to reflect this comment insofar as these definitions may apply to cleanup standards. In this regard, elimination of theses terms from the rule would seem appropriate since they appear to be nearly the same in their meaning as the term "applicable state and federal laws" discussed above.

It is poor rule making to use various similar terms to connote the same meaning. In addition, if slightly different meanings for terms used in the rule are necessary for some reason, the terms selected should be defined so that the intended distinction is obvious. Such has not been accomplished in the proposed rule and this results in confusion and ambiguity.

COMMENTS ON PROPOSED RULE--

1. 200 DEFINITIONS--

a. See comments in the section concerning the Environmental Impact Statement for comments on the following terms:

"Applicable state and federal laws"
"Legally applicable requirement"
"Threats to human health and environment" (proposed addition)
"Hazardous substance."
"Relevant and appropriate requirements"

b. The terms "acute toxicity" and "chronic toxicity" make use of the undefined term "injury" to specify the scope of the two terms. Since acute and chronic toxicity may not be generally interpreted to include allergic health effects from low-level contaminants in a small segment of the society, allergic reactions should be specifically considered in the definitions since the common definition of injury includes items detrimental to comfort as well as health. (The issue is raised in light of the fact that some health authorities and practitioners do not consider allergic reactions the result of acute or chronic toxicity, since such reactions tend to be confined to a limited number of individuals of a given species with no effect in other individuals.)

Also the term "short term" is used to define the maximum time of exposure to a hazardous substance associated with "acute toxicity". Instead of using "short term" the period of 72 hours should be specified. This is generally a conservative specification of short term in toxicity studies and is consistent

with OSHA usage in requirements for worker safety.

Correspondingly the term "chronic toxicity" should specify a total exposure time in excess of 72 hours.

c. The term "containment" is defined in a manner inconsistent with the common understanding of the word, in that the proposed definition allows for slow release--hindered release--by structures. Thus, clay, which is slowly permeable to water and contaminants might be considered a suitable material for a container. To make the term consistent with usage in other environmental rules, for example, rules for high-level radioactive waste disposal in 10 CFR 60, the definition should be modified to specifically refer to structures that achieve the confinement of hazardous substances within a defined boundary and prevent the release to the environment.

d. The term "carcinogen" is defined in a very restrictive and non-conservative manner and is inconsistent with goals and conclusions of the Federal Cancer Policy, initiated by OSHA in 1977. The definition used in this policy is as follows:

> "A substance or condition which increases the incidence of generally irreversible benign or malignant tumors, reduces the latency period, or produces unusual tumors in animals or man."

This definition should be used in place of the current definition since it conservatively identifies a carcinogen.

e. The term "carcinogenic potency factor" or "CPF" should be separated from the definition of "carcinogen". In addition the definition for "CPF" does not make sense. The 95th percentile confidence limit of the slope of the dose-response curve is incorrect terminology. In addition "the dose-response curve" is ambiguous. An accurate definition should be included.

A definition of how the CPF is used may be more informative. A sample dose-response curve pertinent to the development of a benign or malignant tumor or reduction in latency period for same should be given as an example with the instruction as to how to determine the appropriate dose in terms of mg hazardous substance exposure per kg of body weight per day of exposure. This dose could vary depending on the number of individual animals tested, if a standard statistical design base is specified, for example, less than a 5% response at the 95% confidence level.

f. The terms "ground water" and "surface water" appear to exclude water in the vadose zone or unsaturated soil of the earth, generally found above saturated zones. It is recommended that the term "ground water" be expanded to explicitly include the water in the vadose zones of soils and stratum.

of its definition an example which highlights the use of drinking water as an indicator of highest beneficial since it "will generally provide protection for a great variety of other existing and future beneficial uses of ground water." The example, as it is written indicates that drinking water quality may not be the limiting determining factor for <u>all</u> current and future beneficial uses, only a "great variety."
The example of drinking water should be deleted. It is not necessary to modify the first clause in the definition. It only acts to create an ambiguity.

h. The term "risk" as part of the definition includes the idea of a probability that a hazardous substance causes an adverse effect. However, an important and useful parameter, confidence, is necessary to further illuminate any particular statement of risk by addressing its validity and thereby give practical meaning to such statements.

Hence, the definition of "risk" should be modified to refer to a confidence statement. An appropriate standard specification for confidence for risk assessments would be 95 percent.

The following is a brief discussion of factors to be considered in quantitatively specifying risk that should be considered in redrafting the definition.

> What constitutes proper quantification? First one must have an estimate of a probability of a postulated event (risk), generally with respect to passage of time. Second one must have an estimate of the confidence of that probability or risk. This latter estimate is a quantitative statement as to the validity of the analyses used to make the risk estimate. Without the confidence statement a risk estimate is not meaningful. And finally, the estimates must be made within the rigors of a quality assurance system applicable to design activities, including research and development.
>
> In risk analyses a confidence statement should be estimated to take account of both the known and uncontrolled effects anticipated in a scenario, as well as the unknown or vaguely known effects. Such estimates, when combined, would serve as a confidence statement for the stated risk.
>
> However, risk analyses commonly utilize mathematical models of the scenario in question, with random selection of independent variables defined for the respective models, to accomplish "thought experiments" producing statistical data. Such data do not allow for determining a confidence statement since re-doing the analyses for any given scenario will produce the same estimate of risk. The results of such "thought experiments" do not reveal uncertainties in the models themselves. And the validity of the models to represent the scenario in question remains unaddressed.
>
> Typically it takes independent peer reviews to estimate <u>and/or</u> confirm, quantitatively, the uncertainty associated with models used in risk assessments. Conceptually, the "thought experiments" making up the risk analyses should include runs which incorporate bias or uncertainty factors applicable to a model's dependent performance parameters determined by such reviews.

i. The definition for "Subchronic reference dose" includes the parenthetical phrase "(with an uncertainty of an order of magnitude or more)". This confuses the meaning since if would seem some reference doses might not have such large uncertainties. Other ambiguities related to the words "appreciable risk" and "a portion of a lifetime" also confuse and/or leave the definition ambiguous. It is recommended that the definition include the following wording:

> "Subchronic reference dose means an estimate of a daily exposure level for the human population, including sensitive subgroups, that is likely to be without a risk greater than 1/1,000,000 at a confidence of 95% of adverse effects during an exposure of 72 hours or greater."

j. The terms "beneficial use", "in the public interest" and "appreciable risk" should be defined since they are key terms in deciding upon actions required by the rule. Appreciable risk should be defined as 1/1,000,000 at 95 % confidence or greater. Beneficial use should include uses that depend upon the ecological integrity of a site as a natural preserve. In the public interest should be consistent with the definition of "beneficial use" and consistent with the intent of MTCA to achieve cleanup to specified standards.

k. The term "reasonable maximum exposure" is defined in a non scientific manner, making use of the word "reasonable". This qualitative expression should be quantified consistent with establishing risk relative to quantitative risk standards. It is unacceptable to allow key aspects of the risk analysis to remain qualitatively stated. Thus, a probability defining reasonable, for example, 99% probability with 95% confidence that maximum exposure will not exceed the expected amount over a 100 year period considering conditions 500 years in the future, should be incorporated into the definition. It is noted that a time frame is warranted to specify for analysts a tractable problem and to standardize the exposure time to be considered for old people.

It should be noted that old people as their livers degrade and

become less functional are increasingly vulnerable to health effects and cancer caused by toxins. Therefore, long exposure times are reasonable to consider. In addition it is necessary to correct dose/response data to account for the age and liver/kidney function of individuals. The long time frame for consideration of exposure will assure this phenomena shall be considered in determining a hazard index for individuals.

2. 360 (4)--This section should be modified to recognize other relevent state laws, consistent with comment 6 under Draft Environmental Impact Statement.

3. 360 (7)--This subsection concerning practicability should consider costs associated with loss of future beneficial uses. Intangible benefits, for example nature preserves, should be assigned a worth to allow such evaluation. Such "lost beneficial usage" costs should subtract from costs associated with cleanup actions in evaluation required by item (c).

4. 600--Rules for obtaining public input are extensive specified in this section, however, rules applying to DOE for rational, fair resolution of public input are left out. Such rules for operation of DOE should be included in 173-340 WAC. They should include requirements to propose resolution to comments within a specified time and to publish the resolutions. In addition, resolution of comments should provide for appeal and in the case of citizen advisory groups, should require concurrence.

Where comment resolution of public input is not resolved to the satisfaction of the commentator, an appeal mechanism should be specified to provide for further review and adjudication of comments.

5. 700 (5) (d) (iv) (A)--The comment in item 3 above regarding lost beneficial usage costs should be considered in this paragraph.

6. 700 (4) (a)--The text concerning "reasonable maximum exposure should be revised to reflect the discussion under item 1. k. above.

7. 705 (3)--The frequency specified for review and update of the rule is excessive. Many changes to applicable state and federal laws may occur within a five year period. An annual review should be specified with at least annual updates of the rule accomplished as necessary to be consistent with the RCW 70.105D.030 (2) (d). It is unreasonable to allow a 5 year delay in accomplishing protection of human health and the environment. Procedures for publishing the updated standards should be specified in 173-340-705.

8. 720 (1) (a) (ii)--The criteria for determination of potential future use of ground water are inadequate. Consideration of technological advancement in the capability to remove organic or specific inorganic constituents should be included in the analysis.

Drinking water for farm or domestic animals is a use that should be considered routinely and thus should be specified rather than left to the determination of DOE on a case basis. For example, the accumulation of hazardous substances in milk of cows and goats should be considered.

The second sentence of paragraph (a) is unnecessary. It inappropiately suggests consideration of drinking water as the highest beneficial use in most cases. Such a suggestion adds nothing to the rule.

9. 800--A provision should be included in the facility access rules to allow and facilitate discussion with facility owners and there employees. In addition the rules should prohibit facility owners or their agents or other employees from advising any person not to communicate with State employees or their agents regarding health and environmental hazards. Rules should be included against withholding information by any person pertinent to a State investigation.

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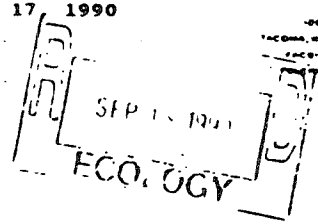
LINDA R LARSON
PARTNER

September 17, 1990



Elena Guilfoil
Toxics Cleanup Program
Washington State Department of Ecology
Mail Stop PV - 11
Olympia, Washington 98504-8711

Re: Comments on Draft Environmental Impact Statement for Cleanup Standards

Dear Ms. Guilfoil:

These comments on the Draft Environmental Impact Statement ("DEIS") for the proposed state cleanup standards under the Model Toxics Control Act ("MTCA") are submitted on behalf of ASARCO Incorporated ("Asarco").

The company believes that the DEIS is inadequate in that it does not carry out the requirements of the State Environmental Policy Act ("SEPA"), chapter 43.21C RCW, in several crucial areas. Its most significant general deficiency is its failure to confine itself to analyzing the environmental impacts of the proposed regulations. Instead, the bulk of the document, especially Chapters 1 -4 and 14, is devoted to justifying the policy decisions made by the Department of Ecology ("Ecology") in drafting the preferred alternative.

The most glaring indication of this failure is the use of a "Regulatory Evaluation of the Alternatives" at pages xiii - xiiii (sic) and in Chapter 14. Although WAC 197-11-440(8) allows the lead agency to include a discussion of other impacts relevant to the agency's decision, the SEPA regulations make it clear that

such a discussion should not be the major focus of an EIS. WAC 197-11-448(1) states:

> SEPA contemplates that the general welfare, social, economic, and other requirements and essential considerations of state policy will be taken into account in weighing and balancing alternatives and in making final decisions. However, the environmental impact statement is not required to evaluate and document all of the possible effects and considerations of a decision or to contain the balancing judgments that must ultimately be made by the decisionmakers. Rather, an environmental impact statement analyzes environmental impacts and must be used by agency decisionmakers, along with other relevant considerations or documents, in making final decisions on a proposal. The EIS provides a basis upon which the responsible agency and officials can make the balancing judgment mandated by SEPA, because it provides information on the environmental costs and impacts.

(emphasis in original). This DEIS does not adequately separate Ecology's policy agenda from the environmental consequences of the proposed action, and by doing so presents confusing and biased information about the environmental impacts of the alternatives. Ecology's program goals should be clearly separated from the environmental analysis, so that an objective evaluation of environmental impacts is presented.

The DEIS also fails to comply with the requirements of SEPA in several specific respects. First, the DEIS impermissibly eliminates the No Action Alternative from detailed analysis. Second, it does not analyze all reasonable alternatives available to Ecology. Third, the alternatives that are presented are not adequately analyzed. In addition, the document does not identify the significant adverse impacts of the alternatives that cannot be mitigated.

The No Action Alternative

The DEIS concludes that the "no action" alternative is "illegal" and in any event identical to the ARARs alternative. Consequently, the DEIS does not analyze the "no action" alternative. As a result, the DEIS does not comply with WAC 197-11-440(5)(b)(ii), which provides that the "[t]he 'no action'

alternative shall be evaluated and compared to other alternatives".

The DEIS assumes that Ecology is required to promulgate new rules under the MTCA. However, the MTCA merely states in RCW 70.105D.030(1)(f) that Ecology "may" take actions necessary to carry out the act "including the power to adopt rules under chapter 34.05 RCW." Promulgation of new rules is discretionary under the MTCA[1], and Ecology could choose to use the general statutory authority of the MTCA as a supplement to its existing authority under other state laws. Those state laws do not require a consideration of ARARs that results in the automatic use of the lowest conceivable standard at a site. The DEIS should have outlined and analyzed a separate "no action" alternative based on a scenario of the enforcement of existing laws and the MTCA.

Alternatives Presented

WAC 173-11-440 requires an EIS to analyze reasonable alternatives. Reasonable alternatives "shall include actions that could feasibly attain or approximate a proposal's objectives, but at a lower environmental cost or decreased level of environmental degradation". Chapter 3 of the DEIS discusses "significant issues" and "options" that are in fact reasonable, feasible alternatives to the preferred alternative. For example, the DEIS states at page 3-2 that "[t]he acceptable level of protection is the essential policy question for site cleanups . . .". It then goes on to assume that the acceptable level of risk is 1 x 10-5. Yet it also identifies at page 4-16 other jurisdictions which have adopted other acceptable risk levels for cleanup standards. Obviously, then, those other levels are reasonable and feasible. The environmental impacts for each risk level would be significantly different and are essential for a decisionmaker in adopting cleanup standards. Yet the DEIS does not present or analyze these levels as alternatives for consideration.

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[1] The DEIS, by making the assumption that promulgating rules is mandatory, totally ignores the requirement in WAC 197-11-440(5)(c)(vii) to discuss the benefits and disadvantages of delayed implementation of the proposal.

Alternatives Analysis

The DEIS assumes at page 6-3 that the measure of the impacts of the alternatives "is how much higher the levels of residual contamination are than the natural concentration levels of the hazardous substances". This assumption is a fundamental flaw in the analysis of environmental impacts. RCW 43.21C.030(c) calls for the preparation of a detailed statement of the "environmental impact of the proposed action" (emphasis added). The proposed action here is to adopt regulations for standards to clean up sites that are already contaminated. It is an action to decide whether to contaminate pristine areas. Consequently, the DEIS should analyze the measure the impacts of the alternative standards by comparing levels of residual contamination with levels already existing on contaminated sites. Such a comparison would result in significantly different information than that contained in the DEIS and would allow decisionmakers and the public to see a more realistic comparison of the alternatives.

The DEIS also appears to endorse a procedure whereby further environmental analysis takes place after a decision on cleanup standards are made. The DEIS states at page 6-6:

> Because the standards and the preferred alternative are presently in draft form, a qualitative assessment was considered appropriate. Once the regulations are finalized, following public comment and internal review, additional quantitative assessments of impacts will be included in the final EIS.

This procedure, if followed, would directly contravene the major purpose of SEPA, which is to provide decisionmakers with information about the environmental consequences of their actions before a decision is made. See, e.g., Juanita Bay Valley Community Association v. City of Kirkland, 9 Wn.2d 59, 73, 510 P.2d 1140, 1149 (1973). If the information to prepare a more quantitative analysis of the alternatives is available, it must be done now so that it is available to decisionmakers and the public before the regulations are "finalized".

In addition, the DEIS does a poor job of describing mitigation measures, and contains virtually no discussion of the unavoidable adverse impacts of each alternative. The "Technical Summary" states at page xii only that the action "will generally result in some unavoidable adverse impacts", and Chapter 13 does

not even have a section on unavoidable adverse impacts. This is not compliance with WAC 197-11-440(6)(c)(v).

Conclusion

As a final matter, Asarco takes strong exception to the implication on page 13-1 that the former operation of its smelter in Tacoma resulted in "area-wide elevation of arsenic concentrations in the Puget Sound area". There is no factual basis for such a statement. Studies conducted by Ecology and the U.S. Environmental Protection Agency in the Ruston/North Tacoma area have shown that elevated levels of arsenic due to smelter emissions are confined to a very discrete geographical area. The DEIS itself notes in earlier sections that natural background concentrations of soil in the Puget Sound area are relatively high. The paragraph on arsenic on page 13-1 should be deleted.

Thank you for this opportunity to comment on the DEIS.

Very truly yours,

HELLER, EHRMAN, WHITE & McAULIFFE

Linda R. Larson

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Attorneys for ASARCO, Incorporated

cc: W. Hart
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STATEMENT OF

DAN W. REICHER, ESQ.

AND

JAMES D. WERNER

ON BEHALF OF

THE NATURAL RESOURCES DEFENSE COUNCIL

BEFORE

THE HOUSE ARMED SERVICES COMMITTEE
SUBCOMMITTEE ON PROCUREMENT AND MILITARY NUCLEAR SYSTEMS

REGARDING

THE PROCESS USED BY THE DEPARTMENT OF ENERGY TO SET PRIORITIES FOR RESOLVING ENVIRONMENTAL PROBLEMS AT ITS NUCLEAR WEAPONS FACILITIES.

FEBRUARY 24, 1989

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My name is Dan W. Reicher. I am a senior project attorney with the Natural Resources Defense Council (NRDC). Prior to joining NRDC, I was an assistant attorney general for environmental protection in the Commonwealth of Massachusetts, a law clerk to a federal district court judge, a staff member of the President's Commission on the Accident at Three Mile Island, and a legal assistant in the hazardous waste section of the U.S. Department of Justice. I am a graduate of Stanford Law School and Dartmouth College.

Appearing with my today is Jim Werner, who is a project engineer with NRDC. Prior to joining NRDC last month, Mr. Werner was a Senior Environmental Engineer at ICF Technology, Inc. At ICF, Jim was a consultant to the Department of Energy on the Environmental Survey Project, which was a project designed to establish a baseline inventory of the Department's environmental problems. As part of that project Jim had a leading role in the Survey Prioritization Implementation Group. That group helped plan the implementation of the model used in the September 1988 Environmental Survey Preliminary Summary Report, which ranked environmental problems at DOE facilities. Jim has a Masters degree in Environmental Engineering from the Johns Hopkins University and has authored numerous technical and policy articles on the costs and technologies of hazardous waste cleanup.

NRDC is a national environmental organization with over 100,000 members and contributors and a staff of over 120 lawyers, scientists, resource specialists and support personnel at offices in New York, Washington, and San Francisco. NRDC pursues a broad range of environmental, energy, and defense issues. The organization has long been concerned about safety and environmental problems at Department of Energy (DOE) nuclear facilities. Over the past twelve years, the NRDC Nuclear Project has won a series of lawsuits to enforce federal environmental laws at DOE facilities including Hanford, Washington; Oak Ridge, Tennessee; and the Savannah River Plant, South Carolina.

We are pleased to have this opportunity to present our views to the Subcommittee on the process used by the Department of Energy (DOE) to set priorities for resolving environmental problems at its nuclear weapons facilities.

SUMMARY

We are reporting today our preliminary analysis of the process used by the Department of Energy (DOE) to set priorities for resolving environmental problems at its nuclear weapons facilities. DOE uses a model called the Multimedia Environmental Pollutant Assessment System (MEPAS) in setting cleanup and budget priorities. The results of MEPAS are the basis for the DOE's prioritization report, released in December, 1988, which ranks the severity of the health and environmental threats at the

weapons plants. They are also the primary input to the Program Optimization System (POS) which underlies DOE's FY90 budgeting.

We find that the MEPAS model is seriously flawed. The problems with the model include: (1) MEPAS cannot distinguish near-term risks from long-term risks; (2) MEPAS cannot identify the most exposed individual; (3) MEPAS uses an inappropriate combination of carcinogenic and non-carcinogenic effects; (4) MEPAS fails to consider multiple contaminants; (5) MEPAS is too data intensive; (6) MEPAS is too complex; (7) priorities set by MEPAS may conflict with legal obligations; (8) DOE has failed to acknowledge the important connection between MEPAS and POS; (9) MEPAS has never been subject to outside public review in contrast with ranking models issued by the Environmental Protection Agency (EPA) and the Department of Defense (DOD).

These serious flaws indicate that MEPAS, in its present form, should not be used for establishing cleanup priorities or as an input to POS for setting budget priorities. Congress should direct DOE to suspend using MEPAS for prioritization and budgeting activities pending resolution of problems with the model. Congress should instruct DOE to subject MEPAS to review by an independent panel, with opportunity for formal public comment. If, after this review, DOE implements a modified ranking model the Department should be required to subject the results to formal public comment, as EPA and DOD do for their ranking systems.

Finally, to address the larger concerns about DOE's management of its environmental problems, the Committee should report out favorably H.R. 765, recently introduced by Representative Dingell (D-MI). The bill would establish a special temporary Commission to review and make recommendations about contamination and cleanup of DOE facilities. If created the Commission could, among other things, review MEPAS as recommended above.

A. Background on MEPAS and POS

The Multimedia Environmental Pollutant Assessment System (MEPAS) model was developed to rank environmental problems at DOE facilities in terms of their severity. MEPAS was developed as a part of the Environmental Survey program, which was one of a number of environmental initiatives announced in September 1985, by then Secretary of Energy Herrington.[1] MEPAS was the basis for DOE's September, 1988 Environmental Survey Preliminary Summary

[1] A second component of the Survey program was field audits of nearly 40 DOE facilities across the country, which resulted in a series of "Preliminary Reports" reviewing environmental problems at each facility. The field surveys cost approximately $6 million and involved four teams with 7 technical specialists each. The third component of the Survey program was sampling and analysis of soil, wastes and water at several DOE facilities visited by the Survey. This component involved dozens of technical specialists from the DOE laboratories and cost approximately $45 million.

Report [2] (released publicly in December) which ranked environmental problems at Defense Program facilities.

MEPAS was developed and implemented, at a cost of $9 million, by DOE's Office of Environment, Safety and Health as an alternative to EPA's Hazard Ranking System (HRS). HRS is used for ranking waste sites for listing on the National Priorities List, a list of sites potentially eligible for cleanup funds under Superfund.[3]

In its report on the FY1988 Defense Authorization Act,[4] the House Armed Services Committee directed DOE to establish a priority system for the allocation of environmental restoration funds. DOE's Office of Defense Programs developed a model to accomplish this task called the Program Optimization System (POS). POS is based on a standard quantitative management tool known as Multiattribute Utility Analysis, which is a technique designed to help with decisions involving multiple competing

[2] U.S. Department of Energy, Environmental Survey Preliminary Summary Report of the Defense Production Facilities. ES and H Office of Environmental Audit DOE/EH-0072 (September 1988).

[3] It is interesting to note that in 1985, DOE developed a variation of the HRS called the "modified Hazard Ranking System" (mHRS)). The purpose of the mHRS was to correct what DOE viewed as the major inadequacy of HRS for use at its nuclear facilities: the failure of the model to consider adequately the characteristics of radioactive substances. The mHRS was an extension of the HRS because, for nonradioactive materials, the two models produced identical results.

[4] Committee on Armed Services, U.S. House of Representatives. National Defense Authorization Act for Fiscal Year 1988/1989. Report on H.R. 1748. April 15, 1987. H.Rep.100-58, pp. 316-317.

objectives. DOE used the results from POS in developing its FY90 budget request[5].

Although POS is structurally very different from MEPAS[6], it relies almost exclusively on the MEPAS model for its input on the relative environmental threat posed by existing problems. In fact, the weighting factor assigned in the POS system to "health and safety" was 94 percent. The other two factors considered in POS -- regulatory responsiveness, and public, State and community concern -- were assigned weighting factors of only five percent and one percent, respectively.[7]

B. Problems with MEPAS

Outlined below are some of the technical and policy problems we have identified with the MEPAS model.

[5] "Priority System for Department of Energy Defense Complex Environmental Restoration Program, A Report Prepared for the House Armed Service Committee," U.S. Department of Energy (August 1988), at page 17.

[6] POS differs significantly from the MEPAS model in that it considers other factors in addition to environmental and public health risks. POS also takes into account the need to comply with regulatory and legal requirements, program costs, and public, State and community concerns.

[7] Merkhofer, L. and K. Jenni, A Program Optimization System for Aiding Defense Programs Environmental Restoration Decisions. Applications to FY90 Budgeting: Final Report, Prepared for the DOE Defense Programs Office, Hazardous Waste and Remedial Actions Division, Washington, DC. (August 8, 1988) at page 34.

1. MEPAS Cannot Distinguish Near-term Risks from Long-term Risks

A fundamental technical problem with the MEPAS model is its total inability to distinguish near-term risks from long-term risks. DOE stated in its Preliminary Summary report that its model enables the Department to address immediate problems sooner: "the earlier the contaminant can arrive and expose a population, the sooner the environmental problem should be addressed."[8] But this claim is simply not supported by the design of the model. MEPAS only produces a risk estimate at the end of a 70-year (individual lifetime) period. It does not identify risks for periods shorter than 70 years. Instead, MEPAS only tells a decisionmaker the particular 70-year period during which the risk posed by a site will be at its highest level. Thus the model is incapable of indicating which environmental problems should be addressed in the next few years compared to those that will need attention several decades from now. This is a serious defect in the model; decisionmakers need to be able to identify changes in the relative risk of sites over periods far shorter than a lifetime.

2. MEPAS Cannot Identify the Most Exposed Individual

A standard risk assessment tool is to calculate the most exposed individual (MEI) to a given hazard, in addition to

[8] U.S. Department of Energy, Preliminary Summary Report, (September 1988) at 1-15.

determining overall population risks. Using this information a decisionmaker can identify immediate responses to protect individuals at greatest risk as well as long-term needs to reduce risks to overall populations.

MEPAS, however, is incapable of calculating MEI risks. Because MEPAS calculates risk only in 70-year increments it cannot identify more specific risks. A report prepared for EPA criticized the absence of the MEI component: "the absence of exposure and risk estimates to the most exposed individual ... could cause [the model] to underestimate the hazard of a site where risk to the MEI is large but risk to the total population is small."[9] This is a serious defect in a model intended to aid in decisionmaking.

3. MEPAS Uses an Inappropriate Combination of Carcinogenic and Non-Carcinogenic Effects

Another technical problem with the MEPAS model involves its mixing of carcinogenic and non-carcinogenic effects. The scientific literature in toxicology generally concludes that there is a threshold below which non-carcinogens do not have a toxic effect, but that no such threshold for carcinogens appears to exist. For example, iodine in low doses, such as is present in table salt, is considered to be an essential nutrient, but at

[9] Industrial Economics Corporation (IEC), Analysis of Alternatives to the Superfund Hazard Ranking System Prepared for the EPA Office of Policy Analysis/Office of Policy Planning and Evaluation, Washington, D.C. (November 1988), at D-10.

a higher dose, iodine is toxic. This distinction between the dose-response relationship of carcinogens versus non-carcinogens is considered so important in risk assessment, that two distinct methods of measuring their effects have been developed. For non-carcinogens, the amount of the compound is compared to a "reference dose", usually equal to the amount necessary to cause some type of health effect. For carcinogens, on the other hand, the risk is defined in terms of a probability of a cancer-induced death from exposure to a certain contaminant (e.g., one in a million). In standard risk assessments, these two types of effects are presented separately[10].

In the MEPAS model, however, the effects of carcinogens and non-carcinogens are combined. This is accomplished by calculating a new index for non-carcinogens called a "Risk Factor" which is equal to the observed or predicted dose of a given non-carcinogen divided by the "Reference Dose" for that non-carcinogen. The Risk Factor for each non-carcinogen is then compared to the probability scale for carcinogens by setting a Risk Factor of 1 equal to a cancer risk of one in a million. A report prepared for EPA was highly critical of DOE's novel methodology: "There is no scientific basis for equating a value of 1 for this risk factor with a cancer risk of [one in a

[10] See e.g., Scofield, R. et al., ENVIRON Corporation, "Multipathway Risk Assessment Methodology Compatible with California Decision Tree and U.S. EPA Guidelines," in Proceedings of the Fifth National Conference on Hazardous Waste and Hazardous Materials (April 1988), p. 368-372.

million]; this is strictly a policy judgement."[11] This hidden policy judgement, contrasts sharply with DOE's own description of MEPAS as, "an objective, scientifically-based computer ranking system." [12]

4. MEPAS Fails to Consider Multiple Contaminants

Another serious problem with the MEPAS model is its failure to account for the additive effects of multiple contaminants at a site. The standard risk assessment methodology[13] is to add the effects of all of the non-carcinogenic contaminants at a site. For example, the potential effects of iodine are added to effects of cadmium and ammonia. Instead of adopting this standard practice, MEPAS multiplies the Risk Factor (see Section B.3. above) by the exposed population (and an exponential weighting factor) to arrive at a preliminary hazard index (PI) for each contaminant. Then MEPAS takes the highest single contaminant PI as the basis for the Hazard Potential Index (HPI), which is the final score used for ranking. Hence, in a situation where there are three contaminants at a site -- two with PI scores of 0.5 and one with a PI of 0.6 -- MEPAS would not add them to get a score of 1.6 but instead would

[11] IEC at D-10.

[12] DOE Preliminary Summary Report, September 1988, at 1-5

[13] See e.g., Environmental Protection Agency, Office of Emergency and Remedial Response, Public Health Evaluation Manual. (October 1986).

select 0.6 as the HPI. A report prepared for EPA criticized this methodology: "This approach may be problematic, since summing the PIs across substances would produce a better indicator of risk."[14] The net effect of this novel procedure is that sites with multiple contaminants are given lower scores than would be assigned using standard risk assessment practices.

5. MEPAS Is Too Data Intensive

One of the most basic and intractable technical problems with the DOE's MEPAS model is the extraordinarily detailed level of data required for its operation. As a theoretical matter, a detailed risk assessment model such as MEPAS could provide useful information for determining the appropriate ranking of environmental problems. As a practical matter, however, the type of data needed for MEPAS far exceeds the amount of data generally available. Only after a detailed investigation of a site is completed is there sufficient data for MEPAS. However, to date, DOE has completed detailed site investigations at only a handful of the more than 3000 sites where wastes have leaked or spilled. And ironically, one of the purposes DOE stated for the rankings based on MEPAS is to determine which sites will receive funding for detailed investigations.

[14] IEC Report November 1988 at D-10

Because the data requirements of the MEPAS model far exceed the level of data generally available, a large number of assumptions have to be made for its operation. In making these assumptions, DOE has relied primarily on generalized, inaccurate and/or subjective sources of information. In fact, 104 out of 138 sites ranked in DOE's Preliminary Summary Report relied on a "moderate" or "significant amount of assumptions" for "critical data." Only 34 of the sites used "monitored or measured" data.[15] For example, the amount of waste buried in landfills for which no records were kept was often established by assuming recent disposal rates. However, in many instances, historical rates of disposal were far higher than present rates. Furthermore, many of the numbers used in the model relied on no data whatsoever and were developed based only on the speculation of the Survey team members in sessions eerily called "Prioritization Decision Meetings". Additionally, in many situations generalized numbers known as "default" values, were incorporated into the model to be used whenever a site specific number was not available. The essential point is that the final prioritization ranking on which the September Preliminary Summary Report was based suggests an aura of objectivity that is simply not warranted by the process used to develop the scores.

In the Preliminary Summary Report, DOE suggested that its Sampling and Analysis program would help to fill these data

[15] DOE Preliminary Summary Report, at 2-17, 2-20, and 2-26.

gaps.[16] Yet in its own Environmental Survey Manual, DOE stated that "[t]he sampling and analysis is not intended to characterize a site's environmental problems."[17] Instead, it is only designed to "identify the presence of contaminants and the general zone of contamination associated with the environmental problems at the various sites ..."[18] This kind of information is simply inadequate to fill the needs of the MEPAS model.

In contrast with MEPAS, one of the fundamental assumptions made in developing the HRS model for the Superfund program was the limitations on the amount and quality of data available for each of the sites being ranked. In fact, "Cost and Availability of Information" was the first section in EPA's response to comments section when it published the HRS in the Federal Register in 1982. EPA noted that, "the amount of information to be collected must be balanced against the cost and time required to obtain that information" (47 Fed. Reg. 31187). DOE, however, appears to have given no real consideration to this dilemma of seeking highly accurate results using a limited amount of data.[19]

[16] DOE Preliminary Summary Report at 1-24.

[17] DOE, Office of Environmental Audit, The Environmental Survey Manual, DOE/EH-0053, Volume 1 of 4 (August 1987), at page 8-4.

[18] Id. (emphasis added).

[19] The documentation for MEPAS is actually only available for its base model, known as RAPS. This documentation also does not address this dilemma. See, Whelan, G. et al. Pacific Northwest Laboratories, The Remedial Action Priority System (RAPS): Mathematical Formulations, Prepared for DOE, DOE/RL/87-09; PNL-6200; UC-11, Richland, Washington (August 1987).

6. MEPAS is Too Complex

MEPAS is an extremely complex model. It was developed on a large, sophisticated main-frame (Digital Equipment Corporation VAX) computer. It requires hundreds of potential inputs for each environmental problem. If an error occurs during input, it is extremely difficult to track down. Some calculations in MEPAS require so much computer time during implementation that they are left overnight to process.

In contrast, the HRS model used in the Superfund Program is much easier to apply than MEPAS. It can be used quite simply by filling out a series of forms with a hand-held calculator.[20] Of course, being complicated and sophisticated is not necessarily undesirable, but in the case of a model intended to be operated on a minimal amount of input, and applied to a large number of sites, it is simply inappropriate.

7. Priorities Set By MEPAS May Conflict with Legal Obligations

A fundamental question which DOE has not squarely addressed is how the priorities set by MEPAS will be reconciled with what may be very different priorities set by state and federal regulatory agencies and courts under RCRA and CERCLA. RCRA section 3004(u) gives EPA and certain states authority to

[20] U.S. EPA, Uncontrolled Hazardous Waste Site Ranking System A Users Manual, (1984) at HW-10.

set cleanup schedules at DOE facilities. CERCLA requires EPA to establish and update a National Priority List (NPL) of sites requiring cleanup. If, for example, EPA has placed a DOE site on the NPL as a high priority cleanup, but that site is low in the MEPAS-derived ranking, will DOE attempt to resist the EPA-ordered cleanup schedule? Also, some states have ranking systems of their own for sites that do not score high enough to be listed on the NPL. These state rankings may conflict with the DOE priority scheme established using MEPAS. Another potential conflict may arise where a court has imposed a compliance or cleanup schedule under an environmental law such as RCRA or the Clean Water Act that addresses a problem that receives a low score in DOE's system.

8. DOE Has Not Clearly Acknowledged the Important Connection Between MEPAS and POS

DOE has failed to acknowledge clearly the essential nature of MEPAS in the POS model used by the Department in its budget process. One must dig very deeply into the POS report[21] to find even a brief mention of the output of MEPAS -the Hazard Potential Index (HPI) - to draw the connection between the two. And even though the MEPAS model results were published in September and released in December 1988, there is no mention of its connection to the POS system, which was released in August

[21] DOE Report to the House Armed Services Committee (August 1988) at p. 6.

1988. DOE's failure to acknowledge clearly the essential link between the two models is especially troubling in light of the serious flaws we have identified with MEPAS.

9. MEPAS Has Never Been Subject to Formal Public Comment

DOE might have avoided many of the problems with MEPAS had it solicited public comment on the model as well as its results. Unfortunately, the same closed-door mentality that has characterized DOE's operations for years prevailed in the case of MEPAS. There was not a single opportunity for interested agencies, private organizations or citizens to comment on this multi-million dollar ranking model and its critical results.

In contrast, EPA published the entire Hazard Ranking System in the Federal Register and solicited public comment.[22] EPA also routinely publishes for comment its proposed National Priority List sites, which are the product of HRS.

The Department of Defense also released for public comment its own priority-setting model called the Defense Priority Model (DPM).[23] EPA, as well as other agencies and individuals filed comments on DPM to which DOD is now responding.[24]

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[22] 47 Fed. Reg. 10972 (July 16, 1982).

[23] 52 Fed. Reg. 44202 (November 18, 1987). It should be noted that unlike MEPAS the DOD's Defense Priority Model is used in conjunction with EPA's HRS model.

[24] See e.g., Letter from J. Winston Porter, EPA, to William H. Parker III, DOD, August 11, 1988.

C. Congressional Response to the Problems with MEPAS

The MEPAS model, as we have shown, is seriously flawed. As a result, MEPAS should not be used in its present form for establishing cleanup priorities, including the revised rankings DOE is expected to release this year in the Environmental Survey Summary Report. MEPAS should also not be used, as presently constituted, as an input to POS for setting future budget priorities.

Congress should take a number of steps to address the problems with MEPAS. First, Congress should instruct DOE to suspend use of MEPAS for prioritization and budget activities pending resolution of problems with the model. Because DOE's current budget request is primarily for investigation rather than cleanups, the problems with MEPAS should not significantly affect the FY90 budget process for environmental restoration activities.

Second, Congress should direct DOE to subject MEPAS to review by an independent panel. The panel should solicit formal public comment on MEPAS as part of its proceedings. The panel should determine whether there is value in the MEPAS approach and whether the model is salvageable. If the panel makes a positive determination on both of these issues, it should recommend necessary modifications to MEPAS.

Third, if DOE adopts a modified ranking model reflecting the panel's recommendations, it should be required to subject the results to formal public review and comment. This would be

asking nothing more of DOE than what DOD and EPA already undergo in their priority-setting systems.

Finally, to address the larger concerns about DOE's management of its environmental problems, the Committee should report out favorably H.R. 765, which was recently introduced by Mr. Dingell (D-MI) with 25 cosponsors. The bill would establish a special temporary Commission to review and make recommendations about contamination and cleanup of DOE facilities. The Commission could, among other things, review MEPAS as recommended above. In fact, one of the Commission's responsibilities under H.R. 765 is to "recommend a process for setting National priorities for environmental remediation activities".[25]

CONCLUSION

There are serious flaws with DOE's process for establishing environmental cleanup priorities at its nuclear weapons facilities. These problems demand careful analysis in an open, public process if meaningful improvements are to be made. We stand ready to assist DOE and Congress with this important task so that cleanup can move forward on a sound footing.

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[25] H.R. 765, Section 3(b)2.

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September 14, 1990

David Bradley
Department of Ecology
Toxics Cleanup Program
Mail Stop PV-11
Olympia WA 98504-8711

Dear Mr. Bradley:

Enclosed please find HEAL's written comments on the draft toxics rule.

If you have any questions, please do not hesitate to call us.

Sincerely,

Lynne Stembridge

Lynne Stembridge
Executive Director

South 325 Oak Street, Spokane, Washington 99204 • (509) 624-7256

HEAL
Hanford Education
Action League

SUBJECT: COMMENTS ON MODEL TOXICS CONTROL ACT PHASE II RULEMAKING

FORMAT--To identify the section, subsection or paragraph in the proposed rules--including existing Phase I rules already promulgated--for which a specific comment applies, the comment will be preceded with the appropriate section, subsection, etc. number, for example, 120 (2) (b). The common chapter designator in the Washington Administrative Code (WAC), WAC 173-340 for the Model Toxics Control Act Cleanup Regulation, will be omitted for purposes of brevity. The draft to which the comments apply is the July 18, 1990 draft of this chapter.

Comments on the Draft Environmental Impact Statement are listed under that respective heading. Applicable sections or text are identified with each comment.

DRAFT ENVIRONMENTAL IMPACT STATEMENT -

1. Per Appendix H the ground water modeling of the MEPAS code used by the Department of Ecology (DOE) does not appear to provide for distribution in discrete pathways, for example, fracture zones and buried ancestral stream beds of high conductivity, now covered by deposited soils. Such features in the geology at Hanford provide the most rapid transit times for the groundwater in the unconfined aquifer from contaminated zones to the river and are appropriate to consider in evaluating effects of spreading contamination and its concentration. This mode of ground water distribution is of most importance at Hanford in transport of water from waste disposal areas to the river and areas of the hospitable environment.

2. Per Appendix H it is indicated that the MEPAS code allows evaluation of the dose via any possible pathway, and DOE indicates it is satisfactory for evaluating the relative impact of various alternatives of cleanup standards. However, DOE indicates that the intent of the impact statement is also to determine the effects on natural resources. Considering the fact that terrestrial and aquatic plants and animals are considered natural resources, any methodology selected to evaluate impacts should be able to consider these parts of the natural resource. Therefore the conclusion that human health effects are sufficient to determine the relative impacts of various cleanup standards is invalid. In many cases flora and fauna may be grossly affected, for example, in salt water ecosystems, and human health would not be effected. In desert ecosystems, the same might be true. Drinking water in both cases may not be a pathway of importance in determining effects on humans.

Regarding the stated capabilities of MEPAS in Table H-1, Modifications to the MEPAS code should be made to allow

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evaluation of the relative effects on terrestrial and aquatic plants and animals as well as human populations. For example, modeling should provide for the evaluation of atmospheric deposition on terrestrial animals as well as terrestrial plants. Likewise groundwater drinking and ingestion/inhalation interactions should consider effects on terrestrial animals, including birds. Bioaccumulation in the terrestrial predator animal chain should be considered and should take into account the ingestion of aquatic animals. (The effect of DDT on predator birds is a classical example of why such a mechanism should be considered.)

3. Risk based effects on populations of flora and fauna species should be established by DOE and used in establishing cleanup actions for each site considered. For example, an appropriate statement of risk might be as follows:

> "Cleanup of hazardous substances shall with 95% confidence be such as to assure no greater than either a 5% increase or decrease in the 10-year average population measured in appropriate units -- individuals per unit area or volume-- for any given species native to the site being considered over a period of 10 generations of the species or 10 years whichever is greater."

Using such a design base for cleanup, the impact statement should consider indicator or limiting species impact. Without it the Statement is incomplete. The fact that good models are not available to assess individual species effects from specific contaminants is not a valid reason for ignoring this issue. Estimates of effects on species from experts in the evaluation of ecological contaminants should be used in the impact assessments.

And even though effects on species of various hazardous substances may not be readily apparent, it is important to establish design bases for specifying what is acceptable and what is not acceptable. As the technical capability develops for assessing species by species risks, the pertinent acceptance standards will be available for determining the acceptability of future cleanup actions.

4. In reviewing the subject Draft Environmental Impact Statement, it is difficult from the definition of "hazardous substance" to ascertain that radio nuclide toxicity is included within the scope of this term.

The Statement should make it clear that the rule and the Impact Statement cover the consideration of cleanup of toxic radio nuclides. To this end specific site scenarios (Appendix H) and remedial technologies (Appendix I) should be modified to incorporate items that address radio nuclides. For example, a site at Hanford should be considered together with the remedial technology applicable.

5. The term "threat to the public health or the environment" is used in the DOE's Final Cleanup Policy, dated July 10, 1984, (Appendix E of the Impact Statement). The term "threats to human health and environment" is used in the Model Toxics Control Act under declaration of policy. The definition of these terms may be consistent or may not.

The definitions should be incorporated into the definitions of Chapter 173-340 WAC and utilized appropriately in the Impact Statement. In this regard it is recommended that risk-based quantitative definitions be incorporated into the Chapter to quantify unacceptable "threats". As noted above, risk-based definitions that apply to the various components of the environment, including species, are necessary to clarify the action required by the Chapter.

6. The Technical Summary discusses the definition of "applicable or relevant and appropriate requirements." This section does not directly address the relevant laws in other states. The impact statement should include a review of laws in other states and provide evidence that the standards being proposed are at least as stringent as the "applicable" laws in other states. In this regard the term "applicable" appears to reflect its synonymous meaning "relevant" for purposes of Washington State rules under Chapter 173-340 WAC.

It is obvious that the actual laws in other states do not "legally apply" to the State of Washington. DOE's adopted wording "legally applicable" in the definitions and usage section of 173-340 WAC is unfounded. Relevancy is the key determining factor in deciding the use of cleanup standards specified by laws (and hence state rules) in other states.

Had it been intended by MTCA that the definition proposed by DOE be consistent with that in the National Contingency Plan, such definition would have been incorporated into MTCA.

Thus, the proposed definition of "applicable state and federal laws" incorrectly and/or ambiguously delimits consideration of any other state's law or requirement through the use of "and" instead of the word "or". As indicated above there are no "legally applicable" laws for residents of Washington in other states's statutes. The following words are suggested to correct this ambiguity:

> "Applicable state and federal laws" as used in context of the specification of cleanup standards means all relevant current laws and corresponding implementation rules and requirements, any of which reasonably could apply to sites in Washington, promulgated by any federal or state authority or state citizenry."

The additional definitions of "legally applicable requirement"

and "relevant and appropriate requirements" in the Draft rules should also be modified to reflect this comment insofar as these definitions may apply to cleanup standards. In this regard, elimination of theses terms from the rule would seem appropriate since they appear to be nearly the same in their meaning as the term "applicable state and federal laws" discussed above.

It is poor rule making to use various similar terms to connote the same meaning. In addition, if slightly different meanings for terms used in the rule are necessary for some reason, the terms selected should be defined so that the intended distinction is obvious. Such has not been accomplished in the proposed rule and this results in confusion and ambiguity.

COMMENTS ON PROPOSED RULE--

1. 200 DEFINITIONS--

a. See comments in the section concerning the Environmental Impact Statement for comments on the following terms:

"Applicable state and federal laws"
"Legally applicable requirement"
"Threats to human health and environment" (proposed addition)
"Hazardous substance."
"Relevant and appropriate requirements"

b. The terms "acute toxicity" and "chronic toxicity" make use of the undefined term "injury" to specify the scope of the two terms. Since acute and chronic toxicity may not be generally interpreted to include allergic health effects from low-level contaminants in a small segment of the society, allergic reactions should be specifically considered in the definitions since the common definition of injury includes items detrimental to comfort as well as health. (The issue is raised in light of the fact that some health authorities and practitioners do not consider allergic reactions the result of acute or chronic toxicity, since such reactions tend to be confined to a limited number of individuals of a given species with no effect in other individuals.)

Also the term "short term" is used to define the maximum time of exposure to a hazardous substance associated with "acute toxicity". Instead of using "short term" the period of 72 hours should be specified. This is generally a conservative specification of short term in toxicity studies and is consistent with OSHA usage in requirements for worker safety.

Correspondingly the term "chronic toxicity" should specify a total exposure time in excess of 72 hours.

c. The term "containment" is defined in a manner inconsistent with the common understanding of the word, in that the proposed definition allows for slow release--hindered release--by structures. Thus, clay, which is slowly permeable to water and contaminants might be considered a suitable material for a container. To make the term consistent with usage in other environmental rules, for example, rules for high-level radioactive waste disposal in 10 CFR 60, the definition should be modified to specifically refer to structures that achieve the confinement of hazardous substances within a defined boundary and prevent the release to the environment.

d. The term "carcinogen" is defined in a very restrictive and non-conservative manner and is inconsistent with goals and conclusions of the Federal Cancer Policy, initiated by OSHA in 1977. The definition used in this policy is as follows:

> "A substance or condition which increases the incidence of generally irreversible benign or malignant tumors, reduces the latency period, or produces unusual tumors in animals or man."

This definition should be used in place of the current definition since it conservatively identifies a carcinogen.

e. The term "carcinogenic potency factor" or "CPF" should be separated from the definition of "carcinogen". In addition the definition for "CPF" does not make sense. The 95th percentile confidence limit of the slope of the dose-response curve is incorrect terminology. In addition "the dose-response curve" is ambiguous. An accurate definition should be included.

A definition of how the CPF is used may be more informative. A sample dose-response curve pertinent to the development of a benign or malignant tumor or reduction in latency period for same should be given as an example with the instruction as to how to determine the appropriate dose in terms of mg hazardous substance exposure per kg of body weight per day of exposure. This dose could vary depending on the number of individual animals tested, if a standard statistical design base is specified, for example, less than a 5% response at the 95% confidence level.

f. The terms "ground water" and "surface water" appear to exclude water in the vadose zone or unsaturated soil of the earth, generally found above saturated zones. It is recommended that the term "ground water" be expanded to explicitly include the water in the vadose zones of soils and stratum.

g. The term "highest beneficial use" ambiguously includes as part of its definition an example which highlights the use of drinking water as an indicator of highest beneficial since it "will generally provide protection for a great variety of other existing and future beneficial uses of ground water." The example, as it is written indicates that drinking water quality may not be the limiting determining factor for <u>all</u> current and future beneficial uses, only a "great variety."

The example of drinking water should be deleted. It is not necessary to modify the first clause in the definition. It only acts to create an ambiguity.

h. The term "risk" as part of the definition includes the idea of a probability that a hazardous substance causes an adverse effect. However, an important and useful parameter, confidence, is necessary to further illuminate any particular statement of risk by addressing its validity and thereby give practical meaning to such statements.

Hence, the definition of "risk" should be modified to refer to a confidence statement. An appropriate standard specification for confidence for risk assessments would be 95 percent.

The following is a brief discussion of factors to be considered in quantitatively specifying risk that should be considered in redrafting the definition.

> What constitutes proper quantification? First one must have an estimate of a probability of a postulated event (risk), generally with respect to passage of time. Second one must have an estimate of the confidence of that probability or risk. This latter estimate is a quantitative statement as to the validity of the analyses used to make the risk estimate. Without the confidence statement a risk estimate is not meaningful. And finally, the estimates must be made within the rigors of a quality assurance system applicable to design activities, including research and development.
>
> In risk analyses a confidence statement should be estimated to take account of both the known and uncontrolled effects anticipated in a scenario, as well as the unknown or vaguely known effects. Such estimates, when combined, would serve as a confidence statement for the stated risk.
>
> However, risk analyses commonly utilize mathematical models of the scenario in question, with random selection of independent variables defined for the respective models, to accomplish "thought experiments" producing statistical data. Such data do not allow for determining a confidence statement since re-doing the analyses for any given scenario will produce the same estimate of risk. The results of such "thought experiments" do not reveal uncertainties in the models themselves. And the validity of the models to represent the scenario in question remains unaddressed.
>
> Typically it takes independent peer reviews to estimate and/or confirm, quantitatively, the uncertainty associated with models used in risk assessments. Conceptually, the "thought experiments" making up the risk analyses should include runs which incorporate bias or uncertainty factors applicable to a model's dependent performance parameters determined by such reviews.

i. The definition for "Subchronic reference dose" includes the parenthetical phrase "(with an uncertainty of an order of magnitude or more)". This confuses the meaning since if would seem some reference doses might not have such large uncertainties. Other ambiguities related to the words "appreciable risk" and "a portion of a lifetime" also confuse and/or leave the definition ambiguous. It is recommended that the definition include the following wording:

> "Subchronic reference dose means an estimate of a daily exposure level for the human population, including sensitive subgroups, that is likely to be without a risk greater than 1/1,000,000 at a confidence of 95% of adverse effects during an exposure of 72 hours or greater."

j. The terms "beneficial use", "in the public interest" and "appreciable risk" should be defined since they are key terms in deciding upon actions required by the rule. Appreciable risk should be defined as 1/1,000,000 at 95 % confidence or greater. Beneficial use should include uses that depend upon the ecological integrity of a site as a natural preserve. In the public interest should be consistent with the definition of "beneficial use" and consistent with the intent of MTCA to achieve cleanup to specified standards.

k. The term "reasonable maximum exposure" is defined in a non scientific manner, making use of the word "reasonable". This qualitative expression should be quantified consistent with establishing risk relative to quantitative risk standards. It is unacceptable to allow key aspects of the risk analysis to remain qualitatively stated. Thus, a probability defining reasonable, for example, 99% probability with 95% confidence that maximum exposure will not exceed the expected amount over a 100 year period considering conditions 500 years in the future, should be incorporated into the definition. It is noted that a time frame is warranted to specify for analysts a tractable problem and to standardize the exposure time to be considered for old people.

It should be noted that old people as their livers degrade and become less functional are increasingly vulnerable to health effects and cancer caused by toxins. Therefore, long exposure times are reasonable to consider. In addition it is necessary to correct dose/response data to account for the age and liver/kidney function of individuals. The long time frame for consideration of exposure will assure this phenomena shall be considered in determining a hazard index for individuals.

2. 360 (4)--This section should be modified to recognize other relevant state laws, consistent with comment 6 under Draft Environmental Impact Statement.

3. 360 (7)--This subsection concerning practicability should consider costs associated with loss of future beneficial uses. Intangible benefits, for example nature preserves, should be assigned a worth to allow such evaluation. Such "lost beneficial usage" costs should subtract from costs associated with cleanup actions in evaluation required by item (c).

4. 600--Rules for obtaining public input are extensive specified in this section, however, rules applying to DOE for rational, fair resolution of public input are left out. Such rules for operation of DOE should be included in 173-340 WAC. They should include requirements to propose resolution to comments within a specified time and to publish the resolutions. In addition, resolution of comments should provide for appeal and in the case of citizen advisory groups, should require concurrence.

Where comment resolution of public input is not resolved to the satisfaction of the commentator, an appeal mechanism should be specified to provide for further review and adjudication of comments.

5. 700 (5) (d) (iv) (A)--The comment in item 3 above regarding lost beneficial usage costs should be considered in this paragraph.

6. 700 (4) (a)--The text concerning "reasonable maximum exposure should be revised to reflect the discussion under item 1. k. above.

7. 705 (3)--The frequency specified for review and update of the rule is excessive. Many changes to applicable state and federal laws may occur within a five year period. An annual review should be specified with at least annual updates of the rule accomplished as necessary to be consistent with the RCW 70.105D.030 (2) (d). It is unreasonable to allow a 5 year delay in accomplishing protection of human health and the environment. Procedures for publishing the updated standards should be specified in 173-340-705.

8. 720 (1) (a) (ii)--The criteria for determination of potential future use of ground water are inadequate. Consideration of technological advancement in the capability to remove organic or specific inorganic constituents should be included in the analysis.

Drinking water for farm or domestic animals is a use that should be considered routinely and thus should be specified rather than left to the determination of DOE on a case basis. For example, the accumulation of hazardous substances in milk of cows and goats should be considered.

The second sentence of paragraph (a) is unnecessary. It inappropiately suggests consideration of drinking water as the highest beneficial use in most cases. Such a suggestion adds nothing to the rule.

9. 800--A provision should be included in the facility access rules to allow and facilitate discussion with facility owners and there employees. In addition the rules should prohibit facility owners or their agents or other employees from advising any person not to communicate with State employees or their agents regarding health and environmental hazards. Rules should be included against withholding information by any person pertinent to a State investigation.

Puyallup Tribe of Indians

September 25, 1990

RECEIVED
SEP 28 1990
ECOLOGY

Mr. Dave Bradley
Toxics Cleanup Program
Department of Ecology
Mail Stop PV-11
Olympia, Washington 98504-8711

Re: Comments of the Puyallup Tribe of Indians on the DOE's Draft EIS Cleanup Standards

Dear Mr. Bradley:

Enclosed are the comments of the Puyallup Tribe of Indians on the Department of Ecology's draft EIS Cleanup Standards. Thank you for the opportunity to comment on the proposed cleanup standards. The Puyallup Tribe wishes to acknowledge DOE's efforts to develop working relationships with our Tribe on a government-to-government basis.

Ecology's proposed regulations are a matter of great concern to our Tribe. The recently approved Land Settlement Act envisions a permanent homeland for the Puyallup Tribe.

Indian Reservations are unique and, for all practical purposes, they are not being made anymore. The Puyallup Reservation provides the homeland for the Puyallup Tribe. Damage to, or destruction of, the Reservation environment is a critical threat to the Tribe. Tribal members do not have the same flexibility in packing up and moving away from their homeland as do many other United States citizens. Tribal members have cultural, spiritual ties to the land, air and water that forms their homeland.

The Puyallup Tribe is concerned that the proposed cleanup standards may not be adequate to protect Tribal resources. This matter is especially important to the Puyallup Tribe because many of the hazardous waste cleanups are located in the Commencement Bay Tideflats and nearshore environment. Many of these sites are within the 1873 boundary of the Puyallup Reservation. These sites will need to conform to Ecology's regulations.

Based on my preliminary review of Ecology's cleanup standards, I have noted the following concerns:

* TREATY RIGHTS: There is neither recognition nor protection of Tribal treaty resources;

* PROTECTION: The cleanup levels may not be adequate to protect Tribal interests. Ecology's application of the risk-based method at the General Metals facility resulted in recommended PCB soil clean up levels in excess of 21 parts per million;

* STANDARDS: Ecology has proposed the establishment of clean up levels at the "practical quantitation limit". This level of control may be substantially more relaxed than accepted detection limits. Proposed WAC section 173-340-705(12)(b);

* TRIBAL DIET: The risk assessment clean up based methodology utilizes fish comsumption rates that may not accurately reflect the diet of Tribal members. Proposed WAC 173-340-730(3); and

* ECONOMICS: Cost considerations are established throughout Ecology's proposed regulations and may result in clean ups less protective of human health and the environment than would otherwise be allowed.

In light of the above, the Puyallup Tribe has serious concerns about whether Ecology's proposed cleanup standards will adequately provide for effective remediation in Commencement Bay. The Puyallup Tribe respectively requests that Ecology take our comments into considerat when finalizing their cleanup standards. If you have any questions, please don't hesitate to contact me at (206) 597-6200, ext 387.

Thank you for your consideration.

Bill Sullivan

Bill Sullivan, Director
Environmental Program Puyallup Tribe

BS/klk

cc: Tribal Council
Richard DuBey

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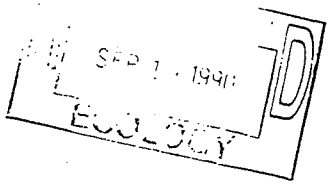
DANIEL D. SYRDAL
PARTNER

September 18, 1990



David Bradley
Department of Ecology
Toxic Cleanup Program
Mail Stop PV-11
Olympia, Washington 98504-8711

Dear Mr. Bradley:

Enclosed please find the hard copy of our comments on the proposed cleanup standard regulations and the DEIS. As you know, we faxed you copies yesterday.

Also enclosed please find additional enclosures which were too lengthy to fax, but which are particularly relevant to your consideration of the proposed cleanup standard regulations. I would particularly direct your attention to pages 3 and 13-26, which take positions with which we certainly agree.

Thank you for your consideration of these matters.

Very truly yours,

HELLER, EHRMAN, WHITE & McAULIFFE

Daniel D. Syrdal

Enclosures

COMMENTS ON DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR CLEANUP STANDARDS

We believe that the DEIS is inadequate in that it does not carry out the requirements of the State Environmental Policy Act ("SEPA"), chapter 43.21C RCW, in several crucial areas. Its most significant general deficiency is its failure to confine itself to analyzing the environmental impacts of the proposed regulations. Instead, the bulk of the document, especially Chapters 1 -4 and 14, is devoted to justifying the policy decisions made by the Department of Ecology ("Ecology") in drafting the preferred alternative.

The most glaring indication of this failure is the use of a "Regulatory Evaluation of the Alternatives" at pages xiii - xiiii (sic) and in Chapter 14. Although WAC 197-11-440(8) allows the lead agency to include a discussion of other impacts relevant to the agency's decision, the SEPA regulations make it clear that such a discussion should not be the major focus of an EIS. WAC 197-11-448(1) states:

> SEPA contemplates that the general welfare, social, economic, and other requirements and essential considerations of state policy will be taken into account in weighing and balancing alternatives and in making final decisions. However, the environmental impact statement is not required to evaluate and document all of the possible effects and considerations of a decision or to contain the balancing judgments that must ultimately be made by the decisionmakers. Rather, an environmental impact statement analyzes environmental impacts and must be used by agency decisionmakers, along with other relevant considerations or documents, in making final decisions on a proposal. The EIS provides a basis upon which the responsible agency and officials can make the balancing judgment mandated by SEPA, because it provides information on the environmental costs and impacts.

(emphasis in original). This DEIS does not adequately separate Ecology's policy agenda from the environmental consequences of the proposed action, and by doing so presents confusing and biased information about the environmental impacts of the alternatives. Ecology's program goals should be clearly separated from the environmental analysis, so that an objective evaluation of environmental impacts is presented.

The DEIS also fails to comply with the requirements of SEPA in several specific respects. It does not analyze all reasonable alternatives available to Ecology. Secondly, the alternatives that are presented are not adequately analyzed. In addition, the

document does not identify the significant adverse impacts of the alternatives that cannot be mitigated.

Alternatives Presented

WAC 173-11-440 requires an EIS to analyze reasonable alternatives. Reasonable alternatives "shall include actions that could feasibly attain or approximate a proposal's objectives, but at a lower environmental cost or decreased level of environmental degradation". Chapter 3 of the DEIS discusses "significant issues" and "options" that are in fact reasonable, feasible alternatives to the preferred alternative. For example, the DEIS states at page 3-2 that "[t]he acceptable level of protection is the essential policy question for site cleanups . . .". It then goes on to assume that the acceptable level of risk is 1 x 10-5. Yet it also identifies at page 4-16 other jurisdictions which have adopted other acceptable risk levels for cleanup standards. In fact, the federal government has adopted a range of 10^{-4} to 10^{-6} for federal Superfund sites. Obviously, then, there are other levels are reasonable and feasible. The environmental impacts for each risk level would be significantly different and an analysis of these differences is essential for a decisionmaker in adopting cleanup standards. Yet the DEIS does not present or analyze these levels as alternatives for consideration.

Alternatives Analysis

The DEIS assumes at page 6-3 that the measure of the impacts of the alternatives "is how much higher the levels of residual contamination are than the natural concentration levels of the hazardous substances". This assumption is a fundamental flaw in the analysis of environmental impacts. RCW 43.21C.030(c) calls for the preparation of a detailed statement of the "environmental impact of the proposed action" (emphasis added). The proposed action here is to adopt regulations for standards to clean up sites that are already contaminated. It is not an action to decide whether to contaminate pristine areas. Consequently, the DEIS should analyze and measure the impacts of the alternative standards by comparing levels of residual contamination with levels already existing on contaminated sites, as well as potential impacts of the remedial actions necessary to comply with the standards. Such a comparison would result in significantly different information than that contained in the DEIS and would allow decisionmakers and the public to see a more realistic comparison of the alternatives.

The DEIS also appears to endorse a procedure whereby further environmental analysis takes place after a decision on cleanup standards are made. The DEIS states at page 6-6:

> Because the standards and the preferred alternative are presently in draft form, a qualitative assessment was considered appropriate. Once the regulations are finalized, following public comment and internal review, additional quantitative assessments of impacts will be included in the final EIS.

This procedure, if followed, would directly contravene the major purpose of SEPA, which is to provide decisionmakers with information about the environmental consequences of their actions before a decision is made. See, e.g., Juanita Bay Valley Community Association v. City of Kirkland, 9 Wn.2d 59, 73, 510 P.2d 1140, 1149 (1973). If the information to prepare a more quantitative analysis of the alternatives is available, it must be done now so that it is available to decisionmakers and the public before the regulations are "finalized".

In addition, the DEIS does a poor job of describing mitigation measures, and contains virtually no discussion of the unavoidable adverse impacts of each alternative. The "Technical Summary" states at page xii only that the action "will generally result in some unavoidable adverse impacts", and Chapter 13 does not even have a section on unavoidable adverse impacts. This is not compliance with WAC 197-11-440(6)(c)(v).

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September 14, 1990

Ms. Carol Fleskes
Program Manager and
Responsible Official
Toxics Cleanup Program
Washington State Department of Ecology
Mail Stop PV-11
Olympia, Washington 98504-8711

BY FAX

Re: Request for Extension for Comments

Dear Ms. Fleskes:

We have been active participants in the development of the Model Toxics Control Act Regulations on behalf of the Public Private Cleanup Coalition, a group of major public and private entities in Washington State.

The Coalition's goals and objectives, which have been plainly stated at meetings and in formal testimony in your rulemaking record, focus on achieving prompt, fair and effective cleanups under the Act. From the outset, we have been convinced that there is considerable common ground among various interests, including business, environmental, and governmental, for these goals and for workable procedures to achieve these goals. There have been real successes.

Two years of hard work by a broad range of interests resulted in a general consensus on rules for the cleanup process. Although there were many difficult issues, much common ground was able to be found. We recognize that differences may be more pronounced on the specifics of cleanup standards than on the process of planning and approving cleanup actions. Nonetheless, it is essential that the state's cleanup standards at least be understandable and usable and that as much willingness to try the fundamental approach be reached as is possible. If not, as Director Gregoire recently pointed out, the rule will fail because it will both discourage parties from coming forward to initiate cleanups and discourage citizens from informed participation in the process.

As you may know from our comments in the advisory process and our formal testimony in Spokane, it appears, assuming we understand it accurately, that the basic structure of the proposed cleanup standard rule makes sense. As drafted, however, a number of provisions are not readily understandable or workable. We are trying to work with various interests in finding common ground on key comments and on proposing specific language to Ecology. We are very concerned about proposing revisions and polarizing different groups' positions until we have had more of an opportunity to consult with each other. Key participants will be unavailable over the next two weeks. Consequently, we are requesting an extension for our comments on the rule and associated documents until October 5.

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We realize the September 17 deadline is not the end of the rulemaking process. We appreciate Dave Bradley's commitment for Ecology staff to consult and work with us after September 17 on the text of the rule. For this reason, we have limited our request to the earliest time we could provide the kind of written comments we hope could provide a constructive basis for improving key parts of the proposed rule. Please do not hesitate to call if you have any questions regarding this request.

We do not make this request lightly, but we also realize if an extension will increase the chances of consensus on some important issues, it will have been well worthwhile. We have taken the initiative to consult with members of the environmental community who have been active in the rulemaking process, and they do not object to this request. Too much has been accomplished to see the progress to date jeopardized.

Very truly yours,

PRESTON THORGRIMSON
SHIDLER GATES & ELLIS

Kenneth S. Weiner

cc: Christine Gregoire
Pete Kmet
Dave Bradley
Elena Guilfoil

KSW7235

STATE OF WASHINGTON

DEPARTMENT OF ECOLOGY

Mail Stop PV-11 • Olympia, Washington 98504-8711 • (206) 459-6000

September 19, 1990

Mr. Kenneth S. Weiner
Preston, Thorgrimson, Shidler,
Gates and Ellis
5400 Columbia Center
701 Fifth Avenue
Seattle, WA 98104-7078

Dear Mr. Weiner:

The purpose of this letter is to acknowledge your request for additional time to submit comments on the proposed amendments to the Model Toxics Control Act Cleanup Regulation. Although the official comment period closed September 17, the Toxics Cleanup Program will accept your comments no later than October 5, 1990. Under our current rulemaking schedule, it will be extremely difficult to address comments received after that date.

This approval is based on our understanding that you intend to utilize the additional time to meet with representatives from various interest groups to prepare specific comments or proposed language revisions. We expect that these will be far more detailed than the general concerns you have raised during the official public comment period.

Although granting this time extension complicates Ecology's efforts to finalize the proposed amendments by the end of this year, we appreciate your efforts to improve and/or clarify portions of the proposed rule. If you have additional questions, please contact Dave Bradley at (206) 438-3026.

Sincerely,

Carol L. Fleskes, Manager
Toxics Cleanup Program

CLP:df

cc: Christine Gregoire
Pete Kmet
Dave Bradley
Elena Guilfoil

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October 5, 1990

Ms. Carol Fleskes
Toxics Cleanup Program Manager
Department of Ecology
Mail Stop PV-11
Olympia, Washington 98504-8711

BY FAX

Subject: Comments on Model Toxics Control Act
Cleanup Standards Proposed Rule

Dear Ms. Fleskes:

We appreciate your telephone message and letter extending the comment period for the comments of the Public Private Cleanup Coalition, a group of several major public bodies and private companies who are committed to the effective implementation of the state cleanup program. We especially acknowledge your encouragement for us to seek a consensus approach by October 5 on some key concepts and specific revisions to the proposed Model Toxics Control Act Cleanup Standards Rule.

We have been doing this since the rule was proposed, working informally with members of the environmental, business, local government and technical communities, including drafters of Initiative 97 and members of Ecology's Cleanup Process and Cleanup Standards Workgroups. We have spent a lot of time and energy to put together specific revisions within this timeframe and without undercutting other comments by these groups.

The bottom line of our comments is: *everyone who uses the rules needs to understand the basic gist of how Ecology will set cleanup standards and select remedies*, even if they do not need to be experts in the inevitably more complicated, technical portions of the rule. We have not found a single person who has read Section 700 as currently drafted, for example, who will say it meets this test. We seriously wonder if the Director or the Ecological Commission members have tried.

All interests agree on this fundamental point, one repeated in every public hearing you held and in the written comments you received from every constituency. If the most basic concepts in the cleanup cannot be read or understood by the people who must use the rules – citizens and news media, environmental professionals, staff and lawyers in your agency, decisionmakers in the companies and public agencies you expect to perform and pay for cleanups, not to mention the judges who are required to approve every cleanup – the rules will:

- discourage effective cleanups from being proposed and carried out.
- discourage informed citizen participation in the cleanup process, one of the basic tenets of Initiative 97.
- reverse the cooperative approach of the cleanup process rule by forcing Ecology to pursue most cleanups by enforcement and litigation, which will waste taxpayer and private dollars and throw the law back into a controversial legislative arena.

We do not want that, and we don't think the public, members of the Legislature, Governor Gardner, Director Gregoire and Ecology staff do either. For better or worse, the problem needs to be addressed in the adoption of the final cleanup standards rule itself. The rule, not possible future guidance policies or handbooks, is the law and the document that defines the cleanup process.

We are pleased to be able to propose relatively limited but crucial revisions in the proposed rule. Representatives from a variety of interests believe these revisions will improve and strengthen the rule. Naturally it would be desirable to meet with you and various other commenters to discuss the revisions and refine the text further as necessary. Without these kinds of changes, however, we believe the cleanup standards rule will directly undermine the goals of the Model Toxics Control Act and the consensus cleanup process rule adopted earlier this year.

As typified by the cleanup standards themselves, there are few guarantees and many risks in life. No one can say whether the methods and levels set out in the proposed cleanup standards will in fact avoid these problems.

We can say that, with the revisions we have proposed and with a concerted effort by Ecology o address remaining inconsistencies and comments on methodologies, a diverse and substantial rt of the community is willing to acknowledge Ecology's hard work and tough policy calls and y to use these cleanup standards with an open mind before reaching conclusions on whether ey are really working. This would be a significant step on so divisive an issue.

UNDAMENTAL PROBLEMS ADDRESSED BY THE REVISIONS

Lack of a Basic Rule on the Standard Setting Process

e proposed rules do not provide a cogent explanation of how cleanup levels are set. The two gical sections, 700 (General Procedures) and 705 (General Principles) are almost entirely devoted detailed provisions on how to conduct risk assessments. Some people's eyes might not glaze r, but not many. These provisions are important, but, like the cleanup process rule, the ovisions belong *after* the user knows how they fit into the basic system for setting the standards.

ution. Insert a page which provides an overview on how the standard setting process works, ilar to WAC 173-340-120 on the cleanup process. Specific text is attached as revised WAC 3-340-700 - OVERVIEW OF CLEANUP STANDARDS. The reasons for some of the sections in this overview should be apparent from the specific concerns in our testimony in the ome public hearing and from comment letters as diverse as those from the Association of shington Business and the Washington Environmental Council.

mbine all of the subsections of Sections 700 and 705 dealing with risk assessment assumptions procedures into a single Section 709, after the sections explaining the basic structure and three hods, since these procedures are mainly used in applying Methods B and C.

would be glad to elaborate orally or in writing at your request.

2. Lack of a Basic Rule on How to Carry Out the Standard Setting Process

The proposed rules do not provide any basic direction on key issues required for the cleanup standards and process to be implemented as intended by the statute, the existing rule, and the briefings from Ecology staff at public meetings and hearings. As noted above, the two logical sections, 700 (General Procedures) and 705 (General Principles) are almost entirely devoted to detailed provisions on how to conduct risk assessments.

Furthermore, the purpose statement in subsection 700(1) refers to explaining how the process of setting cleanup standards relates to the selection of cleanup actions, but the section is essentially void of any such explanations. This is crucial because, as discussed below, one of the fundamental problems with the proposed rule is its persistent confusion of these two central concepts. We should emphasize that we agree with Ecology that these concepts are different and should be kept relatively distinct, even though they need to work in tandem to develop and approve cleanup action plans. This is an area where the proposed rule could be better than federal superfund if the internal inconsistencies in the proposed rule are eliminated.

We have therefore urged, along with commenters from every interest, that the administrative principles are needed to address the most common concerns – ones where there is in fact quite a broad level of consensus.

Solution. Insert a page which provides administrative principles, similar to WAC 173-340-130 on the cleanup process. Specific text is attached as revised WAC 173-340-702 - ADMINISTRATIVE PRINCIPLES FOR CLEANUP STANDARDS. As noted above, the reasons for the subsections should be apparent from the specific concerns we have previously stated and from comment letters as diverse as those from the Association of Washington Business and the Washington Environmental Council. The revised national contingency plan also recognizes the value of articulating key implementation principles. We would be glad to elaborate orally or in writing at your request.

Retain the general policies for setting cleanup standards as Section 704, adding points of compliance from Section 700(11) and indicator chemicals from Section 700(3). They do not appear to be appropriate for Section 709 as they are not limited to risk assessment procedures.

3. Use of Basic Terms that Defy Common Understanding

The proposed cleanup standard rule is premised on a few bedrock elements. Two of these use terms that are so foreign to common understanding and to consistency with the rule itself that, at best, they confuse the user. At worst, they will be constantly misinterpreted, leading to unnecessary delay and litigation in getting cleanups accomplished.

Not surprisingly, members of the environmental, business, local government, and technical communities have all complained about them.

We want to stress at the outset that people will write rules differently and use words they prefer. This is not a case of personal preference for a given term. In fact, we know how Ecology staff have struggled to find appropriate terms. It is a problem that results from trying to find words for fundamental conceptual problems.

Conditional and Compliance

The basic problem is that *all* remedial actions that qualify as cleanups are *both* conditional and compliance. As we stated in our public hearing testimony, all cleanups must comply with cleanup standards, and all cleanups are conditioned upon monitoring results (see both proposed and revised Section 360(2) and attached sheets).

By intent and definition, this means that a remedial action that implements cleanup standards identified under *any* of the three methods in part 7, as well as meeting applicable laws, qualifies as a "cleanup action". Although the rule creates a special burden of proof on so-called conditional cleanups, it does not change the basic fact that if a cleanup meets these standards, it could then be selected if the criteria in Section 360 (Selection of Remedy) are met.

Likewise, regardless of whether a remedial action implements cleanup standards identified under Method A or B, compliance monitoring is required and other conditions, ranging from the need to obtain permits to operation and maintenance actions or site restrictions may be involved.

Solution. Keep it simple and consistent. The proposed rule already uses "Method A" and "Method B". Simply use "Method C", and get rid of the modifiers "compliance and conditional." Each method is an alternate method, depending on which is appropriate to use, as substantively defined in the rules. Under each method, there is an additional safety net because a cleanup is also required to be protective of human health and the environment and meet applicable state and federal laws. In fact, the proposed revisions (Sections 700 and 702) make this clearer.

The rule should just be direct: (1) cleanup standards for particular substances and pathways are figured out by using methods A, B, or C and applying applicable state and federal law; (2) if a remedial action meets these levels, it is presumed to be protective of human health and the environment; and (3) protectiveness is the overriding criteria regardless of cost or whether the specific levels are met.

Each method should also have its own section (see attached revised text), especially since there are quite a few provisions dealing with Method C. Both the criteria for using Method C and the procedures for using it should be next to each other. These are not only very difficult to follow in Section 700, where they are separated, but they are in the middle of a number of other subjects in the same section.

Technically Feasible and Technically Practicable

If conditional and compliance are confusing, it is largely because they are inconsistent with the Act and the rules. As we discussed in our public hearing testimony, the terms "technically feasible" and "technically practicable" are inconsistent with common English usage. Not only are these synonymous, but is inconsistent with case law, where the modifier "technical" generally excludes cost. Equally important, the confusion reflects some basic conceptual problems in the treatment of the balancing criteria in Section 360.

There are two basic concepts that need definition in order to be applied in the currently proposed rule: (1) methods or alternatives that can actually be done, regardless of whether they are easy, cheap, affordable or desirable – in other words, is something "technically possible"; and (2) methods or alternatives that can be done and should be done – in other words, is something "reasonable"

or "feasible". Since the latter term is already used to evaluate options (remedial investigation/*feasibility* study), it seemed to be an appropriate term.

Solution. As the concept is already intended by the rule, as we understand it, it would appear that you need only substitute "technically possible" for "technically feasible", and substitute "feasible" for "technically practicable." As noted above, this is not just a matter of drafting preferences. If there are other words that work for these concepts, we are certainly open to them.

This also solves the problem of inconsistency between sections 350 and 360, because with minor re-ordering of the criteria in 350(6)(e), the last three all relate to the feasibility of a remedial action, while the first seven criteria all relate to actual performance and the environmental risk and impact of the action itself.

It is essential to include an overall environmental quality criterion to address remedial actions that meet cleanup standards and otherwise improve environmental quality such as habitat and cross-media considerations. This is in practice, and is clearly mandated to be, part of Ecology's decisionmaking, whether you consider the basis to be MTCA, CERCLA, SEPA, Environment 2010 goals, or other laws. Please note that we did not use the "environmental benefit" language that has caused concern in the past. With the other revisions, it is clear that this criterion cannot outweigh the requirement to meet cleanup standards and is not part of "feasibility."

4. Mixing Up Cleanup Standards and Selection of Remedy

Dave Bradley, other Ecology staff, and the Attorney General's office have consistently maintained that one set of factors is used for setting cleanup levels, and another for selecting among cleanup action alternatives. We agree, but the rule fails to maintain this distinction. To the contrary, both Section 360 and 700 of the proposed rule mix up these two concepts, which has, in part, led to considerable problems in trying to understand and interpret what criteria apply to each.

Solution. Separate out these concepts again and use administrative principles (discussed above) to explain their relationship. The particulars of how to do this should be apparent from the specific revisions.

For example, Section 360(3) on "Protection" is solely about how to determine whether cleanup standards are met, not about which alternative to select (it also repeats Section 705(5)), and we reached a consensus that it should be revised as indicated and as discussed on page four of this letter. As another example, Subsection 360(4) on applicable state and federal laws belongs with Section 710 on applicable state and federal laws. The former explains what conditions need to be part of specific remedial actions in order to meet the cleanup standard of compliance with these laws, not unlike the provisions on whether and how to use so-called conditional (Method C) cleanup standards.

5. Lack of Distinctions in Other Key Concepts

Both cleanup standards and selection of remedy are based on some key elements that are likewise mixed up in the proposed rule. Without these distinctions, which Ecology has plainly acknowledged in briefings, advisory committee meetings, and in practice, the rules create unreconcilable problems.

Hazardous Substances and Exposure Pathways

leanup standards are premised on setting levels for two different elements: (1) the particular *azardous substances* released or threatened to be released; and (2) the specific *pathways* that will ause environmental exposure to these hazardous substances. This is why there are cleanup levels r both specified substances and for land, water, and so on. The rule as currently drafted never akes this distinction clear, a problem which is aggravated by the next point.

lethods of Treatment and Cleanup Action Alternatives or Plans

lection of remedy is also premised on two different elements: (1) the specific *methods* or chnologies by which hazardous substances will be treated for each pathway (the two distinct ements noted above); and (2) the *overall plan* or package of methods for addressing a release threatened release at a site, which often involves a combination of treatment methods at fferent locations, or alternative cleanup action plans.

e RI/FS is intended to develop different packages that will meet cleanup standards ("feasible rnatives") and are therefore available for selection. It does this by identifying, evaluating and reening methods of treatment. The methods of treatment for both substances and pathways that n meet cleanup standards are then put together into alternative cleanup action plans, which again st meet cleanup standards in order to be selected. The RI/FS then evaluates these alternatives der the criteria in Section 350. These criteria are -- or at least should be -- the same criteria Section 360 for selecting a remedy. The draft cleanup action plan identifies the preferred rnative or alternatives, and the final cleanup action plan selects one.

tting it all together, *cleanup action plans are typically a combination of treatment methods for rticular substances and pathways*. In order for the preferences for selecting remedies to be plied, there are two steps:

1. Maximizing use of higher preference treatment methods for particular substances and pathways.

2. Maximizing the extent of the overall cleanup action that gets done with higher preference methods.

mpliance with the first step is much more capable of being ascertained. With the second step, combination of methods may make the overall plan difficult to categorize (is it by volume, icity, sensitive environmental areas, and so on).

ction. Rather than create impossible conundrums, these four elements should be clearly stated the rule. Because these concepts appear to be what Ecology has intended but not included in proposed rule, it actually takes very little revision to accomplish this (see Sections 702 (1) and and 360(4)).

addition -- and we have not fully explored this idea but believe it ties in with subsection 0(9)(a)(vi) -- recognizing that overall cleanup plans may not be so easily classified, it is portant to create accountability and an action-forcing mechanism for selecting higher preference proaches. This revision would require specific findings if cleanup actions are mainly complished by methods of treatment that are lower than the top three priorities.

CONCLUSION

As we testified in Spokane, we think the basic structure of the rule makes sense -- assuming one can make sense of it.

In our comments, we have maintained *virtually all* of the existing text of part 7 on cleanup standards. Tempted as we may have been to fiddle with the writing, we knew that our effort needed to be focused on *the most basic problems with all users understanding the rule*, and not with stylistic concerns on the one hand, or with basic methodological differences such as risk assessment levels on the other.

You are aware of serious concerns from many quarters, including our Coalition members, and we strongly urge you to give genuine consideration to the excellent set of written comments you have received, which overall are unusually thoughtful for so difficult a subject. We have appended a list of comments we hope will get particular attention as we share many of the concerns raised in them. We regret that neither the draft environmental impact statement nor the economic impact statement adequately addressed the kind of adverse impacts in general or specific that would result from the proposed rule, such as those we note on page one. We were also disappointed that the examples in the DEIS and appendix did not provide adequate information to understand how the standard setting and the selection of remedy would work in practice. Fortunately, a number of technical consultants were willing to volunteer unpaid time to develop examples that assisted our analysis of the rules and development of these proposed revisions. We have not devoted our comment letter to Sections 720 through 750 because we have been working with many of the commenters, wished to avoid duplication, and wanted to emphasize our commitment to you to focus our comments on the most important conceptual problems that could be resolved on a consensus basis by October 5.

I would also like to emphasize, as you and I discussed on the telephone this afternoon, that there is a consensus among several of the individuals from very different groups who have been active in this rulemaking process for the past three years (it's painful just to say that!) on the concepts in this letter and in the attached text. While we have a good comfort level with the organizational revisions, we have generally focused more on agreeing on the solutions by the October 5 deadline than on the precise text. There are certainly involved individuals in Ecology and the various communities with whom we would like to discuss this. We hope you would give us that opportunity, as we discussed today, so that our comments are not rejected over misunderstandings or concerns that could be allayed.

The following materials are attached:

1. Cross-section of comments on the ability to read and understand the proposed rules.

2. Basic definitions and meanings of key terms (submitted at the public hearing).

3. Section 360 in legislative markup style, with key explanatory notes bracketed in boldface type.

4. A clean version of Section 360, so that it can be read more easily.

5. Section 700 - OVERVIEW.

6. Section 702 - ADMINISTRATIVE PRINCIPLES FOR CLEANUP STANDARDS.

7. General outline of how the beginning of part 7 is re-organized.

8. Sections 704 through 710 in legislative markup style, with key explanatory notes in boldface type. The text for these sections were previously in Sections 700, 705, and 710. We have tried to indicate where text has been moved from.

9. List of other comment letters as noted above.

In order to expedite and assist your ability to use this material, we are enclosing with the hard copy of this letter a computer disc of the revised text. We have appreciated your providing material in this format to us on the cleanup process rule and found it very helpful. Please let us know if you would like it in another format or different size disc. We also apologize for not conforming every section to the basic proposed changes, but we are prepared to submit a legislative style markup which does this if you would like.

We would request an opportunity to meet with you, Terry Husseman, Dave Bradley, Jay Manning or whomever you think appropriate within the next week or so to discuss the substance and process for incorporating these comments into the rule. We would be most concerned and would like to know immediately if you think that the planned decisionmaking schedule limits the inclusion of these revisions in the rule.

As we said at the public hearing, we recognize and appreciate the hard work and professionalism your staff has put into these proposed cleanup standards. The basic structure appears sound if the risk assessments are well done and the regulation is applied thoughtfully and consistent with its administrative principles.

Thank you again for your encouragement to develop these comments. With these revisions, several of us are at least optimistic that a person picking up the cleanup standard rule has a fighting chance to understand what it's about and how to use it.

Respectfully submitted,

PRESTON THORGRIMSON
SHIDLER GATES & ELLIS

Kenneth S. Weiner

Attachments

KSW7249

cc: Rod Brown
Barry Tabbutt
Dan Ballbach
Dan Cordell
Et al.
Public Private Cleanup
Coalition Steering Committee

Public Testimony at the Spokane Hearing on September 11, 1990

Ken Weiner

Ken Weiner of the Public/Private Cleanup Coalition commented that a process too complicated or burdensome will not encourage people to come forward to perform cleanups and keep the public from being involved. He stated that they commend the Department for the effort made in getting to this point.

He suggested that the rule should have a section, perhaps called administrative principles, that clearly lays out what the rule is trying to do. This section would state that cleanups need to be protective of human health and the environment no matter what the cost and that cost can be considered only in the selection of remedy between options that are all protective. He also stated that the rule is unclear about the terms "conditional" and "compliance." He pointed out that it appears that all cleanups have to comply with cleanup standards and are conditional with compliance monitoring required. He suggested that the rule state all cleanups must comply and there are three methods to figuring out whether you meet the standards.

Weiner commented that the terms "practicable" and "feasible" are not clear and seem to run counter to common understanding. He also cautioned that the way a rule is carried out in practice is the key to whether or not a law is implemented the way it is intended. He stated that if there are provisions which make it difficult for people to carry them out, then the rule will not work.

He suggested that the feasibility study section and the selection of remedy sections be brought together to clarify how to use the order of priorities identified in the selection of remedy section in designing an individual cleanup action at a site. He also mentioned concerns that the rule encourages a lot of interim cleanups and the relationship of the yet-to-be-written sediments standards to sections of this rule is unclear.

He suggested that a close look be given to highlighting the key structures of the rule and putting the detailed methods in an appendix. He also suggested that the rule pay more attention to the positive actions that can be taken to protect the ecosystem in doing a cleanup. Lastly, he said that he hoped to be able, with a broad range of interests, to continue to help make the rule more usable and understandable.

Weiner also noted that while the environmental impact statement covered a wide range of alternative approaches, the examples were not nearly as helpful in trying to figure out how the rule would work in practice.

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Chapter 7. Distribution List

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State Agencies	Attorney General's Office - Jay Manning Department of Community Development - Director Chuck Clark Department of Health - Don Oliver, Don Peterson Department of Corrections - Marc Horton Department of Ecology - SEPA Review Section, Central Regional Office, Eastern Regional Office, Northwest Regional Office, and Southwest Regional Office Department of Fisheries - Allen Clark and Hal Michael Department of General Administration - Clint Lougheed Department of Natural Resources - Phil Clark and Nancy Sprague, Washington Natural Heritage Program Department of Transportation - Stephan Dobratz Department of Wildlife - Tom Owens Parks and Recreation Commission - Mike Swigert
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Cleanup Standards Work Group Members and Interested Citizens

AEQUUS - Randy Ray
Association of Cities - Dennis Hein, Spokane
Association of Counties
Association of Washington Business - Roger van Gohren, Dan Syrdal (Heller, Ehrman, White & McAuliffe) and Lynda Brothers (Davis Wright Tremaine)
The Boeing Company - Kris Hendrickson
CH2M Hill - Steve Trudell
Independent Business Association - Gary Smith
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