WASHINGTON STATE
DEPARTMENT OF
ECOLOGY

Least Burdensome Alternative Analysis for the Amendments to the Model Toxics Control Act Cleanup Regulation Chapter 173-340 WAC

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Chapter 1 Introduction

1.1 Purpose

The Washington Administrative Procedure Act (APA) requires that significant legislative rules be evaluated to "[d]etermine, after considering alternative versions of the rule and the analysis required under (b) and (c) of this subsection, that the rule being adopted is the least burdensome alternative that will achieve the general goals and specific objectives of the statute." RCW 34.05.328(1)(d). This determination must be documented prior to final rule adoption and included in the rulemaking record. This report summarizes Ecology's analysis of whether the proposed amendments to the MTCA Cleanup Regulation (chapter 173-340 WAC) are the least burdensome alternatives that will achieve the general goals and specific objectives of the statute.

This report relies on documentation found in the rule-making file. These documents include, but are not limited to, the APA Memorandum, the Estimates of the Probable Costs and Benefits (CBA), and the Concise Explanatory Statement (CES).

1.2 Background

The Model Toxics Control Act (Initiative 97), chapter 70.105D RCW, was passed by the voters of the State of Washington in November 1988 and became effective March 1, 1989. The law establishes the basic authorities and requirements for cleaning up contaminated sites in a manner that will protect human health and the environment.

As a general declaration of policy, the Model Toxics Control Act (MTCA), chapter 70.105D RCW, states that:

> Each person has a fundamental and inalienable right to a healthful environment, and each person has a responsibility to preserve and enhance that right. The beneficial stewardship of the land, air, and waters of the state is a solemn obligation of the present generation for the benefit of future generations.

RCW 70.105D.010(1). The statute further states that:

> A healthful environment is now threatened by the irresponsible use and disposal of hazardous substances. There are hundreds of hazardous waste sites in this state, and more will be created if current waste practices continue. Hazardous waste sites threaten the state's water resources, including those used for public drinking water. Many of our municipal landfills are current or potential hazardous waste sites and present serious threats to human health and the environment.

RCW 70.105D.010(2). The purpose of MTCA is to prevent or remedy these threats to human health and the environment. As stated in MTCA's general declaration of policy, "[t]he main

purpose of this act is ... to clean up all hazardous waste sites and to prevent the creation of future hazards due to improper disposal of toxic wastes into the state's land and waters." Id.

To accomplish these statutory goals, MTCA requires Ecology to accomplish several objectives. The statute specifies those objectives in RCW 70.105D.030(2). In particular, MTCA requires Ecology "to immediately implement all provisions of this chapter to the maximum extent practicable, including investigative and remedial actions where appropriate." Id. Furthermore, MTCA requires Ecology to adopt, and thereafter enforce, rules under chapter 34.05 RCW to:

> (a) Provide for public participation...; [and]
> ...
> (e) Publish and periodically update minimum cleanup standards for remedial actions at least as stringent as the cleanup standards 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[.]

Id. The federal cleanup law referenced in MTCA is the Comprehensive Environmental Response Compensation and Liability Act of 1980 as amended by the Superfund Amendments and Reauthorization Act of 1986.

MTCA also provides Ecology with the authority to accomplish several specific statutory objectives. These objectives are specified in RCW 70.105D.030(1) and include the following:

> (a) Investigate, provide for investigating, or require potentially liable persons to investigate any releases of hazardous substances, including but not limited to inspecting, sampling, or testing to determine the nature or extent of any release or threatened release...;
> (b) Conduct, provide for conducting, or require potentially liable persons to conduct remedial actions (including investigations under (a) of this subsection) to remedy releases or threatened releases of hazardous substances.... In conducting, providing for, or requiring remedial action, 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;
> ...
> (d) Carry out all state programs authorized under the federal cleanup law and the federal resource, conservation, and recovery act, 42 U.S.C. Sec. 6901 et seq., as amended;
> (e) Classify substances as hazardous substances...;
> (f) Issue orders or enter into consent decrees or agreed orders that include deed restrictions where necessary to protect human health and the environment from a release or threatened release of a hazardous substance from a facility....;
> (g) Enforce the application of permanent and effective institutional controls that are necessary for a remedial action to be protective of human health and the environment;
> (h) Require holders to conduct remedial actions necessary to abate an imminent or substantial endangerment...;
> (i) Provide informal advice and assistance to persons regarding the administrative and technical requirements of this chapter.... As part of providing this advice for

independent remedial actions, the department may prepare written opinions regarding whether the independent remedial actions or proposals for those actions meet the substantive requirements of this chapter or whether the department believes further remedial action is necessary at the facility....; and

(j) Take any other actions as necessary to carry out the provisions of this chapter, including the power to adopt rules under chapter 34.05 RCW.

RCW 70.105D.030(1).

To achieve the general goals and specific objectives and requirements of MTCA, Ecology adopted the MTCA Cleanup Regulation, chapter 173-340 WAC. The rule was developed in two phases and adopted in 1990 and 1991 respectively.

In 1995, the legislature in HB 1810 established the MTCA Policy Advisory Committee (PAC) and directed it to provide advice to the legislature and Ecology on administrative and legislative actions to implement the goals and objectives of MTCA more effectively. The committee was comprised of 22 members representing a broad range of interests, including the interests of the Legislature, local government, large and small business, agriculture, environmental organizations, financing institutions, ports, the Department of Ecology, the Department of Health, the environmental consulting industry, the Science Advisory Board, and the public at large. The PAC provided its final report containing its recommendations in December 1996. As a member of the PAC, Ecology endorsed these recommendations. The final report and related documentation is included in the rule-making file.

Ecology is currently proposing to adopt amendments to the MTCA Cleanup Regulation. These amendments reflect changes developed through a negotiated rulemaking process that began in 1997. The proposed rule amendments were developed in response to:

- The recommendations of the MTCA Policy Advisory Committee (PAC);
- The recommendations of the MTCA Science Advisory Board (SAB);[1]
- The recommendations of the Duwamish Coalition's Total Petroleum Hydrocarbon (TPH) Project Oversight Group (POG);[2]
- The statutory requirement in RCW 70.105D.030(2)(d) that Ecology publish and periodically update minimum cleanup standards for remedial actions;

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[1] The MTCA Science Advisory Board (SAB) was established by Ecology pursuant to RCW 70.105D.030(4) to render advice to Ecology with respect to the hazard ranking system, cleanup standards, remedial actions, deadlines for remedial actions, monitoring, and the classification of hazardous substances.

[2] The purpose of the Duwamish Coalition's TPH Project was to provide recommendations to Ecology regarding the evaluation of risks and the selection of cleanup actions for sites affected by complex mixtures of contamination with a petroleum-compound base, or what is referred to under current state regulations as Total Petroleum Hydrocarbons (TPH). The TPH Project Oversight Group (POG), consisting of key staff from the Washington State Department of Ecology, the U.S. Environmental Protection Agency Region 10, King County, the Port of Seattle, and the Cities of Seattle and Tukwila, oversaw the project. Other participants included technical specialists from the Department of Ecology, the Pollution Liability Insurance Agency, industry, the Science Advisory Board, U.S. Naval Laboratories, project consultants, and others. An interagency Memorandum of Agreement governed the actions of the POG. The POG submitted its final report in April 1999. The final report and related documentation is included in the rule-making file.

- The regulatory requirement in WAC 173-340-702(3) that Ecology review and, as appropriate, update cleanup standards every five years based on new scientific information and changes in other state and federal laws;
- The amendment of the Model Toxics Control Act;
- The statutory objective in the Administrative Procedure Act (RCW 34.05.230) that agencies convert long-standing interpretative and policy statements into rules; and
- The need to clarify and improve the readability of the rule.

1.3 Scoping of the Analysis

Ecology conducted a comprehensive review of the proposed amendments to the MTCA Cleanup Regulation (chapter 173-340 WAC) to identify those amendments that required further evaluation to determine whether the rule being adopted is the least burdensome alternative that will achieve the general goals and specific objectives of the statute. The review undertaken by Ecology considered several factors, including whether the amendment may have a significant economic impact, whether the amendment establishes requirements under optional methodologies, and whether the amendment only clarifies existing requirements. Based on this review, Ecology determined that the following amendments may have significant economic impacts and should be subject to further analysis.

- Changes to the Method A soil and ground water cleanup levels.
- Establishment of soil cleanup levels – consideration of land use.
- Establishment of soil cleanup levels – evaluation of the soil-to-ground water pathway.
- Establishment of soil cleanup levels – evaluation of the dermal exposure pathway.
- Establishment of soil cleanup levels – evaluation of the vapor exposure pathway.
- Establishment of soil cleanup levels – conducting a terrestrial ecological evaluation.
- Requirement of financial assurances.
- Creation of a citizen technical advisor.

Chapter 2 Evaluation of the Proposed Amendments

The purpose of this chapter is to provide a description of the proposed rule amendments identified during the scoping phase of this analysis, a description of the alternatives to these proposed rule amendments, and an analysis of whether each of the proposed rule amendments is the least burdensome alternative that will achieve the general goals and specific objectives of the Model Toxics Control Act. The alternatives considered as part of this analysis include alternatives based on the draft rule submitted by the Association of Washington Business (AWB). Consideration of the entire AWB draft rule as an alternative is discussed in Chapter 3.

2.1 Method A Cleanup Levels for Soil and Ground Water

2.1.1 Basis for the Proposed Rule Amendments

The proposed rule amendment is required to achieve the general goals and specific objectives of the statute, including the following:

- To protect human health (see RCW 70.105D.010 and .030); and
- To periodically update minimum cleanup standards for remedial actions based on new scientific information and changes to state and federal laws (see RCW 70.105D.030(2)(d) and WAC 173-340-702(3)).

The proposed rule amendment achieves these objectives by updating the Method A soil and ground water cleanup levels based on new scientific information and changes to state and federal laws. The establishment of Method A cleanup levels that are protective of human health requires an evaluation of the relevant exposure pathways. Evaluation of these exposure pathways requires consideration of the "degree of protection" or "acceptable level of risk" for carcinogens and non-carcinogens defined in the MTCA Cleanup Regulation.[3] The changes are identified in WAC 173-340-900 in Tables 720-1, 740-1, and 745-1. The basis for each of these changes and the resulting cleanup levels is provided in the applicable footnotes located at the end of each Method A table.

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[3] The legislature in HB 1810 required the PAC to review, provide advice, and develop recommendations on "clean-up standards and clean-up levels, including the use of site-specific risk assessment." In response, the PAC established the following priority issue for analysis that included consideration of costs and benefits:

> Do allowable risk values in the MTCA cleanup regulations appropriately balance the public's desire for protecting individuals with the need for cleanups to proceed at a reasonable cost? Should the allowable risk values for carcinogens in the MTCA cleanup regulations be amended, for example, to match federal risk range values under CERCLA (the federal superfund program) in the National Contingency Plan?

Final PAC Report, pp. 4-5. At the PAC's request, the MTCA Science Advisory Board conducted a review of the target risk levels defined in the MTCA Cleanup Regulation. The SAB, however, did not recommend changing those levels (Final PAC Report, p. 28). The PAC also did not recommend changing the target risk levels (Final PAC Report, pp. 19, 28 and C-16 through C-17). Based on the lack of a recommendation from the PAC, amendment of the target risk levels was not included within the scope of this rule-making action.

The draft rule submitted by the AWB includes some suggested changes to the Method A cleanup levels for soil and ground water. The basis for these suggested changes has not been explained or justified. Some of the cleanup levels suggested by the AWB, such as the soil cleanup level for benzene, are the same as the levels proposed by Ecology. Other suggested cleanup levels are different from those proposed by Ecology. To the extent that levels proposed by Ecology differ from those proposed by the AWB, the differences are justified by new scientific information, by the consistent application of that information, and by changes to state and federal laws.

2.1.2 Method A Soil Cleanup Levels

The proposed Method A soil cleanup levels were established by evaluating each of the exposure pathways, including the leaching pathway.

Table 2-2 in the CBA identifies the Method A soil cleanup levels for unrestricted land uses that have changed or been added as part of the proposed rule amendments. See Table 740-1 in WAC 173-340-900 for the complete list of Method A soil cleanup levels and explanatory footnotes. Except for benzo(a)pyrene, which is based on direct contact pathway, each of the changes is based on the leaching pathway as the exposure pathway of concern.

Table 2-3 in the CBA identifies the Method A soil cleanup levels for industrial properties that have changed or been added as part of the proposed rule amendments. See Table 745-1 in WAC 173-340-900 for the complete list of Method A soil cleanup levels and explanatory footnotes. Each of the changes is based on the leaching pathway as the exposure pathway of concern.

Further explanation of each of the individual changes is provided in the Concise Explanatory Statement.

The basis for the proposed Method A soil cleanup levels determined by the leaching pathway is the amendment of the methodology for evaluating the leaching pathway. See **Section 2.3** for an evaluation of that amendment. The amendment is based on new scientific and technical information. Evaluation of the leaching pathway (soil-to-ground water pathway) requires a determination that the soil concentration will not cause an exceedance of the ground water cleanup level established under WAC 173-340-720. Under the current rule, soil concentrations that meet this requirement are determined by multiplying the ground water cleanup level by 100. Under the proposed rule amendments, Ecology replaces this methodology with fate and transport models and other approaches. See WAC 173-340-747.

To establish protective Method A soil cleanup levels, Ecology used the three-phase and four-phase equilibrium partitioning models and the default parameters specified in the rule. The basis for the selection of these fate and transport models and default input parameters and the reasons why the use of these models and parameters is necessary to achieve the statutory goals and objectives is explained in the Concise Explanatory Statement. Ecology recognizes and allows for the use of alternative fate and transport models and input parameters, as well as other approaches, to establish protective soil concentrations under Method B and Method C.

2.1.3 Method A Ground Water Cleanup Levels

Table 2-1 in the CBA identifies the Method A ground water cleanup levels that have changed or been added as part of the proposed rule amendments. See Table 720-1 in WAC 173-340-900 for the complete list of Method A ground water cleanup levels and explanatory footnotes. Each of the changes is based on either applicable state and federal law or new scientific information. Further explanation of each of the individual changes is provided in the Concise Explanatory Statement.

2.2 Soil Cleanup Levels – Consideration of Land Use

To establish soil cleanup levels that are protective of human health, consideration of the reasonable maximum exposure scenario and the land uses that form the basis of that scenario is required.

2.2.1 Description of the Proposed Rule Amendment

The following description of the proposed rule amendment includes a description of the current rule and a comparison of the proposed rule amendment with the current rule.

The current rule allows soil cleanup levels to be established using land uses other than residential and industrial as the basis for a reasonable maximum exposure (RME) scenario if certain specified conditions are met. Other land uses that could be considered include commercial, recreational, and agricultural. WAC 173-340-740(1).

The proposed rule amendments allow soil cleanup levels to be established using only residential and industrial land uses as the basis for a RME scenario. This means that other land uses (such as commercial, recreational, and agricultural) must use residential land use as the RME scenario for establishing cleanup levels. However, these other land uses may be used to establish remediation levels as part of remedy selection. WAC 173-340-708(3)(d)(ii); 173-340-740(1)(a). For example, if containment is part of the proposed remedy for contaminated soil at a commercial site, the RME scenario for evaluating the protectiveness of the containment system for the direct contact pathway could be changed from a child living on the site to a maintenance worker or child trespasser. See WAC 173-340-708(3)(d)(ii), (iii).

2.2.2 Description of the Alternatives

Three significant alternatives to the proposed rule amendment were considered during the rule-making process. These alternatives are described below.

Option 1 – "No Action" Alternative
The first or "no action" alternative is the current rule. The current rule allows soil cleanup levels to be established using land uses other than residential and industrial as the basis for a reasonable maximum exposure (RME) scenario if certain specified conditions are met. Other land uses that could be considered include commercial, recreational, and agricultural. See WAC 173-340-740(1) of the current rule.

Option 2 – AWB Alternative
The second alternative considered is based on the draft submitted by the AWB. As under the current rule, the second alternative would allow soil cleanup levels to be established using land uses other than residential and industrial as the basis for a reasonable maximum exposure (RME) scenario. However, contrary to the current rule, the alternative would eliminate the constraints on the use of such other land uses. As under the proposed rule amendment, land uses other than residential and industrial may be used to establish remediation levels as part of remedy selection. However, contrary to the current rule and unlike the proposed rule amendment, the alternative would establish an allowable risk level of 1×10^{-5} for remediation levels under Method B.

Option 3
The third alternative considered would allow soil cleanup levels to be established using only residential and industrial land uses as the basis for a RME scenario just as under the proposed rule amendment. However, unlike the proposed rule amendment, other land uses (such as commercial, recreational, and agricultural) could not be used to establish remediation levels as part of remedy selection. This alternative reflects the minority view regarding the use of site-specific risk assessment expressed by the environmental community during the PAC process (see Final PAC Report, pp. 26-27).

2.2.3 Analysis

The proposed rule amendment is required to achieve the general goals and specific objectives of the statute, including the following:

- To protect human health (see RCW 70.105D.010 and .030);
- To provide industrial cleanup standards at industrial properties (see RCW 70.105D.030(2)(e)); and
- To periodically update minimum cleanup standards for remedial actions based on new scientific information and changes to state and federal laws (RCW 70.105D.030(2)(d) and WAC 173-340-702(3)).

The proposed rule amendment will more effectively achieve these objectives by allowing soil cleanup levels to be established using only residential and industrial land uses as the basis for a RME scenario, but allowing consideration of other land uses (such as commercial, recreational, and agricultural) to establish remediation levels as part of remedy selection. The amendment is based on a PAC recommendation and was determined by the PAC as necessary to more effectively achieve the goals and objectives of MTCA (see Final PAC Report, pp. 24-27). The intent of the amendment is to create a system of constrained flexibility whereby the rule would more effectively ensure the protection of human health while providing increased flexibility to use risk assessment for establishing cleanup levels and for selecting cleanup actions.

The proposed rule amendment is the least burdensome alternative that will achieve the general goals and specific objectives of MTCA. Neither the first or "no action" alternative nor the second or AWB alternative would effectively achieve the statutory goals and objectives. The third alternative is more burdensome than the proposed rule amendment.

The impact of the proposed rule amendment on costs is discussed in the CBA. As discussed more thoroughly in that analysis, the proposed rule amendment is not expected to result in any additional cleanup costs.

The first or "no action" alternative would not effectively achieve the goals and objective of MTCA. As noted previously, the proposed rule amendment is based on a PAC recommendation and was determined by the PAC as necessary to more effectively achieve the goals and objectives of MTCA (see Final PAC Report, pp. 24-27).

The second or AWB alternative would also not effectively achieve the goals and objective of MTCA. The alternative would not only allow soil cleanup levels to be established using land uses other than residential and industrial as the basis for a reasonable maximum exposure (RME) scenario (contrary to the proposed rule and PAC recommendation), but would also eliminate the constraints on the use of such other land uses (contrary to both the current and proposed rules, as well as the PAC recommendation). In effect, the alternative eliminates the system of constrained flexibility, established in the current rule and modified in the proposed rule, which was designed to ensure the protectiveness of human health. Consequently, the alternative is less protective than either the current rule or the proposed rule and inconsistent with the recommendations of the PAC (see Final PAC Report, pp. 24-27). In addition, by establishing an allowable risk level of 1×10^{-5} for remediation levels under Method B, the alternative goes beyond the scope of this rule-making action and the recommendations of the PAC (see Final PAC Report, pp. 24-27, 28). Moreover, the establishment of such a risk level is inconsistent with and less protective than the current rule and would not achieve the goals and objective of MTCA.

Although the third alternative would be protective of human health, the alternative is likely more burdensome for potentially liable persons than either the current rule or the proposed rule amendment. The third alternative is more burdensome because it would limit the flexibility allowed by the proposed rule amendment. Specifically, the alternative would not allow the use of land uses other than residential or industrial to establish remediation levels as part of the remedy selection. Compared to the proposed rule amendment, such a limitation could result in additional cleanup costs at some sites.

2.3 Soil Cleanup Levels – Consideration of the Leaching Pathway

To establish soil cleanup levels that are protective of human health, consideration of several different pathways of exposure is required, including the leaching of contaminants from soil into the ground water.

2.3.1 Description of the Proposed Rule Amendment

The following description of the proposed rule amendment includes a description of the current rule and a comparison of the proposed rule amendment with the current rule.

Evaluation of the leaching pathway (soil-to-ground water pathway) requires a determination that the soil concentration will not cause an exceedance of the ground water cleanup level established

under WAC 173-340-720. Under the current rule, soil concentrations that meet this requirement are determined by multiplying the ground water cleanup level by 100. Under the proposed rule amendments, Ecology replaced this methodology with fate and transport models and other approaches. WAC 173-340-747. The following discussion provides a brief overview of the proposed rule amendment.

WAC 173-340-747(2) sets forth the general requirements (criteria) that soil concentrations must meet for those concentrations to be considered protective of human health. First, the soil concentrations must not cause an exceedance of the ground water cleanup levels established under WAC 173-340-720. To determine if this criterion is met, one of the methodologies specified in subsections (4) through (9) must be used. Second, to ensure that the first criterion is met, the soil concentration must not result in the accumulation of non-aqueous phase liquid (NAPL) on or in ground water. To determine if this criterion is met, one of the methodologies specified in subsection (10) must be used.

WAC 173-340-747(3) provides an overview of the methods specified in subsections (4) through (10) for deriving soil concentrations that meet the criteria specified in subsection (2). Certain methods are tailored for particular types of hazardous substances or sites. Certain methods are more complex than others and certain methods require the use of site-specific data. The specific requirements for deriving a soil concentration under a particular method may also depend on the hazardous substance. Note, however, that the proposed rule amendment does not mandate the use of any particular methodology.

WAC 173-340-747(4) through (10) specifies the procedures and requirements for establishing soil concentrations that meet the criteria specified in subsection (2) under each of the specified methodologies.

This proposed rule amendment has resulted in different Method A soil cleanup level for many hazardous substances. Some of these hazardous substances have become more stringent and some have become less stringent. This proposed rule amendment may also result in different Method B or Method C soil cleanup levels.

2.3.2 Description of the Alternatives

Again, evaluation of the leaching pathway (soil-to-ground water pathway) requires a determination that the soil concentration will not cause an exceedance of the ground water cleanup level established under WAC 173-340-720. Three significant alternatives to the proposed rule amendment were considered during the rule-making process. These alternatives are described below.

Option 1 – "No Action" Alternative
The first or "no action" alternative is the current rule. Under the current rule, protective soil concentrations are determined by multiplying the ground water cleanup level by 100 (the "100x model"). For petroleum mixtures under Method B and Method C, a simplification of the four-phase equilibrium partitioning fate and transport model, as described in the Interim TPH Policy, can be used to derive protective soil concentrations.

Option 2 – AWB Alternative
The second alternative considered is based on the draft submitted by the AWB. This alternative would allow the use of the 100x model in addition to the fate and transport models and other approaches described in the proposed rule amendment.[4]

Option 3
The third alternative considered was included as part of the 1999 proposed rule amendments (WSR, Issue #99-22). This alternative would allow the use of the same fate and transport models and other approaches as described in the 2000 proposed rule amendment, but their use would be limited based on whether standard or modified B or C cleanup levels were being established. For example, to establish standard Method B or C soil cleanup levels, only specified models and default input parameters could be used.

2.3.3 Analysis

The proposed rule amendment is required to achieve the general goals and specific objectives of the statute, including the following:

- To protect human health (see RCW 70.105D.010 and .030); and
- To periodically update minimum cleanup standards for remedial actions based on new scientific information and changes to state and federal laws (see RCW 70.105D.030(2)(d) and WAC 173-340-702(3)).

The proposed rule amendment will more effectively achieve these objectives by replacing the old "100x ground water" model with more accurate chemical and site-specific fate and transport models. The methodology proposed by Ecology more accurately quantifies the risk posed to ground water by hazardous substances within the soil and hence more accurately ensures the protection of human health and the environment.

The proposal to replace the old "100x ground water" model with the more accurate chemical and site-specific fate and transport models is based on an extensive review of new scientific and technical information. Although the 100x ground water model was based on the best scientific and technical information available at the time, the old model does not adequately account for site or chemical-specific factors that control the movement of hazardous substances from soil into water. The movement of hazardous substances from soil into water is primarily controlled by two factors: the soil properties and the hazardous substance water solubility.

For example, some hazardous substances like benzene are relatively soluble in water. When gasoline is released to the soil, benzene will immediately start to partition from the gasoline into water that is held within the soil pores and then flow to the ground water. The 100x ground

[4] While the AWB draft would allow the use of methodologies other than the 100x model, the draft provides no standards (constraints on allowed flexibility) or direction for their use. In addition, the AWB draft does not require an evaluation of the leaching pathway if the pathway is not yet "complete," ignoring potential future impacts and potential future beneficial uses, thereby allowing for the degradation of the ground water.

water model does not adequately account for this mobility. Under the 100x model, all hazardous substances are treated the same, even if some are more mobile than others. Consequently, for hazardous substances that are highly mobile (e.g., benzene, gasoline and chlorinated organics), the 100x model will predict a soil concentration that is too high and consequently not sufficiently protective of human health. Conversely, for hazardous substances that are less mobile (e.g., PCBs, metals and heavier petroleum products), the 100x model will predict a soil concentration that is too low.

Based on new scientific and technical information developed since the adoption of the 100x ground water methodology in 1991, Ecology developed two fate and transport models to account for the way hazardous substances behave when they are released to the soil. These models apply the same principle of equilibrium partitioning used for evaluating the leaching pathway in the ASTM Risk-Based Corrective Action protocol and the U.S. Environmental Protection Agency's Soil Screening Guidance. The three-phase model accounts for partitioning of hazardous substances between the water, air and solid phases of a soil. The four-phase model accounts for partitioning between these same phases, as well as a non-aqueous liquid phase, a phase that commonly occurs when organic chemicals such as petroleum products are released to soils. Both of these models were subject to rigorous review by the MTCA Science Advisory Board and it's Fate and Transport Subcommittee, which included members from the private consulting community and the University of Washington and Washington State University. Assumptions used in these models include extensive information extracted from the literature as well as information from contaminated sites in Washington State.

The proposed rule amendment is the least burdensome alternative that will achieve the general goals and specific objectives of MTCA. Neither the first or "no action" alternative nor the second alternative would effectively achieve the statutory goals and objectives. The third alternative is more burdensome than the proposed rule amendment.

The proposed rule amendment attempts to combine the goals advanced by the MTCA Policy Advisory Committee of creating a rule that achieves a level of simplicity combined with a level of human health and environmental protection consistent with advances in scientific information. This goal was accomplished by creating a system of constrained flexibility. The amendment, for example, does not mandate the use of any particular methodology. Instead, the amendment specifies the general criteria that must be met and the methodologies that may be used to determine if those criteria are met. Certain methods are tailored for particular types of hazardous substances or sites. Certain methods are more complex than others and certain methods require the use of site-specific data. The specific requirements for deriving a soil concentration under a particular method may also depend on the hazardous substance. The amendment also specifies the procedures and requirements for establishing soil concentrations that meet the criteria under each of the specified methodologies.

The impact of the proposed rule amendment on costs is discussed in the CBA. As discussed more thoroughly in that analysis, the impact depends on whether the soil cleanup level is established based on the leaching pathway and, if so, whether evaluation of the leaching pathway results in a less or more stringent soil cleanup level.

The proposed rule amendment has resulted in a different Method A soil cleanup level for many hazardous substances. Some of these hazardous substances have become more stringent and some have become less stringent. This proposed rule amendment may also result in different Method B or Method C soil cleanup levels. More stringent cleanup levels may increase the total cost of site remediation while less stringent cleanup levels may decrease the total cost of site remediation (avoided cost). Ultimately, and perhaps most significantly, the impact of the proposed rule amendment depends on the remedy selected.

The first or "no action" alternative would not effectively achieve the goals and objectives of MTCA. As discussed above, the proposed rule amendment is based on new scientific and technical information and is necessary to more effectively protect human health. This conclusion is also based on the determinations and recommendations of the MTCA Science Advisory Board.

For similar reasons, the second or AWB alternative would also not effectively achieve the goals and objectives of MTCA. Based on the availability of new scientific and technical information, use of the less accurate 100x model is no longer scientifically justifiable. To permit the use of the 100x model as an alternative to the more accurate fate and transport models would preclude the achievement of the statutory goals and objectives, particularly if use of 100x model should result in a less stringent soil concentration that is not sufficiently protective. This conclusion is also based on the determinations and recommendations of the MTCA Science Advisory Board.

With respect to the AWB draft in particular, the lack of appropriate constraints on the use of the various methods for establishing protective soil concentrations destroys the system of constrained flexibility discussed previously. Furthermore, the lack of appropriate direction or standardized procedures under each of the specified methods undermines the credibility of any determination that a soil concentration derived using those methods is protective of human health. The lack of such direction or standardized procedures also results in a more burdensome regulation because the regulation is more difficult to implement. In addition, by not even requiring an evaluation of the leaching pathway if the pathway is not yet "complete," the AWB draft ignores potential future impacts on ground water and potential future beneficial uses of that ground water, thereby allowing for the degradation of the ground water. Such degradation would not only pose a threat to human health, but would also unnecessarily restrict the potential future use of a finite and diminishing natural resource – potable ground water.

Although the third alternative would effectively achieve the goals and objective of MTCA, the alternative is more burdensome for potentially liable persons than the proposed rule amendment. The third alternative, which would specify the use of particular methodologies and default input parameters for the establishment of protective soil concentrations under standard Method B and C, provides less flexibility and less consideration of site-specific factors than under the proposed rule amendment. In some cases, the lack of such flexibility and consideration of site-specific factors could result in more stringent cleanup levels and consequently higher cleanup costs.

2.4 Soil Cleanup Levels – Consideration of the Dermal Pathway

To establish soil cleanup levels that are protective of human health, consideration of several different pathways of exposure is required, including the direct contact (dermal + ingestion) pathway of exposure.

2.4.1 Description of the Proposed Rule Amendment

The proposed rule amendment requires the evaluation of the dermal exposure pathway, concurrent with the ingestion exposure pathway, for certain hazardous substances and for other hazardous substances under certain conditions. Specifically, the dermal exposure pathway must be evaluated concurrently with the ingestion exposure pathway for all sites contaminated with petroleum mixtures. WAC 173-340-740(3)(b)(iii)(B)(III) and 173-340-745(5)(b)(iii)(B)(III). For all other contaminated sites, a concurrent exposure evaluation (dermal + ingestion) must be conducted only if the proposed changes to the default assumptions in the standard Method B or standard Method C equations "would result in a significantly higher soil cleanup level than would be calculated without the proposed changes." WAC 173-340-740(3)(c)(iii) and 173-340-745(5)(c)(iii).

If an evaluation of the dermal exposure pathway concurrent with the ingestion exposure pathway is required, the proposed rule amendment specifies the equations and default assumptions that must be used to conduct that evaluation. See Equations 740-3 through 740-5 and Equations 745-3 through 745-5. Modification of these default assumptions is allowed to derive modified Method B or C soil cleanup levels. See WAC 173-340-740(3)(c)(ii) and (iii)(C); 173-340-745(5)(c)(ii) and (iii)(C).

2.4.2 Description of the Alternatives

Three significant alternatives to the proposed rule amendment were considered during the rule-making process. These alternatives are described below.

Option 1 – "No Action" Alternative
The first or "no action" alternative is the current rule. Under the current rule, evaluation of the dermal exposure pathway is not specifically required to establish soil cleanup levels. However, Ecology may establish soil cleanup levels that are more stringent than those otherwise required, when, based on a site-specific evaluation, Ecology determines that such levels are necessary to protect human health or the environment. See WAC 173-340-740(2)(c), (3)(b), (4)(c); and 173-340-745(3)(c), (4)(b) in the current rule.

Option 2 – AWB Alternative
The second alternative considered is based on the draft submitted by the AWB. As under the proposed rule amendment, this alternative requires an evaluation of the dermal exposure pathway, concurrent with the ingestion exposure pathway, for certain hazardous substances (petroleum mixtures) and for other hazardous substances under certain standardized conditions.[5]

[5] While the AWB draft requires the risk from other potentially relevant pathways of exposure to be addressed if modifications to default assumptions result in significantly higher cleanup levels than would be calculated without those modifications, the AWB draft does not specify procedures for addressing the dermal pathway. Therefore, it is uncertain whether an evaluation of the dermal pathway would ever be required for substances other than petroleum

However, contrary to the proposed rule amendment, this alternative does not specify how an evaluation should be conducted (equations and default assumptions) when an evaluation is required for non-petroleum mixtures under modified Method B and C.

Option 3
The third alternative considered would change when the dermal exposure pathway, concurrent with the ingestion exposure pathway, must be evaluated. Specifically, under the third alternative, evaluation of the dermal exposure pathway, concurrent with the ingestion exposure pathway, would be required for all hazardous substances and under all conditions. In other words, whether an evaluation would be required would not be dependent on any site-specific factors.

2.4.3 Analysis

The proposed rule amendment is required to achieve the general goals and specific objectives of the statute, including the following:

- To protect human health (see RCW 70.105D.010 and .030); and
- To periodically update minimum cleanup standards for remedial actions based on new scientific information and changes to state and federal laws (see RCW 70.105D.030(2)(d) and WAC 173-340-702(3)).

The proposed rule amendment will more effectively achieve these objectives by requiring an evaluation of the dermal exposure pathway, concurrent with the ingestion exposure pathway, for certain hazardous substances (petroleum mixtures) and for other hazardous substances under certain standardized conditions and by specifying how (through standard equations and default assumptions) that evaluation should be conducted. The amendment is based on a review of new scientific and technical information. Review of this information demonstrates that soil cleanup levels established without evaluating the dermal pathway concurrent with the ingestion pathway may not be sufficiently protective of human health. The amendment was subject to rigorous review by the MTCA Science Advisory Board and is consistent with current trends across both state and federal agencies. The amendment is also consistent with the recommendations of the PAC regarding the evaluation of other potentially relevant pathways of exposure, including the dermal pathway, when modifications to default assumptions result in significantly higher soil cleanup levels than would be calculated without those modifications (see Final PAC Report, pp. 25-26 and C-10). Further explanation of the rule amendment is provided in the CES.

The proposed rule amendment is the least burdensome alternative that will achieve the general goals and specific objectives of MTCA. Neither the first or "no action" alternative nor the second or AWB alternative would effectively achieve the statutory goals and objectives. The third alternative is more burdensome than the proposed rule amendment.

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mixtures. For the purposes of this analysis, Ecology has assumed that such an evaluation would be required if the specified conditions were met.

The proposed rule amendment attempts to combine the goals advanced by the MTCA Policy Advisory Committee of creating a rule that achieves a level of simplicity combined with a level of human health and environmental protection consistent with advances in scientific information. This goal was accomplished by creating a system of constrained flexibility. Instead of requiring an evaluation of the dermal pathway (concurrent with the ingestion pathway) for every substance at every site, such an evaluation is required for only certain hazardous substances (petroleum mixtures) and for other hazardous substances under certain standardized conditions based on site-specific factors. The system of constrained flexibility is also reflected in the establishment of standardized equations and default factors for evaluating the dermal pathway. The standardized equations and default assumptions ensure protectiveness and provide consistency and ease of use. As the name implies, though, default assumptions may be modified based on site-specific or new scientific information, subject to certain quality of information and other requirements.

The impact of the proposed rule amendment on costs is discussed in the CBA. As discussed more thoroughly in that analysis, the impact depends on whether the dermal exposure pathway would be analyzed under the amendment and, if so, whether that analysis would result in a more stringent soil cleanup level than would otherwise have been established if that pathway had not been analyzed. The amendment does not result in any changes to the Method A soil cleanup levels. The amendment could result in changes to standard Method B or standard Method C soil cleanup levels for petroleum mixtures.

The first or "no action" alternative would not effectively achieve the goals and objective of MTCA. As discussed previously, the proposed rule amendments, including both the requirement of conducting an evaluation and the method for conducting that evaluation, are based on new scientific and technical information and are necessary to protect human health.

The second or AWB alternative would also not effectively achieve the goals and objective of MTCA. While the second alternative does require an evaluation of the dermal exposure pathway, concurrent with the ingestion exposure pathway, for petroleum mixtures and for non-petroleum mixtures under modified Method B and C (as under the proposed rule amendment), the alternative does not set forth the equations and default assumptions for conducting an evaluation under modified Method B and C for non-petroleum mixtures. As discussed previously, the equations and default assumptions for evaluating the dermal pathway are based on new scientific and technical information and are necessary to protect human health

Although the third alternative would effectively achieve the goals and objective of MTCA, the alternative is more burdensome for potentially liable persons than the proposed rule amendment. The third alternative, which would require an evaluation of the dermal exposure pathway for all hazardous substances at every site (irrespective of site-specific factors), is more burdensome than the proposed rule amendment because more sites would be required to conduct such an evaluation.

2.5 Soil Cleanup Levels – Consideration of the Vapor Pathway

To establish soil cleanup levels that are protective of human health, consideration of several different pathways of exposure is required, including the vapor pathway of exposure.

2.5.1 Description of the Proposed Rule Amendment

The following description of the proposed rule amendment includes a description of the current rule and a comparison of the proposed rule amendment with the current rule.

The current rule requires the evaluation of the vapor exposure pathway for protection of both ambient and indoor air under certain circumstances. WAC 173-340-740(3)(a)(iv) and (4)(b)(iv) and WAC 173-340-740(3)(b)(iv) and (4)(b)(iv).

The proposed rule amendments do not change how the pathway is evaluated; rather, the proposed amendments only change the circumstances for requiring an evaluation of the pathway. Furthermore, the proposed amendments do not mandate the use of any particular methodology for evaluating the pathway, if an evaluation is required.

The proposed rule amendments set forth the criteria for determining when to conduct an evaluation of the vapor exposure pathway. In general, the criteria identify those situations where the vapor pathway, rather than the direct contact or the leaching pathways, becomes the most significant exposure pathway (the exposure pathway of concern). The following discussion provides an overview of those criteria.

For standard Method B (soil cleanup levels for unrestricted land use) and for standard Method C (soil cleanup levels for industrial land use), the applicability of the vapor pathway evaluation is defined in WAC 173-340-740(3)(b)(iii)(C) and WAC 173-340-745(5)(b)(iii)(C) respectively. Specifically, the proposed rule amendments provide the following:

> The soil to vapor pathway shall be evaluated for volatile organic compounds whenever any of the following conditions exist:
>
> (I) For gasoline range organics, whenever the total petroleum hydrocarbon (TPH) concentration is significantly higher than a concentration derived for protection of ground water for drinking water beneficial use under WAC 173-340-747(6) using default assumptions;
> (II) For diesel range organics, whenever the total petroleum hydrocarbon (TPH) concentration is greater than 10,000 mg/kg;
> (III) For other volatile organic compounds, including petroleum components, whenever the concentration is significantly higher than a concentration derived for protection of ground water for drinking water beneficial use under WAC 173-340-747(4).

For modified Method B (soil cleanup levels for unrestricted land use) and for modified Method C (soil cleanup levels for industrial land use), the applicability of the vapor pathway evaluation is defined in WAC 173-340-740(3)(c)(iv)(A) and WAC 173-340-745(5)(c)(iv)(A) respectively. Specifically, the proposed rule amendments provide the following:

The soil to vapor pathway shall be evaluated for volatile organic compounds whenever any of the following conditions exist:

(I) For other than petroleum hydrocarbon mixtures, the proposed changes to the standard ... equations ... or default values would result in a significantly higher soil cleanup level than would be calculated without the proposed changes;

(II) For petroleum hydrocarbon mixtures, the proposed changes to the standard ... equations ... or default values would result in a significantly higher soil cleanup level than would be calculated without the proposed changes;

(III) For gasoline range organics, whenever the total petroleum hydrocarbon (TPH) concentration is significantly higher than a concentration derived for protection of ground water for drinking water beneficial use under WAC 173-340-747(6) using default assumptions;

(IV) For diesel range organics, whenever the total petroleum hydrocarbon (TPH) concentration is greater than 10,000 mg/kg;

(V) For other volatile organic compounds, including petroleum components, whenever the concentration is significantly higher than a concentration derived for protection of ground water for drinking water beneficial use under WAC 173-340-747(4).

The proposed rule amendments set forth the methods that may be used to evaluate the pathway in WAC 173-340-740(3)(c)(iv)(A) and 173-340-745(5)(c)(iv)(A). The amendments, however, do not mandate the use of any particular methodology.

2.5.2 Description of Alternatives

Three significant alternatives to the proposed rule amendment were considered during the rule-making process. These alternatives are described below.

Option 1 – "No Action" Alternative
The first or "no action" alternative is the current rule. See Section 2.5.1 for a description of the current rule and for a comparison with the proposed rule amendment.

Option 2 – AWB Alternative
The second alternative considered is based on the draft submitted by the AWB. As under the proposed rule amendment, this alternative requires an evaluation of the vapor exposure pathway for protection of ambient air under certain circumstances. However, contrary to the proposed rule amendment, this alternative does not specifically require an evaluation of the pathway for protection of indoor air. Also contrary to the proposed rule amendment, this alternative does not specify how an evaluation may be conducted when an evaluation is required.

Option 3
The third alternative considered would change when the vapor pathway would require specific evaluation. Under the third alternative, specific evaluation of the vapor pathway would always

be required for all hazardous substances and under all conditions. In other words, whether an evaluation would be required would not be dependent on any site-specific factors.

2.5.3 Analysis

The proposed rule amendment is required to achieve the general goals and specific objectives of the statute, including the following:

- To protect human health (see RCW 70.105D.010 and .030); and
- To periodically update minimum cleanup standards for remedial actions based on new scientific information and changes to state and federal laws (see RCW 70.105D.030(2)(d) and WAC 173-340-702(3)).

The proposed rule amendment will more effectively achieve these objectives by establishing standardized procedures and criteria for determining whether an evaluation of the vapor exposure pathway is required and by providing methods that may be used to conduct an evaluation if required. The amendment is based on a review of new scientific and technical information. Review of this information demonstrates that soil cleanup levels established without evaluating the vapor pathway may not be sufficiently protective of human health. The amendment was subject to rigorous review by the MTCA Science Advisory Board and is consistent with current trends across both state and federal agencies. The amendment is also consistent with the recommendations of the PAC regarding the evaluation of other potentially relevant pathways of exposure, including the vapor pathway, when modifications to default assumptions result in significantly higher soil cleanup levels than would be calculated without those modifications (see Final PAC Report, pp. 25-26 and C-10). Further explanation of the rule amendment is provided in the CES.

The proposed rule amendment is the least burdensome alternative that will achieve the general goals and specific objectives of MTCA. Neither the first or "no action" alternative nor the second or AWB alternative would effectively achieve the statutory goals and objectives. The third alternative is more burdensome than the proposed rule amendment.

The proposed rule amendment attempts to combine the goals advanced by the MTCA Policy Advisory Committee of creating a rule that achieves a level of simplicity combined with a level of human health and environmental protection consistent with advances in scientific information. This goal was accomplished by creating a system of constrained flexibility. Instead of requiring an evaluation of the vapor pathway for every substance at every site, standardized procedures and criteria were developed to determine based on site-specific factors whether such an evaluation is required. Furthermore, although the amendment sets forth methods that may be used to evaluate the pathway, the amendment does not mandate the use of any particular methodology.

The impact of the proposed rule amendment on costs is discussed in the CBA. As discussed more thoroughly in that analysis, the impact depends on whether the vapor exposure pathway would be analyzed under the amendment (but not under the current rule) and, if so, whether that analysis would result in a more stringent soil cleanup level than would otherwise have been

established if that pathway had not been analyzed. The proposed rule amendment does not result in any changes to the Method A soil cleanup levels. The proposed rule amendment could result in more stringent standard Method B or standard Method C soil cleanup levels.

The first or "no action" alternative would not effectively achieve the goals and objective of MTCA. As discussed previously, the proposed rule amendment is based on new scientific and technical information and is necessary to protect human health.

The second or AWB alternative would also not effectively achieve the goals and objective of MTCA. While the second alternative does require an evaluation of the vapor exposure pathway for protection of ambient air under certain circumstances (as under the proposed rule amendment), the alternative does not specifically require an evaluation of the pathway for protection of indoor air. The lack of such a requirement results in insufficient protection of human health. Also contrary to the proposed rule amendment, the alternative does not specify how an evaluation may be conducted when an evaluation is required. The lack of any methodology or guidance for conducting an evaluation not only results in less effective protection of human health, it also results in a more burdensome regulation because the regulation is more difficult to implement

Although the third alternative would effectively achieve the goals and objective of MTCA, the alternative is more burdensome for potentially liable persons than the proposed rule amendment. The third alternative, which would require an evaluation of the vapor exposure pathway for all hazardous substances at every site (irrespective of site-specific factors), is more burdensome than the proposed rule amendment because more sites would be required to conduct such an evaluation.

2.6 Soil Cleanup Levels – Consideration of Terrestrial Ecological Receptors

To establish soil cleanup levels that are protective of the environment, consideration of the impact of hazardous substances on terrestrial ecological receptors is required.

2.6.1 Description of the Proposed Rule Amendment

The following description of the proposed rule amendment includes a description of the current rule and a comparison of the proposed rule amendment with the current rule.

Under both the current and proposed rules, all cleanup actions must meet certain minimum requirements, including protection of human health and the environment. WAC 173-340-360(2). "Environment" is broadly defined in the rule to mean "any plant, animal, natural resource, surface water (including underlying sediments), ground water, drinking water supply, land surface (including tidelands and shorelands) or subsurface strata, or ambient air within the state of Washington or under jurisdiction of the state of Washington." WAC 173-340-200.

The current rule requires, as appropriate, an investigation of the current and potential threats to plants and animals that may be posed by hazardous substances. Specifically, the current rule requires as part of the remedial investigation and feasibility study, as appropriate, "sufficient

investigations to characterize the distribution of hazardous substances present at the site, and threat to human health **and the environment**," including, as applicable to the site:

> Information to determine the impact or potential impact of the hazardous substance from the facility on the natural resources and Ecology of the area such as: Sensitive environment, plant and animal species, and other environmental receptors.

WAC 173-340-350(6)(c) and (6)(c)(vi) (emphasis added). The current rule also requires, as appropriate, that the remedial investigation and feasibility study include:

> A risk assessment characterizing the current and potential threats to human health **and the environment** that may be posed by hazardous substances. This assessment may not be required when [Ecology] determines that proposed cleanup standards are obvious and undisputed and allow an adequate margin of safety for protection of human health **and the environment.**

WAC 173-340-350(6) and (6)(d) (emphasis added).

Under the current rule, Ecology may also establish cleanup levels more stringent than those otherwise required by the rule when, based on a site-specific evaluation, Ecology determines that such levels are necessary to protect human health and the environment. With respect to the terrestrial environment in particular, the current rule authorizes the following:

> [Ecology] may establish method B cleanup levels that are more stringent than those required under (a) of this subsection, when, based on a site-specific evaluation, [Ecology] determines that such levels are necessary to protect human health or environment, including the following:
>
> (i) Concentrations which eliminate or substantially reduce the potential for food chain contamination;
> (ii) Concentrations which eliminate or substantially reduce the potential for damage to soils or biota in the soils which could impair the use of soils for agricultural or silvicultural purposes;
> (iii) Concentrations which eliminate or substantially reduce the potential for adverse effects on vegetation or wildlife;
>
> ...

WAC 173-340-740(3)(b). The current rule provides Ecology the same authority to establish more stringent soil cleanup levels under Method C. WAC 173-340-740(4)(c).

However, the current rule does not indicate how this site-specific evaluation should be conducted.

In summary, under the current rule, terrestrial ecological impacts are evaluated on a case-by-case basis. The current rule does not specify criteria for ecological protectiveness, whether a

terrestrial ecological evaluation is required, or how a terrestrial ecological evaluation should be conducted.

The proposed rule amendments, in comparison, establish criteria for ecological protectiveness and define a tiered process for evaluating threats from soil contamination to terrestrial ecological receptors. The basic framework of the proposed rule amendment, including the tiered screening approach, is based on a PAC recommendation (see Final PAC Report, pp. 30-32). The requirements and procedures for determining whether a simplified or site-specific terrestrial ecological evaluation is required (i.e., whether an exclusion applies) and, where an evaluation is required, how a simplified or site-specific evaluation may be conducted are set forth in WAC 173-340-7490 through 173-340-7494. The amendment provides significant flexibility in determining the type of ecological evaluation that is required for a particular site. In particular, the amendment provides significant flexibility in how one may conduct a site-specific evaluation. The amendment does not require the use of any particular methodology for conducting a site-specific evaluation.

Based on a comparison of the current rule and the proposed rule amendments, Ecology has made the following determinations regarding the impact of the proposed rule amendments:

- Both the current rule and the proposed rule require all cleanup actions to protect human health and the environment. See WAC 173-340-360.
- Both the current rule and the proposed rule require, as appropriate, an investigation of the current and potential threats to terrestrial ecological receptors that may be posed by hazardous substances. See WAC 173-340-350.
- Under both the current rule and the proposed rule, Ecology may establish more stringent cleanup levels, including soil cleanup levels, to protect the environment. See WAC 173-340-720 through 173-340-750.
- The current rule does not provide clear direction as to when a terrestrial ecological evaluation is required or how an evaluation should be conducted. The proposed rule amendments specify those situations where a simplified or site-specific terrestrial ecological evaluation is not required (exclusions) and, where such an evaluation is required, how such an evaluation may be conducted. See WAC 173-340-350, 173-340-740 and 173-340-745 under both rules and WAC 173-340-7490 through 173-340-7494 under the proposed rule amendments.
- Neither the current rule nor the proposed rule requires the use of any particular methodology for conducting an evaluation.
- Under both the current rule and the proposed rule, a site-specific terrestrial ecological evaluation may not be required.
- Under both the current rule and the proposed rule, even if a site-specific terrestrial ecological evaluation is conducted, it may not result in lower soil cleanup levels or additional remedial actions.

2.6.2 Description of the Alternatives

Four significant alternatives to the proposed rule amendment were considered during the rule-making process. These alternatives are described below.

Option 1 – "No Action" Alternative
The first or "no action" alternative is the current rule. See Section 2.6.1 for a description of the current rule and for a comparison with the proposed rule amendment.

Option 2 – Ecologically Based Soil Cleanup Standards
The second alternative considered would require the establishment of ecologically based soil cleanup standards for each site. Consideration of this alternative was prompted by the legislature, which in ESHB 1810 required the MTCA Policy Advisory Committee (PAC) to review, provide advice, and develop recommendations on "[t]he need for adoption of and recommended levels for ecologically based cleanup standards." While the PAC considered this alternative as a stand-alone alternative, it was rejected in favor of the tiered screening approach adopted by the proposed rule amendment.

Option 3 – Site-Specific Terrestrial Ecological Evaluations
The third alternative considered would require the conduction of site-specific terrestrial ecological evaluations at every site. Under this alternative, Ecology would adopt consistent policies, including constraints, for how one could conduct a site-specific terrestrial ecological evaluation. While the PAC also briefly considered this alternative as a stand-alone alternative, it was also rejected in favor of the tiered screening approach adopted by the proposed rule amendment.

Option 4 – AWB Alternative
The fourth alternative considered is based on the draft rule submitted by the AWB. Under this alternative, a terrestrial ecological evaluation would not be required unless required by the department. If an evaluation were required or otherwise conducted, then an evaluation would be conducted using a tiered screening approach. Though similar to the one adopted by the proposed rule amendment, this approach contains significant differences, including the lack of ecologically based screening levels or methods to establish protective soil concentrations.

2.6.3 Analysis

The proposed rule amendment is required to achieve the general goals and specific objectives of the statute, including the following:

- To protect the environment (see RCW 70.105D.010 and .030);
- To periodically update minimum cleanup standards for remedial actions based on new scientific information and changes to state and federal laws (RCW 70.105D.030(2)(d) and WAC 173-340-702(3));
- To require potentially liable persons to conduct remedial actions (including investigations) to remedy releases or threatened releases of hazardous substances (see RCW 70.105D.030(1)(b));
- To give preference to permanent solutions to the maximum extent practicable (see RCW 70.105D.030(1)(b));
- To require adequate monitoring to ensure the effectiveness of the remedial action (see RCW 70.105D.030(1)(b)); and

- To enforce the application of permanent and effective institutional controls that are necessary for a remedial action to be protective of human health and the environment (see RCW 70.105D.030(1)(g)).

The proposed rule amendment will achieve these objectives by defining a tiered process for evaluating potential threats posed by soil contaminants to terrestrial ecological receptors and by establishing criteria for ecological protectiveness. The basic framework for the amendment, including the tiered screening approach, is based on a PAC recommendation and was determined by the PAC as necessary to more effectively achieve the goals and objectives of MTCA (see Final PAC Report, pp. 30-32).

The proposed rule amendment is the least burdensome alternative that will achieve the general goals and specific objectives of MTCA. The first or "no action" alternative would not effectively achieve the statutory goals and objectives. Both the second and third alternatives are more burdensome than the proposed rule amendment. The fourth or AWB alternative would not achieve, or as effectively achieve, the statutory goals and objectives. The fourth alternative is also, in certain respects, more burdensome than the proposed rule amendment.

The impact of the proposed rule amendment on costs is discussed in the CBA. As discussed more thoroughly in that analysis, the impact depends on several factors, including the following:

- First, whether a terrestrial ecological evaluation would be required under the proposed rule, but not under the current rule;
- Second, whether the site would qualify for an exclusion from conducting a simplified or site-specific terrestrial ecological evaluation under the proposed rule;
- Third, the type of terrestrial ecological evaluation conducted under the proposed rule;
- Fourth, whether the terrestrial ecological evaluation conducted under the proposed rule would result in lower soil cleanup levels or additional remedial actions;

Based on that analysis, Ecology concluded that only if a simplified or site-specific terrestrial ecological evaluation were required under the proposed rule, but not under the current rule, and that evaluation resulted in additional remedial actions would the proposed rule result in additional cleanup costs. Considering the factors discussed above, Ecology does not expect that the proposed rule amendments will result in lower soil cleanup levels or additional cleanup actions being required at most sites. Consequently, Ecology does not expect that the proposed rule will result in additional cleanup costs at most sites. However, Ecology does expect that for a few sites, additional evaluation costs may be incurred as a consequence of conducting more involved terrestrial ecological evaluations than would have been conducted under the current rule. Most of these evaluations are expected to be simplified evaluations as opposed to site-specific evaluations. Ecology also expects that for a few sites, additional cleanup costs may be incurred as a consequence of the proposed rule. Those costs that are incurred are not expected to be significant.

As also discussed more thoroughly in the CBA, the proposed rule amendment is expected to reduce the regulatory burden and costs of conducting a terrestrial ecological evaluation at many sites. Examples of measures that may reduce the regulatory burden are listed in the CBA.

The first or "no action" alternative would not effectively achieve the goals and objectives of MTCA. While the current rule requires all cleanup actions to protect human health and the environment and requires, as appropriate, an investigation of the current and potential threats to terrestrial ecological receptors, the current rule does not provide either a standardized framework for conducting a terrestrial ecological evaluation or criteria for ecological protectiveness. As noted previously, the basic framework for the amendment, including the tiered screening approach, is based on a PAC recommendation and was determined by the PAC as necessary to more effectively achieve the goals and objectives of MTCA (see Final PAC Report, pp. 30-32).

Although the second alternative (ecologically based cleanup standards) would effectively achieve the goals and objectives of MTCA, the alternative is more burdensome for potentially liable persons than the proposed rule amendment. The second alternative is more burdensome than the proposed rule amendment based on several interrelated factors. First, the alternative provides less flexibility in conducting terrestrial ecological evaluations. Second, the alternative provides less consideration of site-specific factors. Third, the alternative does not provide a tiered screening process that includes "off-ramps." In addition, the PAC considered this alternative (at the request of the legislature) and rejected it in favor of the framework which established the basis for the proposed rule amendment.

Although the third alternative (site-specific terrestrial ecological evaluations) would also effectively achieve the goals and objectives of MTCA, the alternative is also more burdensome for potentially liable persons than the proposed rule amendment. The third alternative is more burdensome than the proposed rule amendment because the alternative does not provide a tiered screening process. A tiered screening process that allows for "off-ramps" based on exclusions and simplified evaluations avoids the need for conducting more burdensome site-specific evaluations.

The fourth or AWB alternative would not effectively achieve the goals and objectives of MTCA. While the fourth alternative establishes a tiered screening approach for conducting a terrestrial ecological evaluation, the alternative does not require an evaluation unless required by the department. Lacking a standardized framework for conducting a terrestrial ecological evaluation at every site, this alternative does not effectively ensure the protection of the environment. This same inadequacy prompted the PAC to recommend the framework adopted as part of the proposed rule. Even if an evaluation were required or otherwise conducted under this alternative, the alternative may not effectively ensure the protection of the environment at every site. While the tiered approach adopted as part of this alternative is similar to the one adopted by the proposed rule amendment, this approach contains significant differences. Many of these differences, including the lack of ecologically based screening levels or standardized methods to establish protective soil concentrations, result in a regulation that may not effectively ensure the protection of terrestrial ecological receptors at every site. In particular, the lack of appropriate constraints on the use of the various methods for establishing protective soil concentrations destroys the system of constrained flexibility discussed previously. Furthermore, the lack of appropriate direction or standardized procedures under each of the specified methods undermines the credibility of any determination that a soil concentration derived using those methods is protective of terrestrial ecological receptors. Furthermore, the lack of appropriate standards and

guidance, including the lack of screening levels and methods to establish protective concentrations, results in a more burdensome regulation because the regulation is more difficult to implement.

2.7 Financial Assurances

2.7.1 Description of the Proposed Rule Amendment

The following description of the proposed rule amendment includes a description of the current rule and a comparison of the proposed rule amendment with the current rule.

Under the current rule, Ecology may require the potentially liable person to provide financial assurances under certain circumstances and using specified or approved mechanisms. See WAC 173-340-440(7) under the current rule.

The proposed rule amendments on financial assurances revise the current rule in the following ways:

- First, the proposed rule changes Ecology's authority and duty to require the potentially liable person to provide financial assurances. Specifically, the amendment provides that "Ecology shall, as appropriate, require financial assurance mechanisms at sites where the cleanup action selected includes engineered and/or institutional controls." WAC 173-340-440(11). Based on this amendment, Ecology expects that financial assurances will be required in practice under the proposed rule where they may not have been required under the current rule.

- Second, the proposed rule provides potentially liable persons increased flexibility in the selection of financial assurance mechanisms that meet the requirements of the rule. See WAC 173-340-440(11)(a).

- Third, the proposed rule provides a specific exemption for financial hardship. See WAC 173-340-440(11)(b).

- Fourth, the proposed rule provides a specific exemption for potentially liable persons that can demonstrate that sufficient financial resources are available and in place to provide for the long-term effectiveness of engineered and institutional controls adopted. See WAC 173-340-440(11).

The proposed rule amendment is based on a PAC recommendation (see Final PAC Report, pp. 32-34).

2.7.2 Description of the Alternatives

Three significant alternatives to the proposed rule amendment were considered during the rule-making process. These alternatives are described below.

Option 1 – "No Action" Alternative
The first or "no action" alternative is the current rule. See Section 2.7.1 for a description of the current rule that also includes a comparison with the proposed rule amendment.

Option 2 – AWB Alternative
The second alternative considered is based on the draft submitted by the AWB. As under the proposed rule amendment, the second alternative attempts to change Ecology's authority and duty to require a potentially liable person to provide financial assurances. However, the affect of the change is more uncertain. Further, unlike the proposed rule amendment, the second alternative provides neither a specific exemption for financial hardship nor an increased flexibility in the selection of financial assurance mechanisms.

Option 3
The third alternative considered affects whether financial assurances would be required, whether exemptions would be allowed, and what mechanisms could be used to meet the requirement. Specifically, under the third alternative, Ecology would have no discretion in whether financial assurances would be required. Financial assurances would simply be required whenever the cleanup action included engineered and/or institutional controls. Variations of this alternative include the lack of an exemption for financial hardship and reduced flexibility in the selection of financial assurance mechanisms.

2.7.3 Analysis

The proposed rule amendment is required to achieve the general goals and specific objectives of the statute, including the following:

- To protect human health and the environment (see RCW 70.105D.010 and .030);
- To require potentially liable persons to conduct remedial actions (including investigations) to remedy releases or threatened releases of hazardous substances (see RCW 70.105D.030(1)(b));
- To give preference to permanent solutions to the maximum extent practicable (see RCW 70.105D.030(1)(b));
- To require adequate monitoring to ensure the effectiveness of the remedial action (see RCW 70.105D.030(1)(b)); and
- To enforce the application of permanent and effective institutional controls that are necessary for a remedial action to be protective of human health and the environment (see RCW 70.105D.030(1)(g)).

The proposed rule amendment will achieve these objectives by requiring, as appropriate, "financial assurance mechanism at sites where the cleanup action selected includes engineered and/or institutional controls." See WAC 173-340-440(11). The amendment is based on a PAC recommendation and was determined by the PAC as necessary to more effectively achieve the goals and objectives of MTCA (see Final PAC Report, pp. 32-34).

Financial assurances are safeguards (an "insurance" policy) to ensure the long-term protectiveness of a less permanent cleanup action that includes engineered and/or institutional controls. Financial assurances may be required to cover one or more of the following: operation and maintenance, compliance monitoring, and corrective measures. A more detailed description of what financial assurances might be required to cover is presented in the CBA

Financial assurances also ensure that the potentially liable persons, not the taxpayers, are required to pay for the cleanup, as directed by the Model Toxics Control Act. Ensuring that the potentially liable persons, not the taxpayers, are required to pay for the cleanup is an issue of fairness and equity. Without such financial assurances, taxpayers may be required to pay for the long-term operation and maintenance of a less than permanent cleanup. Without such financial assurances, taxpayers would be subsidizing the selection and implementation of less permanent cleanups.

The proposed rule amendment is the least burdensome alternative that will achieve the general goals and specific objectives of MTCA. The first or "no action" alternative would not effectively achieve the statutory goals and objectives. The second alternative would also not effectively achieve the statutory goals and objectives. The second alternative is also more burdensome in certain respects than the proposed rule amendment. The third alternative is more burdensome than the proposed rule amendment.

The proposed rule amendment is not expected to impact most sites. The impact depends on several factors. Most notably, the impact depends on whether, and to what extent, financial assurances will be required in practice under the proposed rule where they may not have been required under the current rule. Even if financial assurances will be required in practice under the proposed rule where they may not have been required under the current rule, other factors may mitigate the impact on costs. First, the proposed rule amendment provides potentially liable persons increased flexibility in the selection of financial assurance mechanisms that meet the requirements of the rule. See WAC 173-340-440(11)(a). Second, the proposed rule provides a specific exemption for financial hardship. See WAC 173-340-440(11)(b). Third, the proposed rule provides a specific exemption for potentially liable persons that can demonstrate that sufficient financial resources are available and in place to provide for the long-term effectiveness of engineered and institutional controls adopted. See WAC 173-340-440(11). The CBA provides a more extensive discussion of the potential adverse impact of the amendment on potentially liable persons.

The first or "no action" alternative would not effectively achieve the goals and objectives of MTCA. As discussed previously, amendment of the current rule is required to enforce the application of permanent and effective engineered and/or institutional controls that are necessary for a remedial action to be protective of human health and the environment. As noted previously, the proposed rule amendment is based on a PAC recommendation (see Final PAC Report, pp. 32-34).

The second or AWB alternative would also not effectively achieve the goals and objectives of MTCA because the alternative would not effectively enforce the application of permanent and effective engineered and/or institutional controls that are necessary for a remedial action to be

protective of human health and the environment. In other words, the language proposed by the AWB might not require financial assurances in circumstances required under the proposed rule amendment for the remedial action to be protective. The AWB alternative is also a more burdensome regulation than the proposed rule amendment in certain respects. Specifically, the alternative does not include the flexibility allowed by the proposed rule amendment in the selection of financial assurance mechanisms. The alternative also does not provide exemptions for potentially liable persons that can demonstrate financial hardship.

Although the third alternative would effectively achieve the goals and objective of MTCA, the alternative is more burdensome for potentially liable persons than the proposed rule amendment. The third alternative is more burdensome than the proposed rule amendment based on several factors. First, the alternative would require financial assurances more often because they would be required whenever engineered and/or institutional controls were used as part of a cleanup action. Ecology would retain no discretion. Second, the alternative would not include the flexibility allowed by the proposed rule amendment in the selection of financial assurance mechanisms. Third, the alternative would not provide exemptions for potentially liable persons that can demonstrate financial hardship or that sufficient financial resources are available and in place to provide for the long-term effectiveness of engineered and institutional controls adopted.

2.8 Citizen Technical Advisor

2.8.1 Description of the Proposed Rule Amendment

The proposed rule amendment includes a funding mechanism for the addition of a citizen technical advisor position at the Department of Ecology. WAC 173-340-550. This amendment is based on a PAC recommendation (see Final PAC Report, pp. 47-48). The citizen technical advisor will increase the resources available to citizens, enabling citizens to more effectively participate in the cleanup process. The proposed rule amendment includes the cost of the citizen technical advisor as an overhead program support cost. As a type of remedial action cost, program support costs are recoverable from a potentially liable person.

2.8.2 Description of the Alternatives

Three significant alternatives to the proposed rule amendment were considered during the rule-making process. These alternatives are described below.

Option 1 – "No Action" Alternative
The first or "no action" alternative is the current rule. The current rule does not provide for a citizen technical advisor.

Option 2
The second alternative considered would provide for a citizen technical advisor, but unlike the proposed rule amendment, the cost of the citizen technical advisor would not be recoverable from a potentially liable person. Instead, Ecology would cover the entire cost of the citizen technical advisor.

Option 3 – AWB Alternative & 1999 Proposal
The third alternative considered would also provide for a citizen technical advisor, but unlike the proposed rule amendment, the cost of the citizen technical advisor would be recoverable as a direct staff cost rather than as an overhead program support cost. This alternative is based on the draft submitted by the AWB and was proposed as part of the 1999 proposed rule amendments.

2.8.3 Analysis

The proposed rule amendment is required to achieve the general goals and specific objectives of the statute, including the following:

- To protect human health and the environment (See RCW 70.105D.010 and .030);
- To provide for public participation (See RCW 70.105D.030(2)(a)); and
- To recover remedial action costs from potentially liable persons (See RCW 70.105D.050(3)).

To provide for more meaningful public participation and to more effectively protect human health and the environment, Ecology has established the citizen technical advisor. The proposed rule amendment is based on a PAC recommendation and was determined by the PAC as necessary to more effectively achieve the goals and objectives of MTCA (Final PAC Report, pp. 47-48). The citizen technical advisor will help citizens participate more effectively in the cleanup process by enhancing their understanding of the Model Toxics Control Act and the implementing regulations, as well as site investigations and feasibility studies. The citizen technical advisor is intended to augment, not replace, resources available to citizens now provided by Ecology site staff. Effective citizen participation contributes to efficient and protective cleanups by helping decision-makers develop remedies that consider community values. Effective citizen participation also enhances the protectiveness of a remedy by increasing the knowledge and understanding of citizens of the cleanup and the risks associated with any residual contamination.

The cost of a citizen technical advisor is a cost recoverable from a potentially liable person under the Model Toxics Control Act as a remedial action cost. MTCA requires that the state seek to recover the amounts spent by the department for investigative and remedial actions. MTCA defines "remedial action" to include "any action or expenditure consistent with the purposes of this chapter to identify, eliminate, or minimize any threat or potential threat posed by hazardous substances to human health or the environment." RCW 70.105D.020(20). The MTCA Cleanup Regulation defines remedial action costs as "costs reasonably attributable to the site and may include costs of direct activities, support costs of direct activities, and interest charges for delayed payments." WAC 173-340-550(2).

The proposed rule amendment is the least burdensome alternative that will achieve the general goals and specific objectives of MTCA. Neither the first nor the second alternative would effectively achieve the statutory goals and objectives. The third alternative is more burdensome than the proposed rule amendment.

The impact of the proposed rule amendment on costs is based on whether additional program support costs, including those attributable to the citizen technical advisor, can be recovered under

the MTCA Cleanup Regulation. As discussed more thoroughly in the CBA, because the MTCA Cleanup Regulation places a limit on the amount of program support costs that are recoverable and because those costs currently exceed that limit, additional program support costs cannot be recovered. Consequently, the proposed rule amendment, which makes the costs of a citizen technical advisor recoverable as a program support cost, is not expected to result in any additional costs for potentially liable persons.

The first or "no action" alternative would not sufficiently provide for meaningful public participation or, consequently, sufficiently protect human health and the environment. The proposed rule amendment is based on a PAC recommendation and was determined by the PAC as necessary to more effectively achieve the goals and objectives of MTCA (Final PAC Report, pp. 47-48). The need for a citizen technical advisor to provide meaningful public participation is further supported by program experience.

Although the second alternative provides for a citizen technical advisor, the alternative would not allow for the recovery of the cost of the citizen technical advisor as a remedial action cost. Consequently, this alternative would not achieve the third statutory objective, recovery of remedial action costs from potentially liable persons.

Although the third or AWB alternative provides for a citizen technical advisor and for the recovery of costs from a potentially liable person as remedial action costs, the alternative is more burdensome for potentially liable persons than the proposed rule amendment. The third alternative is more burdensome than the proposed rule amendment because the additional cost of the citizen technical advisor would be recoverable as direct staff cost instead of as program support cost. As discussed previously in relation to the proposed rule amendment and also more thoroughly in the CBA, because of the regulatory limits placed on amount of program support costs recoverable from potentially liable persons, additional program support costs, including those attributable to the citizen technical advisor, could not be recovered. Additional direct staff costs, however, including those attributable to the citizen technical advisor, could be recovered from potentially liable persons. Consequently, whereas the additional cost of a citizen technical advisor would not be recoverable as a program support cost under the proposed rule amendment, that additional cost would be recoverable as a direct staff cost under the third alternative.

Chapter 3 Consideration of Alternative Draft Rule

Ecology conducted a comprehensive review of the alternative draft of the MTCA Cleanup Regulation submitted by the Association of Washington Business (AWB).[6] As part of that review, Ecology considered whether the amendments, taken as a whole or separately, would effectively achieve the general goals and specific objectives of the Model Toxics Control Act and, if so, whether they were the least burdensome alternatives. Consideration of individual amendments suggested by the AWB as alternatives to the proposed rule amendments is discussed in Chapter 2. As a stand-alone alternative, the AWB draft does not meet the general goals and specific objectives of MTCA because several of the suggested amendments, either standing alone or together, do not meet the statutory goals and objectives. Certain suggested amendments may even result in a more burdensome regulation. Other suggested amendments are beyond the scope of this rule-making action and even include the elimination of existing regulatory requirements or authority. In making these determinations, Ecology considered whether the suggested amendments were consistent with the following:

- The goals and objectives of MTCA;
- The recommendations of the MTCA Policy Advisory Committee (PAC);
- The recommendations of the MTCA Science Advisory Board (SAB);
- The recommendations of the TPH Project Oversight Group (POG);
- Applicable state and federal laws; and
- New scientific information.

Significantly, however, several of the individual amendments suggested by the AWB have been incorporated, as appropriate, into the proposed rule amendments.

[6] The Association of Washington Business (AWB) submitted to Ecology various draft versions of its suggested amendments to the MTCA Cleanup Regulation. The AWB first submitted a draft in 1998. Most recently, the AWB submitted a revised draft as part of its comments on the proposed rule in October 2000.